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NBT AS

Zophia Wind Farm

Environmental and Social Impact Assessment - Non-Technical Summary

14 April 2021

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Amendment Record

Revision Number	Date	Summary of Amendments	Purpose of Revision
A1	21/11/2020	n/a	First draft
A2	22/11/2020	Minor amendments following review	Internal authorisation
B1	26/11/2020	Minor amendments following authorisation	Client issue
B2	11/12/2020	Minor amendments following client review	Client issue
B3	16/03/2021	Amendments following layout update	Client issue
B4	14/04/2021	Minor amendments following client review	Client issue

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Glossary

Abbreviation or Term	Definition
CRM	Collision Risk Model
EHS	Environment, Health and Safety
EIA	Environment Impact Assessment
EPC	Engineering, Procurement and Construction
EPs	Equator Principles
ESAP	Environmental and Social Action Plan
ERP	Emergency Response Plan
ESMP	Environmental and Social Management Plan
ESIA	Environmental and Social Impact Assessment
GIS	Geographical Information Systems
Ha	Hectare. Equivalent to an area of 10,000m^2
HGV	Heavy Goods Vehicle
IBA	Important Bird Area
IFC	International Finance Corporation
IUCN	International Union for the Conservation of Nature
LCT	Landscape Character Types
LVIA	Landscape and Visual Impact Assessment
NES	National Environmental Strategy
RDB	Red Data Book. - The IUCN Red List of Threatened Species is a comprehensive, global approach for evaluating the conservation status of plant and animal species
SEP	Stakeholder Engagement Plan
VP	Vantage Point when used in the context of ornithological surveys to describe a specific location chosen to undertake bird surveys Viewpoint when used to describe specific locations used to assess visual impacts
WMP	Waste Management Plan

Abbreviation or Term	Definition
WTG	Wind Turbine Generator
ZTV	Zone of Theoretical Visibility

1 Introduction

1.1 This Document

This document presents a Non-Technical Summary (NTS) of the Environmental and Social Impact Assessment (ESIA) that has been prepared on behalf of NBT for Zophia Wind Farm (the Project). The location of the Project site is illustrated in Figure 1-1.

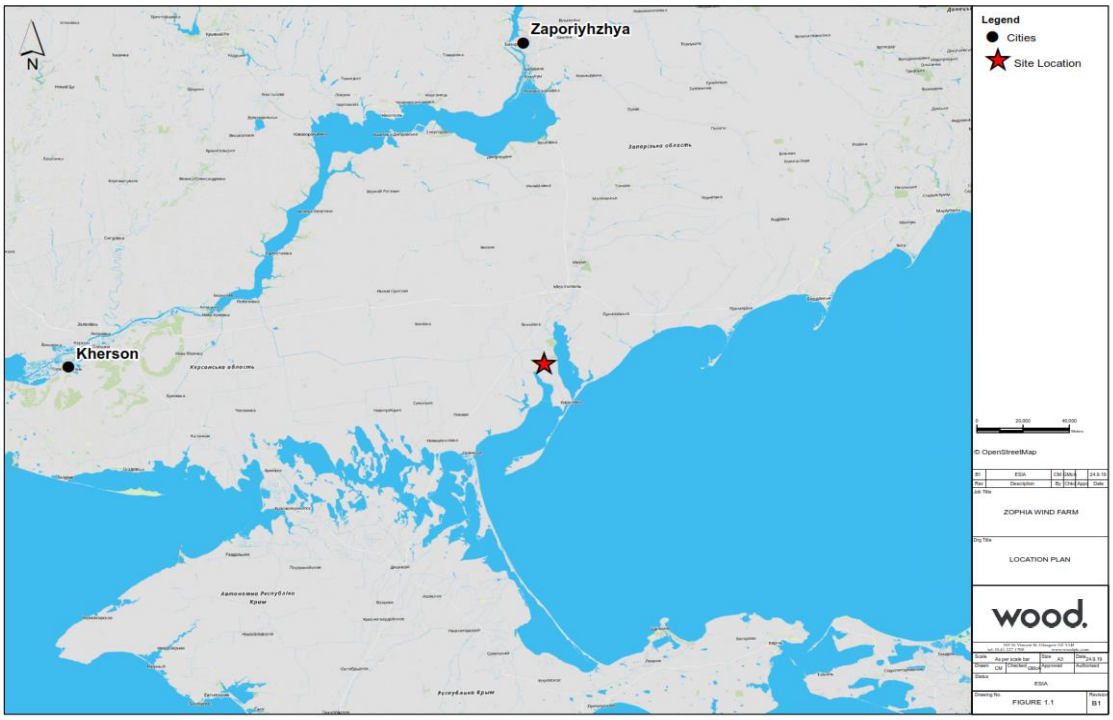

Figure 1-1: Site Location

The ESIA presents information on the identification and assessment of the likely significant environmental and social effects of the Project and its associated infrastructure.

1.2 Background to the Project

A wind farm consisting of up to 179 wind turbine generators (WTGs), each with an individual capacity of up to 4.5 MW, is proposed to be constructed on land within the Yakymovskij district in the Zaporizhya region of Ukraine. The installed electrical capacity will be a total of 792.5 MW, to be developed in three phases. The ESIA focuses on the Project area including the wind farm and associated facilities and extends out to an area identified as potentially being impacted directly or indirectly by the Project (also known as the Project's area of influence).

The ESIA considers a worst-case scenario in terms of environmental and social impact (maximum WTG numbers, elevations and noise levels).

It is expected that construction will commence in Q2 2021 and will span over a 30-month period. Once operational, the Project will supply power to the National Energy Company 'Ukrenergo' State Enterprise grid system with the option for distribution both locally and nationally.

The ESIA and this NTS will be disclosed to project stakeholders and the public, in compliance with Lender guidelines, as best practise. All stakeholder and public comments received to date were considered.

1.3 Need for the Project

Renewable energy development in Ukraine is important to provide alternative energy solutions to decrease reliance on fossil fuels and imported energy. The Ukrainian government has developed an Energy Strategy to 2035 setting the target to increase the share of renewables to 20.4 % by 2035[1].

To stimulate renewable energy development in Ukraine a feed in tariff was introduced in 2009 and established until 1 January 2030. The National Energy and Utilities Regulatory Commission of Ukraine (the regulatory authority) established a single tariff for all onshore wind energy generation.

1.4 Scope and Content of the Environmental Statement

In order to successfully develop this Project, the following requirements must be met:

- The Project would meet Ukrainian national requirements and international lending standards.
- The Project would include all necessary mitigation measures to minimise any significant adverse change in environmental, health and safety, and socioeconomic conditions.

[1] Yang, M., Cela, B. & Yang, F. Innovative energy policy to transform energy systems in Ukraine. *Mitig Adapt Strateg Glob Change* **25,** 857–879 (2020). https://doi.org/10.1007/s11027-019-09898-x

- Appropriate public consultation and disclosure are undertaken in line with Equator Principles and International Finance Corporation (IFC) Performance Standards (PS) ensuring all reasonable public opinions are adequately considered prior to a commitment for financing.

To ensure compliance with international lending requirements, the overall scope of this assessment includes:

- Identification of key issues.
- Definition of baseline conditions of key environmental and social resources.
- Assessment of positive and negative impacts of the Project.
- Consultation with people who may be affected by the Project and other stakeholders.
- Development of design and operating practices that are sufficient to avoid, reduce, or compensate for significant adverse environmental and social impacts.
- Development of such monitoring programs as are necessary to verify mitigation is effective in accomplishing its goals, and to develop and refine the effectiveness of mitigation measures.

1.5 Best Practice

The overall approach for the ESIA and reporting has been based on IFC Performance Standards. The following sources of guidance were utilised together with additional sources as referenced throughout the text:

- IFC Guidelines, including Environmental, Health and Safety (EHS) *Guidelines for Wind Energy* (IFC, 2015), *General EHS Guidelines* (IFC, 2007), *EHS Guidance for Roads* (IFC, 2006), and *Operational Policy 4.01*.
- European Union Council Directive 85/337/EEC *on the assessment of the effects of certain public and private projects on the environment*, as amended by Council Directive 97/11/EC, Directive 2003/35/EC, Directive 2009/31/EC (Council of the European Union, 1985; 1997, 2003, 2009).

Each of the stages listed in the section above has been completed during the EIA process and summarised in this NTS following the best practice guidelines as closely as possible.

2 Project Description

This is a description of the key project elements; a fuller Project description is provided in the ESIA document.

2.1 Site Description

The proposed site is located within the Yakymivskyi district in the Zaporizhia region (oblast) of southern Ukraine (Figure 1-1). The site is located near to the north-western shore of the Azov Sea, approximately 12km south of the town of Melitopol, and consists of plots leased from Kyrylivka and Yakymivka councils. The site footprint comprises access roads, crane hardstandings, WTG bases, OHL route, construction compounds and substation areas.

The topography of the site is generally flat and consists of areas of cultivated land. There are some localised areas of wetland, dominated by reeds. Infrastructure currently located on the site includes large irrigation drains and farm access roads.

The site is surrounded by the villages of Novodanylivka. Okhrimivka, Volodymyrivka, Yakymivka, Radyvonivka and other small villages adjacent to the project area.

2.2 Site Layout

The layout has been selected with the aim of minimising conflicts with existing roads, residential areas and on-site constraints. WTGs have been removed from activity corridors for bird and bats in order to ensure a reduction of impacts.

An initial draft ESIA considered a maximum of 220 WTGs however following analysis and review of predicted noise and shadow flicker impacts the WTG numbers have been reduced to 179, removing WTGs in closest proximity to settlement and ensuring IFC guidelines are met in relation to siting of WTGs in proximity to settlement. The 179 WTGs are therefore considered as a "worst case" scenario. All WTGs are located over 800 m from closest residential areas to reduce noise, shadow flicker, visual and ensure community health and safety guidelines are met. The maximum capacity of the Project is expected to be 792.5 MW.

The indicative WTG layout is shown in Figure 2-1

Figure 2-1: Proposed WTG Layout

2.3 Summary of Key Components

The proposal is for the construction, operation, and decommissioning of a wind farm comprising the following components:

- Access roads from paved highway to the Project site.
- Grid connection and substations.
- On-site access roads from the control centre to the WTGs and underground cables to carry electricity from the WTGs to the control centre substations.
- Construction compound.
- Control room.
- 179 WTGs.

2.4 Other Wind Farm Developments in the Area

A review of wind farms within a 60 km radius of the Project site has been undertaken. Those identified are listed in Table 2-1

Table 2-1: Wind Farms within 60 km of the Project

No.	Wind Farm	Location	Distance from Project	Capacity (MW)	Turbine model	Project stage
1	Zaporizha Wind Park	Melitopol & Priazovsk Districts	Approx. 9 km from nearest WTG across estuary	Up to 500 MW	GE - 3.6 MW	Construction / Commissioning
2	Prymorska Wind Farm	Botiyeve	Approx. 35 km to NE of Project	Up to 200 MW	GE 3.8 MW	Operational since October 2019
3	Orlivska Wind Farm	Orlivska settlement council, Prymorskyi district	Approx. 45 km to the NE	100 MW	Vestas 3.8MW	Operational since November 2019
4	Botievska WPP	Between Botiyeve and Primorskiy Posad villages	Approx. 40 km to the NE of the Project.	200 MW	Vestas V112-3	Operational

2.5 Protected Sites

Four Important Bird Areas (IBAs) are located within 30 km of the proposed wind farm (see Figure 2-2 and Figure 2-3) and all four support large numbers of wetland birds during winter, passage and breeding seasons :

- Molochnyj Liman - approximately 1500 m east of Project site.
- Utlyuk lyman - approximately 600m south-south-west of Project site.
- Molochna River Valley - approximately 6.5 km north-east of site
- Agricultural lands near Bilorets'ke (Chornozemne village) - approximately 19 km north-west of site.

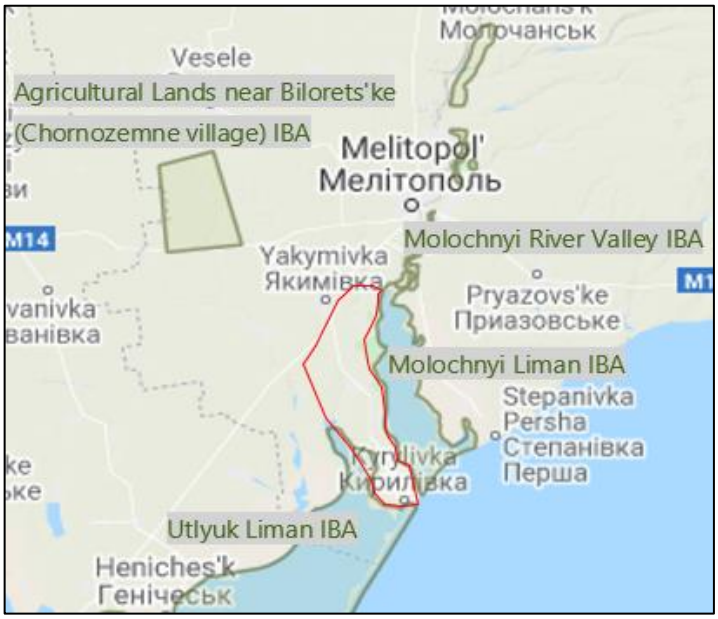

Figure 2-2 IBA Locations and approximate site boundaries

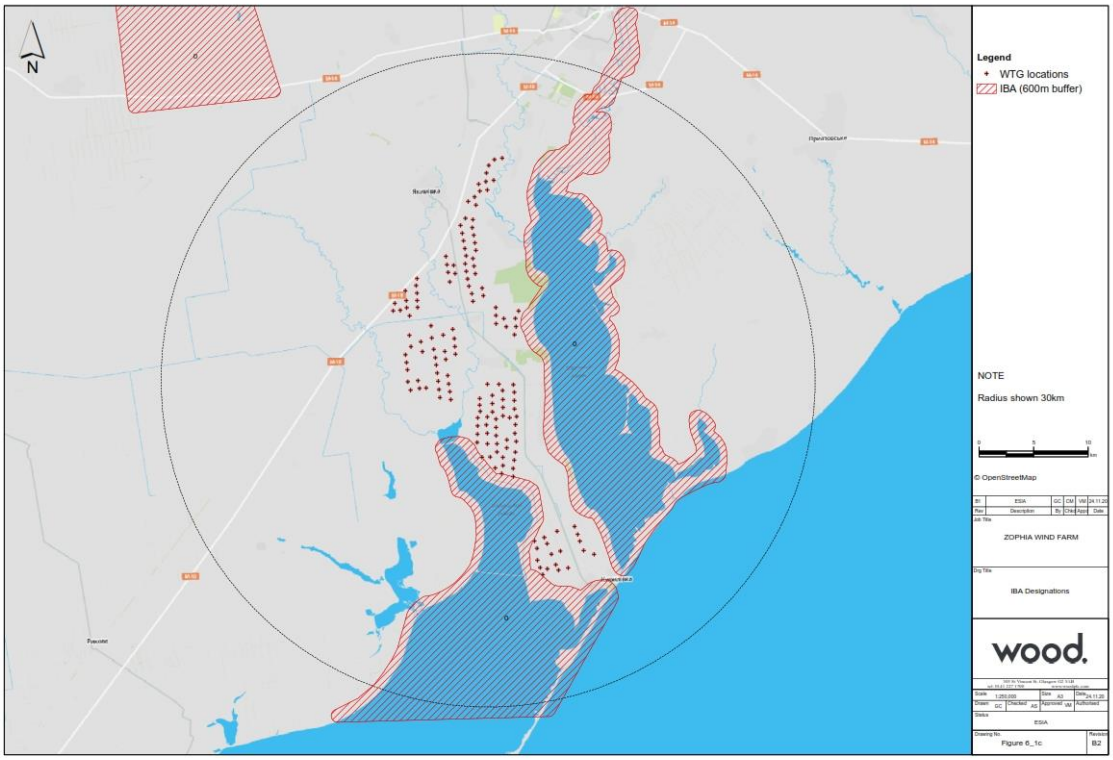

Figure 2-3: Buffer zone of protected Sites within 30 km of the Project

3 Assessment Methodology

The impact assessment considered the condition of the existing environment (the baseline conditions), the impact of the environment that would occur from the construction and operation of the wind farm, how these impacts could be reduced (or mitigated) and the residual impact after the mitigations have been implemented.

3.1 Environmental Monitoring

Where there is uncertainty over the potential significance of an impact, mitigation may include monitoring of that impact to determine whether additional measures are required. It is recommended that Project monitoring be described in a corresponding Environmental and Social Management Plan (ESMP), a framework ESMP accompanies the ESIA.

3.2 Scope of ESIA

It is proposed that air quality impacts can be scoped out of the ESIA due the fact that the Project will have negligible emissions during normal operation. Air quality issues such as dust emissions during construction will be considered as part of the assessment of construction impacts and managed as part of the ESMP.

4 Landscape and Visual Impact Assessment

4.1 Baseline

The Project area is located in the vast agriculture with settlement Landscape Character Type (LCT). This landscape type is representative of the wider area. The following smaller landscape character types have been identified within the Project's area of influence.

- Agriculture with Settlement
- Urban settlement
- Sea of Azov.

4.2 Key Potential Impacts and Mitigation

4.2.1 Operation

Potential landscape and visual impacts primarily arise during operation of the wind farm primarily as a result of the erection of the WTGs.

The potential visual impacts were assessed based on views from 13 representative viewpoints.

Nine receptors are assessed as not significant and therefore no specific mitigation is considered. Four receptor, VP 1: Western edge of Radyvonivka, VP 2: North of Vovchans'ke, VP 4: Peninsula south-west of Kyrylivka, VP 11: Volodymyrivka, will experience significant impacts as the Project would result in a noticeable deterioration of the view despite the existing vertical features.

Mitigation options are fairly limited during operation and would be focused on the full implementation of the community benefits package to ensure that any visual impacts on the local population is offset by an appropriate level of community benefit.

4.2.2 Construction and Decommissioning

Potential landscape and visual impacts during construction and decommissioning are temporary and medium term with the significance being Slight and not significant. These impacts are reasonably easily mitigated through "good house-keeping" to keep the site tidy and considerate construction practices such as restricting vehicle movements to surfaced roads.

5 Terrestrial Ecology

5.1 Baseline

There are no designated sites included within the search area around Project that are designated specifically for their value for terrestrial ecology and or terrestrial receptors they support.

The Project Site is represented exclusively by agricultural fields, which are separated by artificial tree lines (field shelterbelts), formed by woody species and bushes, and associated narrow strips of grassland. The route of the OHL is also predominantly represented by agricultural fields with plantation areas separating these.

The site encloses European Otter is a Ukraine Red Book species and IUCN Near Threatened and Grey Hamster is a Ukraine Red Book species.

Reptiles and amphibians such as toads, frogs, lizards and snakes were identified on the site. Three species of snake identified (or assumed to be present) within the study area are listed in the Red Data Book of Ukraine, one species as Vulnerable on the European Red List and one species listed as Near Threatened on the Red List of Threatened Species (IUCN)

Habitats on the site, such as trees in shelter belts and buildings, are considered to be suitable for bats. A total of 22 bat species were identified within and adjacent to the wind farm. The most frequently recorded bats were “Kuhl’s / Nathusius’ Pipistrelle” or “Myotis species”.

5.2 Key Potential Impacts

Potential impacts on terrestrial ecology are primarily anticipated during the construction phase of the Project.

Potential construction stage impacts on flora and habitats include the following:

- Direct loss of vegetation and habitat (including food sources).
- Direct loss of fauna during construction activities.
- Damage to habitats and disturbance of fauna from presence of people, machinery, traffic, and noise, both within and outside of the Zophia Wind Farm area (e.g. Steppe Habitat adjacent to proposed WTG’s and pylons). This indirect impact could affect species of global and regional conservation concern.
- Indirect impacts associated with pollution.

However, due to the extent of habitat loss across the entire project area (even though the loss of habitat in each distinct location is not significant) it is considered that the proposals will have significant negative impact on habitats and flora at a site level during the construction phase.

5.3 Operation

Potential impacts during operation of the Project are as follows:

- Disturbance of fauna from WTG noise, shadow flicker, people, and traffic.
- Displacement from immediate surrounds of WTG's and wind farm area resulting in loss of feeding resources.
- Loss of fauna (bats)from collision with WTGs

There will be some disturbance as a result of operational noise from the WTGs. At the likely noise levels, it is however unlikely that the resultant effect of noise on terrestrial fauna within the immediate vicinity of the operational WTGs will be significant and as such no negative impacts are predicted at any geographic level.

It is possible, without control measures, that staff working on the operational WTGs could cause disturbance to ecological receptors. Control measures such as , no access outside of the Project area, no hunting and control of lighting and night-time vehicle movements, will be incorporated into the Project. This will ensure no operational disturbance outside of the Project area.

Species known to be sensitive to the impacts of operational wind farms have been recorded using the site with several locations observed with high activity. The risks to these species include killing and injuring, displacement from the immediate surrounds, displacement from the wider area by barrier effect and the loss of foraging habitat.

The proposed WTGs will be constructed in areas utilised by bats, with the majority of WTGs located within or adjacent to field boundaries and shelterbelts which are used by commuting and foraging bats. In absence of mitigation, direct impacts to higher risk species from the present in these areas (including Kuhl's Pipistrelle, Nathusius' Pipistrelle, Common Pipistrelle, Leisler's Bat and Noctule) are likely and are considered to be negative at the regional level at a moderate to high significance, while direct impacts to medium to low risk species (principally Myotis species bats) are considered to be of low significance with no impacts anticipated at any geographic level.

Seven roosts of Kuhl's Pipistrelle, one roost of Common Pipistrelle, two roosts of Noctule, one roost of Brown Long-eared bats, two roosts of Serotine and one roost of Steppe Whiskered bats were found adjacent to site during the 2020 surveys. In addition, individual roosts of Steppe Whiskered, Pond and Brandt's bats were found under bridges outside the Project area. All roosts are outside of the windfarm area and as such are considered to be of low significance and outside the range where direct impacts would be anticipated.

5.4 Mitigation

The following mitigation will be adopted to address these potential impacts:

- Avoidance of habitats that support fauna receptors of moderate to high sensitivity.
- Clearly sign any animal crossings during construction and, if necessary, employ additional mitigation to reduce conflict with on-site traffic.
- Enforcement of standard pollution control measures during construction such as storage of fuel and lubricants in double-bunded containers and ensuring availability of spill kits in appropriate locations.
- A ban on all hunting activities by site staff must be enforced and speed limits must be strictly adhered to within the construction zone.
- Prohibit site workers from cutting down trees, and the collecting of firewood from the site or the wider area.
- Prohibit setting fire to woodland areas and / or meadow habitats.
- Maintenance of excellent house-keeping practises and high levels of recycling.

Potential construction phase impacts on fauna (excluding ornithology) include the following:

- Disturbance of fauna from presence of people, machinery, traffic, and noise.
- Indirect impacts associated with pollution incidents could affect habitats and breeding sites. This is of low to moderate significance.
- High sensitivity bat species could be indirectly affected through noise disturbance and/or lighting impacts considered to be moderate to high significance.

Construction phase mitigation in relation to species and habitats will also address the potential impacts identified here in relation to fauna.

Similar to construction, the main impacts during decommissioning are likely to comprise habitat loss, loss of small numbers of faunal species as well as disturbance impacts. Following decommissioning, reinstatement will be important to re-establishing more natural meadow habitats across the site previously occupied by WTGs, site roads and other structures. Similar mitigation to that described in relation to the construction phase will be adopted during decommissioning.

5.5 Enhancements

Enhancements will be completed to improve the quality of the habitats being retained as well as ensure that suitable refuge habitats are present for a range of mammals, reptiles and invertebrates.

Enhancements will include native vegetation planting along the shelter belts to increase the amount of cover and reduce the number of gaps to improve this 'corridor' habitat for wildlife to move through the site. Any additional planting and associated habitat improvement will also replace areas of habitat that are being lost to the development.

In addition to habitat creation, refuges will be created within the shelter belts to increase opportunities for a range of mammal, reptile and amphibian species. Refuges will consist of piles of stone or rubble as well as large wooden boards which will be used by a range of species for shelter and breeding habitat. Invertebrate houses should also be installed at regular intervals along all of the retained shelter belts. A range of habitats within each of the invertebrate houses should be installed to increase the diversity of the invertebrate assemblages using these features.

A minimum of 50 bat boxes (tree mounted or pole mounted) should be installed in areas of suitable foraging and commuting habitat around the perimeter of the proposed Project area with each box being at least 500 m away from any WTG (from tip reach) to increase the amount of available roosting opportunities for these receptors of high sensitivity. Bat boxes should ideally be located near areas of suitable foraging habitat, e.g. steppe or wetland habitat as well as on the edge of villages. These boxes should be monitored as part of the on-going maintenance programme associated with the operation of the Project and damaged/broken boxes replaced as appropriate.

Enhancements will also be completed once the Project has been decommissioned and this will involve re-planting the areas of the shelter belts that have been managed to reduce collision risk in bats, re-planting with native species in other areas to increase the ecological value and function of the shelter belt habitats for a range of ecological receptors. Additional bat boxes should be installed in all areas of the site to increase roosting opportunities for bats.

5.6 Residual Impacts

The impacts on other habitats and all species on, or within the vicinity of, the proposed Project site have been assessed as low generally, with some impacts anticipated at local and regional levels. The proposed mitigation will reduce the levels of impact to not significant at any geographic level.

Provided that the proposed mitigation measures are fully and successfully implemented, the overall effect of Project on species and habitats will be Minor and not significant in the long-term. Following decommissioning, reinstatement will re-establish the ecosystem in the areas previously occupied by the WTGs, site roads and other structures should result in a residual impact that is considered to be a positive impact of low to moderate significance.

6 Bird Impacts

6.1 Baseline

Four IBAs are located within 30 km of the Project and all four support large numbers of wetland birds during winter, passage and breeding seasons:

- Molochnyj Liman - approximately 1500m east of Project site.
- Utlyuk lyman - approximately 600m south-south-west of Project site.
- Molochna River Valley - approximately 6.5 km north-east of site.

Agricultural lands near Bilorets'ke (Chornozemne village) - approximately 19 km north-west of site. Each of which have populations of bird species, some of which are listed as being of conservation concern on the IUCN Red List.

Bird survey work was carried out between 2018 and 2020. An overview of survey findings is provided in the following sections. Survey results have been concentrated to focus on those species considered of conservation concern. This includes species on IUCN and European Red List, Ukraine Red Book and species included within the designations of nearby IBA sites.

The Target or Notable species that were recorded during all the completed surveys and are considered to be potentially significantly impacted by the proposals (based on location, predicted collisions, risk of displacement etc) have been included in individual species accounts for:

- Caspian Gull.
- Common Crane.
- Great White Egret.
- Greater White-fronted Goose.
- Hen Harrier.
- Long-legged Buzzard.
- Lapwing.
- Saker Falcon.
- Short-eared Owl.
- Red-footed Falcon

6.2 Assessment of Impacts and Mitigation

There are three ways in which the Project may have an adverse effect on birds: direct loss of habitat; increased mortality rate through collision with WTGs; and loss of habitat through disturbance.

Construction impacts are likely to include habitat loss and possible nest destruction for passerine and ground nesting bird species as well as disturbance impacts in the Project and adjacent areas. The Target or Notable species that were recorded during all the completed surveys and are considered to be potentially significantly impacted by the proposals are Caspian Gull, Common Crane, Great White Egret, Greater White-fronted Goose, Hen Harrier, Long-legged Buzzard, Lapwing, Saker Falcon, Short-eared Owl, Red-footed Falcon.

Mitigation measures and enhancements are summarised in Table 6-1.

Table 6-1 Summary of Species-Specific Mitigation, Off-setting and Enhancement

Species	Phase	Mitigation and Off-setting
Barn Owl	Operation & Construction	Provision of around 20 nesting boxes throughout the site as enhancement. Positioned away from WTGs main roads to reduce impacts of collision with WTGs vehicles.
Common Crane	Operation	Observer led shut-down targeted in particular end of September to late October
Hen harrier	Operation	Observer led shut-down targeted at November to February
	Operation	Monitoring of the winter roost location through November to February
Long-legged Buzzard	Operation	Observer led shut-down targeted in particular mid-September to mid-October
Montagu's Harrier	Operation & Construction	Offsetting with nest protection
	Operation & Construction	Monitoring of nesting locations
Red-footed Falcon	Operation	Offsetting with around 100 nesting baskets positioned colonially away from WTGs in suitable habitat. A further 50 boxes will be placed individually which may be used by this species as well as Kestrel, Hobby and Long-eared Owl.
	Operation	Monitoring of nesting location old and new

Species	Phase	Mitigation and Off-setting
Saker Falcon	Operation & Construction	Monitoring of nesting locations
	Operation & Construction	Provision of 10 nesting boxes along the proposed OHL as enhancement as well as the pylons themselves as potential nesting locations
Scops Owl	Operation & Construction	Addition of tree planting will provide possible additional Scops owl habitat around the site as well as provision of around 20 nest boxes in current suitable habitat away from WTG

It is proposed that mitigation does not remain entirely within the realm of the wind farm developer with an aim to create the Zophia Raptor Monitoring Group. The aim of the group is to facilitate the mitigation of negative impacts from the proposals on raptors as per the details in this document but also to increase the success of raptor populations in the area through community engagement.

Further monitoring of wider raptor species nests will take place (initially on an annual basis) to understand if there are any changes to the site due to the impacts of the wind farm development or if changes to the breeding composition require further mitigation and monitoring impacts.

WTG will be constructed to avoid areas of highest quality habitats and if possible, buffer zones between wet grasslands and marshes should be set in order to ensure these areas can be used during periods of migration and or staging. Habitats that are being lost to construction activity should be removed outside of the breeding bird season (March to August) and if this is not possible after a check has been completed by the on-site ecologist to ensure that breeding birds are not directly affected by construction.

Potential impacts during operation of the Project include disturbance of birds from WTG noise, shadow flicker, people, and traffic and loss of birds from collision with WTGs. During operation it is considered likely that the Project site is subject to levels of migratory and wintering bird activity that would merit operational mitigation and monitoring for a minimum of three years.

6.3 Cumulative Impacts

Other wind farms immediately to the east of Molochna Lyman are unlikely to cause a cumulative impact on IBA species given the lack of use of the proposed site by the majority of the species away from the core IBA boundaries.

7 Hydrology and Hydrogeology

7.1 Baseline

The Project site is located in close proximity to the Malyi Utliuk river and Molochnyi and Utliuk estuaries and dominated by large open arable fields of limited ecological interest. However, in the lower floodplains of the Molochny estuary there are two areas of saline (halophytic) meadows.

Moreover, irrigation infrastructure is present in the form of large drains and associated irrigation equipment, of note, a large channel runs to the south of the eastern portion of the site outwith the land plot boundaries.

Figure 7-1: Drainage / Irrigation Channel

The annual precipitation varies between 370- and 430-mm. Droughts are frequent in spring and summer.

The occurrence of groundwater (and its quality) in the aquifers and its movement depends not only on type of formation but also on the recharge mechanisms. All groundwater must have had a source of recharge. This is normally rainfall but can also be seepage from rivers, canals, or lakes.

The World Bank Group has developed a flood hazard map for the Ukraine region[2]. The Project site is located predominately within an area of low flood risk, with some areas of higher risk of flooding identified associated with surface water bodies feeding into the Sea of Azov.

7.2 Key Potential Impacts and Mitigation

Potential impacts on water resources are primarily associated with the construction phase of the Project but can occur to a lesser extent during operation and decommissioning. Potential impacts include:

- Water consumption, potentially affecting local water resources.
- Alteration of surface and groundwater flow as a result of construction earthworks, road construction and use of heavy vehicles.
- Water discharge and pollution.

Potential impacts to surface waters by operating activities would be confined to increased runoff and erosion, primarily in existing or new erosion channels that receive run-off from roads. The sensitivity of the channels is low, and the magnitude of the impact is low. Therefore, the significance of the impact is negligible.

Groundwater is assessed as medium sensitivity and the magnitude of pollution risk is low, therefore the significance of the impact is minor adverse.

Micro-siting (small movement of WTGs) of WTGs and Project infrastructure will be undertaken during the detailed design process to maintain an appropriate buffer distance (50 m recommended) from any hydrological features on site.

To reduce the potential for erosion of drainage channels during road construction, routes should be selected to avoid existing drainage channels where possible. Culverts or other drainage control features should be installed where crossings of drainage routes are unavoidable. Vehicle movements should be restricted to defined routes and sealed tracks.

Standard pollution control and waste management measures will be enforced during all stages of the Project to prevent pollution of hydrological and hydrogeological features.

2 https://www.geonode-gfdrrlab.org/documents/1008

An operational water availability / resource use assessment and management plan will be developed to confirm operational water use, an assessment of the ability and capacity of existing local supply to provide operational requirements without impacting existing users will be undertaken should groundwater be utilised for any operational purposes.

During decommissioning it is recommended that:

- Structures are recycled and other materials sent to a suitable disposal site.
- All containers are capped, and all valves closed then transported to a suitable disposal site.
- To reduce effects on drainage channels, vehicles, equipment and foot traffic should be confined to demarcated areas.
- After roads or other compacted areas are removed and / or abandoned, scarify soils and plant native grass seeds. This should be monitored and repeated until reclamation is successful for at least two growing seasons after the last planting / seeding.

7.3 Residual Impacts

With the implementation of mitigation measures outlined above, it is considered that there will be no significant residual impacts on the water environment.

8 Geology and Soils

8.1 Baseline

The Project site is located within the southern boundary of the eastern segment of the South Ukrainian monocline and is associated with the Volyn-Azov plate of the Eastern European platform[3] and is predominately of flat terrain with an elevation from 9-14 m.

Soils in the Project area are identified as vulnerable to erosion. In particular, soil erosion caused by vehicles on unimproved tracks and water erosion that occurs during the winter period.

The area is poor with minerals, a small deposit of fuel gas is known, and poor Cimmerian iron ores are common. There are small deposits of therapeutic mud and signs of sediment salt and mineral water. Brick and tile clays and construction sands are widely spread.

The site is located in the north-eastern part of the Black Sea basin. There are known Precambrian, Cretaceous, Paleogene, Neogene and Quaternary sediments with total capacity of 200-300 m in the east to 1,500-2,000 m in the west area. The crystalline basement is divided into several large blocks, more immersed in the south-west.

Near coastal landforms are widespread along the coast of the Azov Sea and estuaries. Azov seacoast steep, composed of loess loam, sometimes with layers of clay and silty sand.

According to the WHO Seismic Hazard Distribution Map of Ukraine[4] the Project site is identified being in an area with low seismic hazard (0.2 – 0.8 PGA, m/s2). No significant earthquakes are identified by WHO in the Project area.

8.2 Key Potential Impacts and Mitigation

The main impacts on soils and geology are likely to arise during the various site preparation and construction activities associated with the Project and its access roads. However, soils will remain vulnerable during the operation phase. Soils are assessed as a medium sensitivity receptor.

[3] Ministry of Energy and Environment Protection of Ukraine, State Enterprise "Kyiv Institute of Engineering and Geological Surveys and Studies ENERGOPROEKT", Zophia 1+2 Wind Farm in Yakymivka District of Zaporizhzhia Region, volume 1, 2019

[4] WHO (2010)

Soil compaction and loss of vegetation as a result of vehicle movement (particularly when vehicles drive off-road) and other construction activities on the site, increases the soils' vulnerability to erosion. During operation and decommissioning there should be no requirement for vehicles to drive off-road due the presence of prepared on-site roads built during the construction phase. The main risks during these later stages are associated with vehicles leaving the prepared roads and driving cross-country.

There is also potential for soils to be contaminated by waste.

The sensitivity of soils is medium, and the magnitude of the impact is medium, since there is the potential for larger areas around the foundations of the WTGs to be affected during construction, in addition to off-site impacts of roads and power transmission. The significance of the impact is therefore assessed as moderate. The major impact should be of relatively short duration, lasting only through construction of the WTG foundations and roads. Once WTG foundations have been buried and roads have been narrowed, a much smaller area will be affected, and previously disturbed areas will have been reclaimed.

There is potential for soils to be contaminated by waste. Liquid wastes such as oils and sanitary waste are discussed in Chapter 8 (Hydrology and Hydrogeology). Inert waste will be taken off-site and disposed of in a suitable landfill site. Because residual waste is very low, the significance of the impact is assessed as minor.

There should be no need for vehicles to travel off the improved roads, and this should be activity discouraged. As described under construction above, the main risk to soils would be where vehicles leave prepared roads and drive cross-country. If designated roads are not used, vehicle movements will cause damage over a wide area around the WTGs or other off-road areas. The soils are a medium sensitive receptor, but the magnitude of the effect during operation is low, since there will be much less frequent traffic than during construction, and only occasional use of heavy equipment. In addition, vehicles will keep to improved roads. The significance of the impact is assessed as minor.

Proposed mitigation measures are as follows:

- Confine all vehicles to roadways.
- Monitor road condition regularly; then repair damaged and rutted roads rather than bypassing damaged sections.

- Salvage and store topsoil and subsoil before areas are excavated, with topsoil stripped and stockpiled separately.
- Segregate excavated soils into stockpiles according to the type of material and provide erosion control while stockpiled.
- Monitor erosion controls and repair as needed.
- Maintain grass cover on berms and ditches.
- Prohibit use of vehicles and equipment off prepared roads.
- Re-stabilize existing eroded tracks and restore grass cover as needed.
- Do not collect firewood from the site.
- Reduce wastes to the extent possible and maximise re-use and recycling of materials. Collect and store all waste and garbage before disposal at the designated site.
- Clean up and store oily and chemical waste and contaminated material before transport to the designated disposal site to reduce risk of soil and groundwater contamination.
- Establish a designated storage area with an impervious base and impermeable bund walls and protected from precipitation. Capacity must be sufficient to contain full volume within a bund and secured area.
- Store all fuel, oil and chemical storage in the designated secure area.
- Do not leave vehicles unattended during refuelling, never leave open a delivery valve.
- Check hoses and valves regularly for signs of wear and ensure that they are turned off and securely locked when not in use.
- Place diesel pumps and similar on drip trays to collect minor spillages. Check trays regularly and remove any accumulated oil.

During decommissioning, after roads and other compacted areas are removed and / or abandoned, soil should be dug-up/loosened and native grass seeds planted.

8.3 Residual Impacts

Impacts should be relatively short in duration, lasting only through construction of the WTG foundations and the roads. Following implementation of mitigation measures, no significant effects are anticipated.

During operation, impacts on soils are less significant and mainly confined to continued vehicle traffic. With mitigation implemented, these risks should be reduced, resulting in minimal residual impacts.

9 Archaeology and Cultural Heritage

9.1 Baseline

The archaeological survey undertaken for the substations area and OHL route[5] has identified approximately 80 archaeological sites in the study area, as well as a number of 'probable locations of individual burial mounds and mound groups'. Within the 'direct right-of-way', 31 archaeological heritage sites were identified. Of these, nine of the sites are registered in the national records, the rest are newly discovered archaeological sites.

National authorities delivered the 'Letters of approval' issued by the Institute of Archaeology, National Ukrainian Academy of Sciences, approving the construction and operation of Zophia I6, II7 and III8. The letters of approval have been granted, with the condition that all earth-moving and road construction works are carried out under archaeological supervision, as detailed in the Cultural Heritage Management Plan (CHMP)[9] compiled for the Project, by the Institute of Archaeology.

[5] O. Osaulchuk, 2019. Archaeological Research – New Construction of 330 kV PL AZOVSKA VES-MOLOCHANSK SUB (Project 16-19-AB)

[6] Ref. 125/01-15-282, dated 26 May 2020, issued Institute of Archaeology, National Ukrainian Academy of Sciences

[7] Ref. 125/01-9-584, dated 01 October 2020, issued by Institute of Archaeology, National Ukrainian Academy of Sciences

[8] Ref. 125/01-9-578, dated 01 October 2020, issued by Institute of Archaeology, National Ukrainian Academy of Sciences

[9] General Cultural Heritage Management Plan, Institute of Archaeology of the National Academy of Sciences of Ukraine, dated 2020.

9.2 Key Impacts and Mitigation

As a result of the presence of known archaeological, religious, and aesthetic sites within close proximity to the Project site boundary, including those protected by national legislation, the site sensitivity is assessed to be High. The magnitude of direct impact on known features is assessed as High, given that approximately 80 archaeological sites have been identified along the OHL route/substations area. The impact is therefore Major and significant. A cultural heritage management plan will be developed. This will outline actions and measures necessary for the effective management of risks and impacts to cultural heritage during all phases of the Project. Several mitigation measures will be carried out such as:

- Any earthworks in the immediate vicinity of archaeological sites and their exclusion zones as part of the construction will be carried out under the direct supervision of an employee of the Institute of Archaeology of the National Academy of Sciences of Ukraine. In addition, this staff member must lead a team of archaeologists (of at least two members) to coordinate and ensure closer supervision of the construction site.
- The described work on mapping and marking of the territory is to be performed before the start of construction works for a period of three days to a week. Such measures will protect archaeological objects from potential looting and destruction.

In addition, a chance find procedure will be developed. During construction, toolbox talks will be provided to ensure that workers will be alert to any signs of past cultural activity in the area. Should any artefacts or evidence of past activity be discovered, NBT AS will notify the appropriate authorities and await direction before taking action that would disturb the resources.

9.3 Cumulative Impacts

The operational Zophia Wind Farm is the closest cumulative site and as this is part of the existing baseline this has been considered as part of the assessment above.

Other planned wind farms within the 50 km study area include Zoporizha Wind Farm (ongoing construction) approximately 9 km from the nearest WTG across the estuary, and Prymorska Wind Farm (operational since October 2019) approximately 35 km to the north-east of the Project, Orlivska Wind Farm (operational since November 2019) and Botievska Wind Farms approximately 40 km to the north-east of the Project (Operational). The wind farms are considered a sufficient distance from the Project that associated significant cumulative impacts on archaeology and cultural heritage are not expected.

9.4 Residual Effects

There is a significant potential for impacts on any previously undiscovered sites and features that may be discovered during construction works. Mitigation measures will be put in place to alert the appropriate authorities to artefacts or evidence of past activity discovered.

With mitigation, it can be concluded that the risk can be lowered to impacts of Moderate to Low significance associated with cultural heritage as a result of the Project.

10 Noise

10.1 Introduction

This Chapter considers the likely significant effects in terms of noise of the Project WTGs at noise sensitive receptors (NSRs).

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Noise propagation has been modelled in accordance with International Standards.

10.1.1 Construction Phase

Construction noise effects are normally of a temporary nature and result from both moving and static sources. Assessment allows the temporary impact of construction noise to be understood and for suitable mitigation measures to be identified to minimise any potential adverse effects.

10.1.2 Operations Phase

When operational, WTGs emit two types of noise – mechanical noise and aerodynamic noise. The main sources of mechanical noise are from internal components housed within the nacelle, such as gearbox and generator. Mechanical noise from a modern WTG is negligible as designs are highly refined. Aerodynamic noise occurs from the movement of the blades passing through the air. At high wind speeds, that aerodynamic noise is usually masked by the increasing sound of wind blowing through trees and around buildings, and turbulent noise within the air itself. The level of masking determines the perceived audibility of the wind farm. The noise impact assessment establishes the relationship between WTG noise and the natural masking noise and assesses levels against established standards.

10.2 Baseline

Background Noise (BGN) monitoring was undertaken at a total of 11 locations representative of settlements in close proximity to the Project.

The operational noise of wind farms is generally assessed by comparing operational noise with existing BGN noise levels.

Representative BGN levels are shown in table Table 10-1 and Table 10-2

Table 10-1 Measured Background Noise Results Quiet Daytime

Receptor	Wind Speed (m/s)								
	4	5	6	7	8	9	10	11	12
Kyrylivka	24.8	26.2	27.8	29.7	31.7	33.9	36.3	38.8	41.6
Lymans'ke	25.5	27.2	28.9	30.8	32.6	34.6	36.6	38.6	40.8
Kosykh	23.8	24.9	26.0	27.1	28.1	29.1	30.1	31.0	31.9
Okhrimivka	26.4	27.7	28.7	29.5	30.3	31.2	32.3	33.7	35.6
Shelyuhy*	20.2	20.4	20.9	21.6	22.7	24.5	27.1	30.5	35.1
Radyvonivka*	23.5	23.8	24.5	25.4	26.7	28.4	30.4	32.7	35.4

Table 10-2 Measured Background Noise Results Night

Receptor	Wind Speed (m/s)								
	4	5	6	7	8	9	10	11	12
Kyrylivka	21.3	22.6	24.1	25.9	27.9	30.2	32.7	35.5	38.5
Lymans'ke	18.9	20.3	22.2	24.6	27.4	30.6	34.4	38.5	43.2
Kosykh	17.3	18.0	19.2	20.8	22.9	25.3	28.2	31.4	35.1
Okhrimivka	22.4	23.9	25.7	27.8	30.1	32.6	35.4	38.4	41.6
Shelyuhy	20.2	20.4	20.9	21.6	22.7	24.5	27.1	30.5	35.1
Radyvonivka	23.5	23.8	24.5	25.4	26.7	28.4	30.4	32.7	35.4

It should be noted that further verification the background noise levels is required due to unusual noise levels recorded during baseline monitoring. This is further described in Volume 1 of the ESIA.

10.3 WTG Noise Emission Data

The WTG is the Goldwind GW155-4.5 MW with 130 m hub height. The operational noise has been assessed based on the input noise levels emitted from this WTG, using information supplied by manufacturer specification documents for hub height wind speeds between 4 and 10 m/s.

Noise model are presented below:

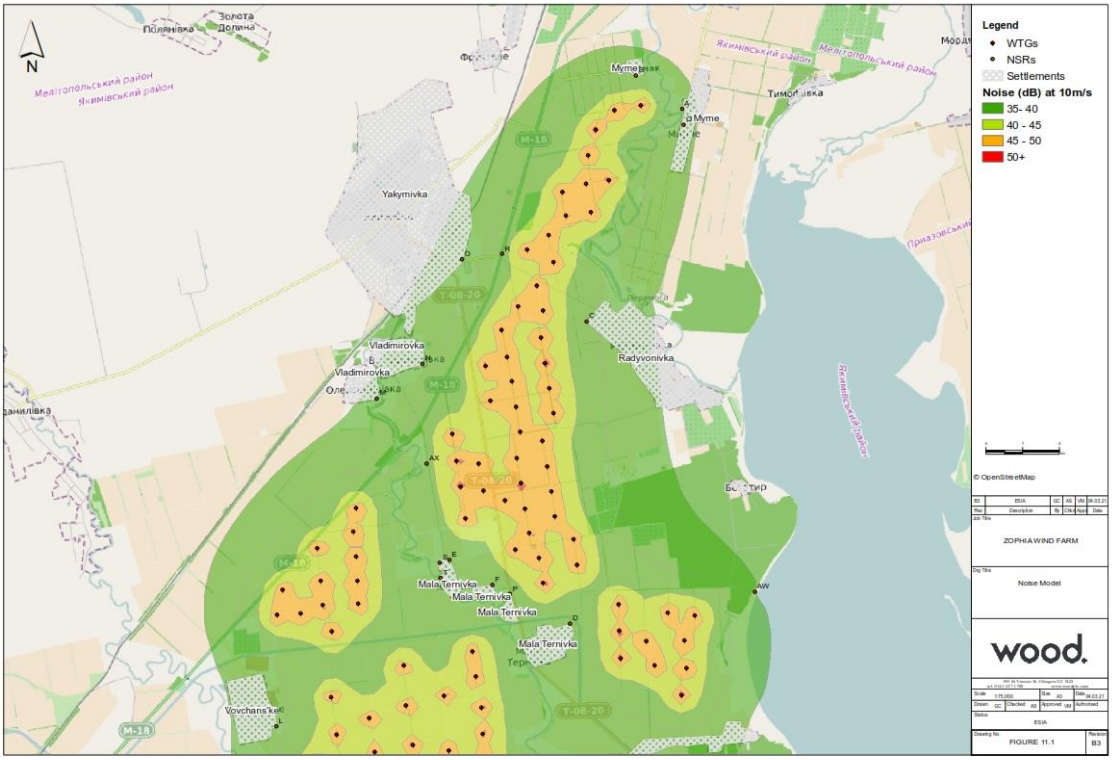

Figure 10-1: Noise model

Figure 10-2: Noise model

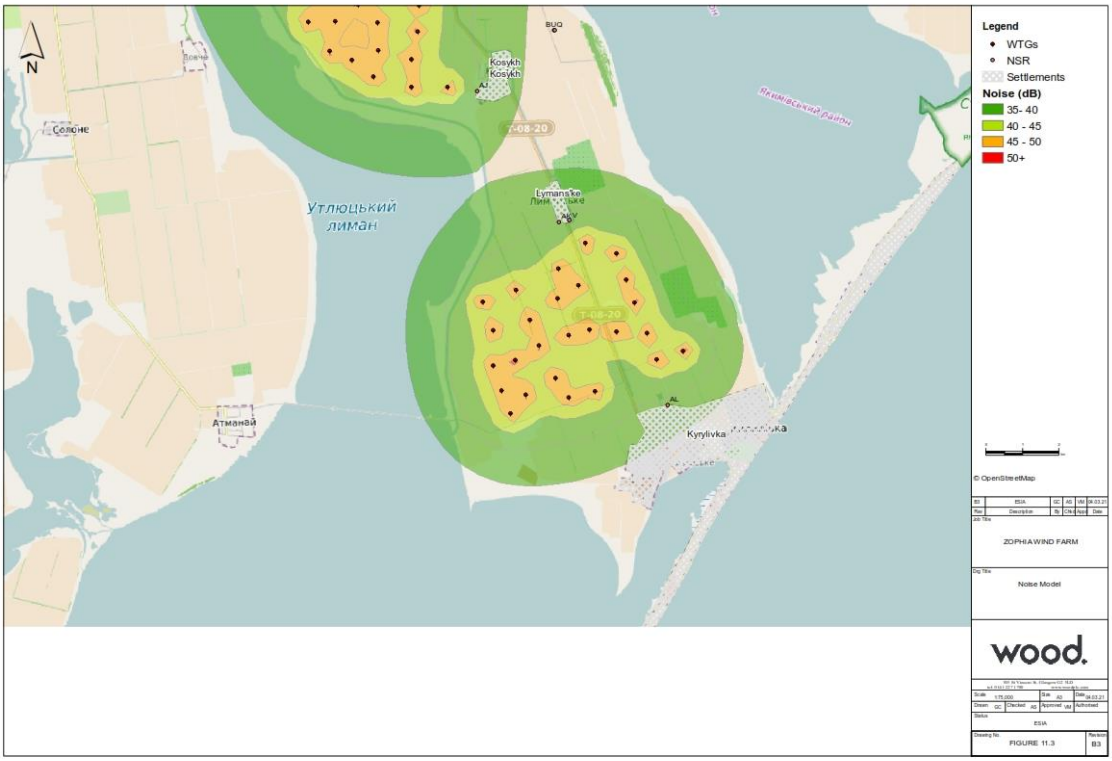

Figure 10-3: Noise Model

10.4 Key Impacts and Mitigation

A large number of receptors are in exceedance of the 45 dB night-time limit. These occur at Lymans'ke at 12 m/s and Davydivka between 8 – 12 m/s. In addition, there are exceedances of this limit at point NSRs R, Y, and AX. Therefore, the effect concerning the night-time absolute limit for these NSRs is Significant and will require mitigation.

10.4.1 Construction Mitigation

Construction activities will be scheduled, unless otherwise agreed, from Monday to Saturday. Unattended plant equipment should be kept to a minimum. Construction activities outside of these times, short term high transient noise events, or activates relatively close to NSRs should be scheduled in consultation with the residents to minimise their inconvenience.

The contractor should produce and implement a Noise Management Plan for the construction phase.

10.4.2 Operational Mitigation

No mitigation is required to reduce any significant impacts arising from the day-time limit of 55 dB.

A number of receptors have Significant impacts arising from the night-time limit of 45 dB and will require mitigation.

Where additional exposure levels above BGN at NSRs equate to an increase of 10 dB or more, it is recommended that mitigation be considered as an advisory. An increase of 10 dB or more is an indication of Significant effect.

It may be that several WTGs will need to be run in a curtailed mode for specific wind speeds to reduce the additional exposure at NSRs. Curtailment modes for the candidate WTGs are not currently available, so it is not possible to propose a curtailment scheme.

It is understood that the WTG manufacturer is conducting noise testing on the candidate WTG. When the final noise data is available, it is recommended that curtailment calculations are performed. Furthermore, it is recommended that a curtailment scheme is designed to mitigate all significant effects. This curtailment scheme is to be developed in more detail following further investigation of background noise levels at sensitive receptors.

11 Shadow Flicker

11.1 Introduction

This Chapter presents an assessment of the shadow flicker effect of the development on nearby sensitive receptors. The assessment considers shadow flicker effects from the operation of the proposed wind farm.

Shadow flicker occurs during the operational phase of a wind farm when the sun passes behind the WTG and casts a shadow. As the rotor blades rotate, shadows pass over the same point causing an effect termed shadow flicker. Shadow flicker may become a problem when potentially sensitive receptors (residential properties, workplaces, learning spaces and health care settings are all potentially sensitive to shadow flicker) are located near, or have a specific orientation to, the wind farm.

Limits on shadow flicker are applied primarily to avoid nuisance and preserve amenity. It is generally accepted that there are no health or safety concerns associated with shadow flicker. The IFC Environmental, Health and Safety Guidelines for Wind Energy (2015) recommend the use of the 30 hours per year and 0.5 hours per day limits for shadow flicker, based on worst-case scenario modelling.

11.2 Baseline

The identification of potential shadow flicker receptors was based on inspection of topographical maps, satellite imagery and the site visits undertaken in March 2019. Identified residential areas are shown in Figure 11-1.

11.3 Key Impacts and Mitigation

Shadow flicker impacts were predicted, based on 179 WTGs each with a rotor diameter a rotor diameter of up to 155 m and a hub height of up to 130 m with a capacity of 4.5 MW., using the Shadow Flicker module of the ReSoft WindFarm software. The WindFarm analysis reports the ‘worst case’ scenario, directly comparable with the limits provided in the IFC guidance.

Using the WindFarm software, a potential shadow flicker impact area map was produced based on the assumption that shadow flicker impact is negligible beyond a distance of 10 rotor diameters (1550 m). This is shown in Figure 11-1.

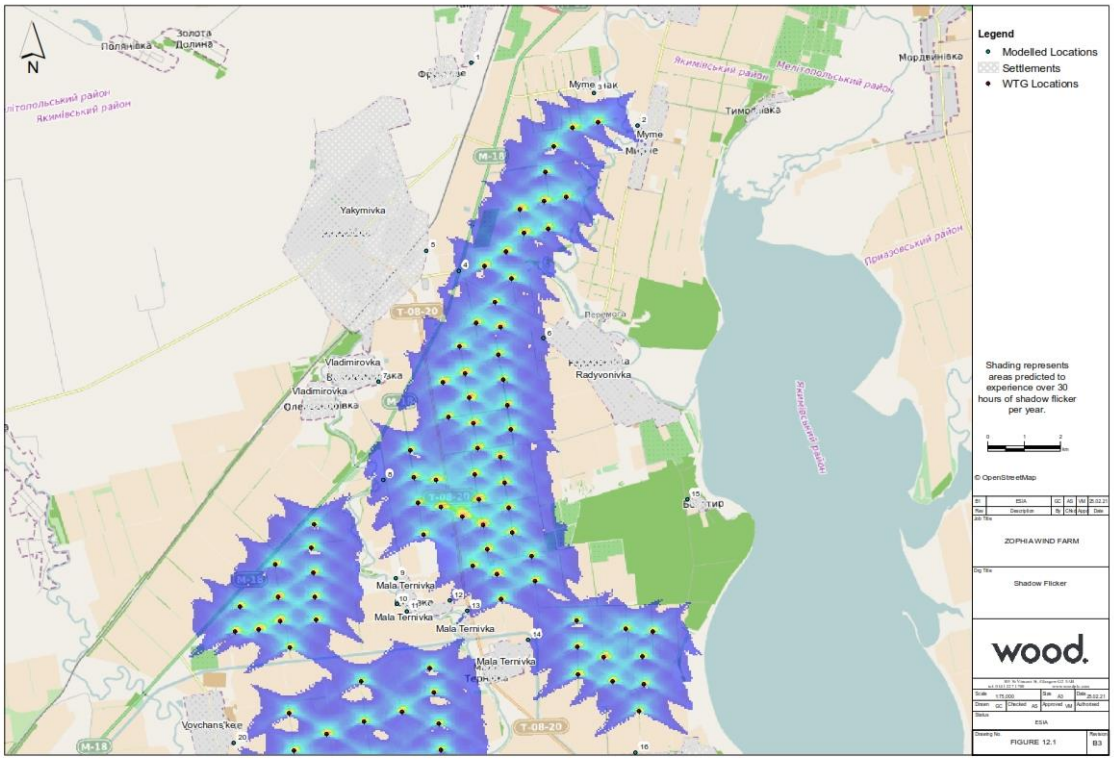

Figure 11-1: Predicted Shadow Flicker Impact Zone (shading illustrates areas predicted to experience over 30 hours of shadow flicker per year)

Figure 11-2: Predicted Shadow Flicker Impact Zone (shading illustrates areas predicted to experience over 30 hours of shadow flicker per year)

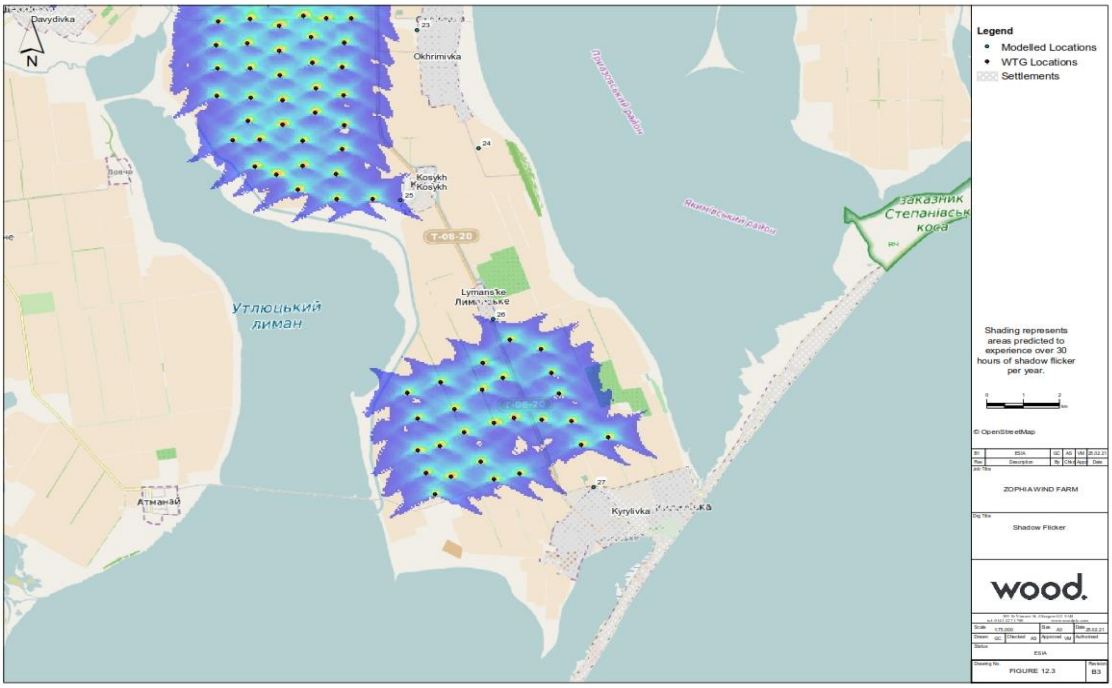

Figure 11-3 Predicted Shadow Flicker Impact Zone (shading illustrates areas predicted to experience over 30 hours of shadow flicker per year)

A number of residential properties (approximately 28 potentially sensitive receptors based on the worst-case layout) are predicted to experience shadow flicker effects in excess of the limits within the IFC guidance. Consequently, a procedure will be put in place to mitigate potential impacts. Prior to construction, the number of residential properties within the modelled shadow flicker impact zone, as shown in Figure 11-1 to 11-3, will need to be confirmed.

If any complaints are raised by the local community (through the grievance mechanism or other channels) relating to shadow flicker from the wind farm, the wind farm operator shall investigate and instigate, at their own expense and within one month of being advised of the complaint, appropriate measures to mitigate the shadow flicker effects.

Measures to mitigate shadow flicker effects in the first instance include provision of additional screening or provision of window blinds at the affected receptor. Should this not adequately address impacts WTGs will be programmed to shut-down during periods when shadow flicker is predicted to occur at the affected receptors in order to ensure impacts are reduced.

11.4 Residual Effects

Shadow flicker effects are predictable and easily mitigated. Consequently, with the adoption of the above proposed mitigation strategy, no residual effects are anticipated.

12 Transportation and Access

12.1 Introduction

This Chapter describes the likely effects of the Project including a description of the access route and the likely extent of highway works along the route and presents the assessment of the significance of these effects.

12.2 Baseline

12.2.1 Transport Route

It is envisaged that the WTG components will be transported from Nikolaev Port in Mykolaïv to site.

A map showing the proposed transportation route is presented in Figure 12-1.

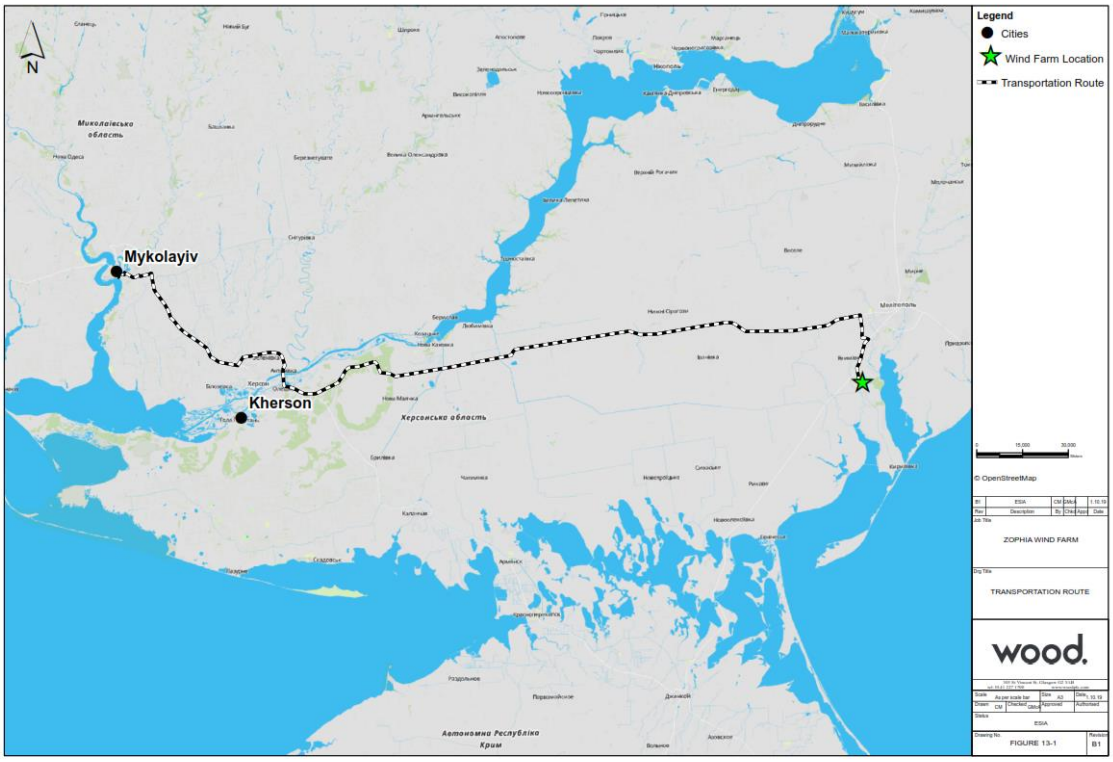

Figure 12-1 Transportation route

The indicative route to site is as follows:

1. Arrival at Nikolaev sea port (Mykolaïv).
2. Travel along minor roads for approximately 5km to Khersons'ke Highway.
3. Follow Khersons'ke Highway for around 9km then turn right onto E58/M14.

4. Follow E58/M14 for around 270km then turn right onto Zhovtnerva Street.
5. Right onto M18 / E105 to the site access.

The total distance from port to site is approximately 300 km with a journey time of 4 to 5 hours (longer for abnormal load deliveries). The main roads proposed for use are largely in good condition and would not require any significant works.

Figure 12-2: Road Condition leading to Site

Also, an additional route is being considered for the transportation of wind turbine components from Berdyansk port. Details of the route will be given in the final ESIA.

12.2.2 Roads on Site

There are some existing unpaved farm tracks on site however these will need to be upgraded to accommodate construction works. Roads on site will be maintained to an acceptable standard. The sign-posting of roads will be consistent with the use of the road, the type of vehicle using the thoroughfare and the hazards and dangers associated with the proper and safe flow of traffic. Speed limits will also be displayed.

Roads utilized by pedestrians during hours of darkness will be adequately illuminated and equipment near roads will be protected from damage by vehicles.

12.3 Key Potential Impacts and Mitigation

Significant transportation and access impacts are primarily associated with the construction phase of the Project and include:

- Impact of the Project HGV / abnormal load traffic during construction on the existing road.
- Increased total daily traffic flow on the local road network.
- Damage to road edges and general 'wear and tear' of the road may occur through increased HGV movements.
- For each WTG, a maximum of 11 abnormal loads will be required to be transported to site on oversized road transporters (22 total trips in and out of site):
- During month 12, an average of 1,032 vehicle movements is predicted to be generated on each working day (around 516 in and 516 out). For HGV / abnormal load traffic, this would be around 420 movements into site and 420 out of site per day.
- As no baseline information with regards to current traffic volumes along the proposed transport route is available, it has not been possible to quantify the predicted impact of HGVs on the proposed road network route. The quantity of traffic generated during the construction period is considered to be significant.

A Construction Transport Management Plan (CTMP) will be developed to manage potential impacts on the road network and its users.

12.4 Further Work

The proposed transportation route for the delivery of WTGs needs to be assessed and finalised. It is recommended that the route, particularly where it crosses any bridges, be verified through further assessment (including site swept path analysis and route inspection). Furthermore, the method of transportation for other materials and equipment should be verified through further studies.

12.5 Residual Impacts

The transportation of the WTG components will take around a day from the port to the Project site. The effect of the Project's construction HGV / abnormal load traffic on the existing roads cannot be quantified given the lack of traffic data however, considering all construction traffic and proposed mitigation, the impact is likely to be of Minor to Moderate significance during construction and Negligible during operation.

13 Social Impact Assessment

13.1 Introduction

This Chapter sets out details of information disclosure, consultation and participation that have been undertaken as part of the ESIA process and assesses the potential socio-economic impacts of the Project and associated works.

13.2 Information Disclosure, Consultation and Participation

This section details the information disclosure, consultation and participation activities undertaken as part of the ESIA process, the outcomes of these activities and details of additional activities planned throughout the planning process.

13.2.1 ESIA Consultation Activities to Date

31 meetings have been held with local communities and groups with the following communities Atmanay, Davydivka, Kyrylivka, Kyrylivka, Nove, Okhrimivka, Radyvonivka, Shelyhu and Yakymivka. The primary goals of these meetings were to:

- Describe the proposed Project and ESIA process.
- Discuss and identify potential Project impacts associated with the construction and operation of the wind farm.
- Understand local land use, activities and populations living and working within or near the Project site.
- Identify the most effective ways of information dissemination in the future.
- Develop a list of stakeholder's groups and local people most likely to be affected by the Project.

The key topics that came out of the above meetings were in relation to queries regarding how the wind farm would benefit local communities in terms of employment opportunities and upgrade of infrastructure; affect irrigation systems; and how the development would affect human health.

13.2.2 Future Consultation Activities

Additional consultation activities are proposed as the Project progresses. NBT would seek to undertake the following at a minimum:

- Disclosure of Preliminary ESIA at locations accessible to local communities and other stakeholders. Provision of the ESIA on NBT website. Documents to include ESIA Non-Technical Summary.
- Invite comment on Preliminary ESIA.
- Disclosure of Final ESIA to local communities and other stakeholders. Provision of the ESIA on the Zophia Project website.
- Disclosure of the Stakeholder Engagement Plan (SEP) to include setting out future community /stakeholder consultation.
- Implementation of Grievance Mechanism to be in place throughout construction, operation and decommissioning of the wind farm.
- Disclosure of monitoring reports.

A Project Community Health and Safety Plan will also be developed. This will describe the potential hazards of the Project during construction and commissioning to local communities and how these will be controlled. The document will also outline emergency preparedness and response along with a grievance mechanism to ensure that feedback is acknowledged and addressed appropriately.

In addition, a Grievance Mechanism will be developed for worker grievances to raise reasonable workplace concerns.

13.3 Baseline

13.3.1 Population and Demographics

Communities located within approximately 5 km of the Project site include: Yakymivka, Kyrylivka joint territorial communities.

The largest economic sector in the district is the agricultural sector involving crops and livestock. Agricultural land covers a total area of 1,352 km^2, approximately 6.0% of Yakymivka district of the Zaporizhzhya region. Industry is dominated by the processing of agricultural products and there are 155 agricultural enterprises of different types registered in the district. In addition, there are two industrial enterprises and four construction companies in the district.

13.3.2 Social Infrastructure

There are 24 schools operating in 43 individual towns and villages providing both primary and secondary education[10]. The health care services in Yakymivka community includes Yakymivka Central District Hospital, located in Yakymivka. Health care services in the Kyrylivka community are provided by the following medical facilities: an ambulance clinic and rural health post (RHP) in Kyrylivka; a RHP in Lymanske, Nove and Solone villages; ambulance clinic in Atmanai and Okhrymivka villages. Currently, there is a single-family doctor in Kyrylivka for the entire population.

13.4 Key Potential Impacts

13.4.1 Impacts to the Regional & National Economy during Construction from Procurement

The Project will positively influence the regional and national economy during construction from the direct procurement and supply of materials and services from companies based in Yakymivka district and elsewhere in Ukraine. This includes for example, companies providing earth moving equipment, cranes workers to complete civil works, logistics services to transport the WTGs to the Project area, and companies in Yakymivka district providing accommodation facilities for the non-local workforce. Other companies located outside of Ukraine will be responsible for the supply of wind farm components, such as the nacelle structure and blades. In total, the combined capital investment of the three phases of wind farms is in excess of Euro 1 billion.

13.4.2 Impacts associated with changes in Land Use, Land Access Restrictions and Impacts to Land from Operation of the WTGs

The impact is mostly positive. Both landowners and farmers have chosen to accept changes in land use and temporary access restrictions to land so that they can receive cash compensation. The rate of compensation has been negotiated in a transparent and open manner and will address the future loss of income from agricultural activities. No landowner or farmer has been forced to accept a change in their existing access to land.

[10] website of Yakymivka state district administration - http://akim.gov.ua/index.php?page=page&id=21 .

The cash compensation paid to farmers during operation will reduce their capital spend on agricultural inputs and reduce their economic vulnerability as cash payments will be made for up to three seasons with certainty, irrespective of weather conditions and any other external factors that affect agricultural production.

There is a potential for further positive impacts to occur as the construction of internal access roads will be available for use by farmers which will improve the way in which they transport their crops from the fields, reducing the time taken through an improved road surface and accessible road network.

Negative impacts will occur through a small, net loss of agricultural land which will be permanently occupied by Project infrastructure, reducing the income of farmers after construction works are complete. However, this represents a very small area of the regional land available for agricultural activities and will not result in a significant impact on the region's total agricultural productivity, or individual farmer's future income. No negative impacts are expected to occur to landowners as the annual payment will off-set the income they would have received from the farmer, if agricultural activities were to continue without the Project.

13.4.3 Impacts from Employment and Training during Construction

Impact is largely positive as local employment is a key expectation amongst local village residents and their representatives, and this has been recorded during numerous stakeholder engagement activities.

However, there is a potential for local tensions to arise if residents within local communities incorrectly perceive that people from outside the local area are being provided with employment opportunities. Whilst local employment is generally a positive impact, a loss of reputation and negative perceptions towards the Project could occur if the local recruitment process is not adequately managed and negative perceptions arise.

Other types of negative impacts could also occur if the income earned is not spent in a sustainable, gender-inclusive manner. This may include, for example, male workers spending earned income on highly valued products (such as vehicles and motorbikes) which require capital for their ongoing maintenance and use, rather than on basic goods and services that may be required in the household.

Mitigation measures will be adopted to ensure local communities' expectations are managed with regard to the availability of jobs, to avoid disappointment.

13.4.4 Impacts from the Influx of Job Seekers During Construction

During construction there is a potential for people from outside the local area to turn up without invitation, seeking employment and other types of economic opportunities. This may result in a spread of communicable diseases, increased tensions between local people and newcomers, and may result in an increase in the local incidence of crime. The potential for influx to occur was reputedly mentioned during stakeholder engagement meetings with local community leaders and this is a key area of concern.

The impact is negative. Tensions may arise between locals and newcomers competing over Project benefits and opportunities, and this may also result in local inflation of basic food prices. Additional pressure on environmental and social welfare resources may also occur, alongside an increase in crime.

13.4.5 Health and Safety Incidents involving the Workforce and Local Communities

Occupational health and safety incidents during construction have the potential to impact the health of the workforce. A community health and safety incident during construction, such as a local person gaining unauthorised entry into a working area where excavations are present, could result in an injury or fatality. During operations emergency events could be linked to an electrical fire or catastrophic failure of a WTG.

13.5 Mitigation

13.5.1 Construction

The following sections set out the proposed mitigation during the construction phase.

13.5.1.1 Regional and National Economy

In order to strengthen the positive effects and record the use of Small-to-Medium Enterprises (SMEs) during construction, the following enhancement measures will be implemented:

- Where possible, the Project Company will seek to procure goods and services from SMEs based in Yakymivka district to ensure that the positive effects of using SMEs are experienced as close to the Project site as possible to enhance the positive benefits of the Project at this location. For this purpose, The Project Company will develop a Local Content Policy; and

- The total capital spent on SMEs during the construction phase will be recorded, broken down by where they are based and operational (i.e. at a local, regional and/or national level). This information will be collated and compiled into future Environmental and Social Performance Reports to provide stakeholders with information on how SMEs have been involved in the Project. The reports will also include details (presented as individual case studies) that reflect how the SMEs have benefitted from their involvement in the Project to date, using the information from interviews with business owners which will be accompanied by photographs and statistical/graphical summaries.

13.5.1.2 Impacts associated with changes in Land Use, Land Access Restrictions and Impacts to Land from Operation of the WTGs

The following mitigation and enhancement measures will be implemented:

- A survey of the individual areas of land to be disturbed will be undertaken to investigate the presence of irrigation equipment. If this is present, then the specific areas of land will be avoided to the extent possible. Where avoidance is not possible and irrigation equipment will need to be disturbed then the Project will, as part of the survey, identify ways to maintain the flow of water either side of the affected section of piping in consultation with the legal owner of the equipment. This could include, for example, using temporary piping/hosing to ensure that water can flow and be available to farmers in sufficient quantities so that it does not disrupt agricultural production. During construction works if any damage to irrigation equipment occurs then this will be immediately repaired by the Project Company, or legal owner (if they wish the repair to be undertaken by themselves), at no cost to the legal owner.
- The Project's grievance mechanism will be available that can be used to raise a concern about any aspect associated with the Project, the level of compensation received, or any other matter.
- Any land that is unexpectantly disturbed during construction works will be compensated at the unit rates stated above.

- Use of Local Accommodation by Non-Local Workforce. In the event that an accommodation camp is constructed for construction workers coming into the area, there is potential for conflict between local livestock farmers and construction workers. Minor adverse impacts are predicted. These effects are likely to be short to medium term during construction. Establishing clear rules for worker behaviour will avoid these issues. An Influx Management Plan to set out measures to manage the influx of migrant labour during construction minimising impacts on local communities.

13.5.1.3 Influx of job seekers

Increased risks to community safety and security are likely as a result of influx of workers and other individuals to the area. While worker camps are 'dry' and Camp Management Procedures will govern the behaviour of workers, potential risks to local communities may still exist from both workers and other migrants attracted to the area in search of income generating opportunities.

The following mitigation will be implemented:

- Appropriate training of security staff.
- Develop a code of conduct for security personnel and the general workforce.
- Introduce head of security personnel to neighbouring.
- Promote awareness of the Grievance Mechanism within local communities.

13.5.1.4 Plan Health and safety Incidents involving the workforce and local communities.

The Project will develop a Health and Safety Plan (for the workers), a Community Health and Safety Plan and a COVID-19 preventative measures plan. An Emergency Response Plan will also be prepared and available prior to the start of construction works. The nearest hospital, ambulance, fire station and police station will be identified in the Emergency Response Plan. A similar plan will also be prepared prior to the start of operations.

The Community Health and Safety Plan will include the following:

- A commitment to ensure that public access is restricted to all working areas during the construction phase. Fences will have signs with warning notices (in both Ukrainian and Russian) to deter people from entering. Contact details will also be placed on the fences that use the details in the grievance mechanism so that any person can request additional information on the fence lines, should they wish to do so;
- A commitment to engage with young people in local schools (including the schools engaged with during the ESIA which were: Municipal establishment of secondary school of I-III degrees in Vovchanske, Azov secondary school of I-III degrees of Kyrylivka rural council, Okhrimivska secondary school of I-III degrees, Municipal establishment of secondary school of I-III degrees in Shelyhu, and Secondary school N1 of I-III degrees in Yakymivka), to inform them about the start of construction works in advance, to educate them on the dangers inside fenced-off areas; and
- Warning signs indicating the presence of the wind farm along access roads (to be installed during both construction and operation) to inform local people of the dangers posed by the wind farm. This will include the potential for ice throw to occur during winter.
- Whenever there is a business operation in or nearby residential communities, the likelihood for the residents being impacted increases. These potential risks and impacts must be properly managed to the level of maximum control achievable.

Given the current COVID-19 pandemic, and as applicable prior to the start of construction, NBT / the EPC Contractor will produce a COVID-19 Preventative Measures Plan detailing guidelines to be followed on the Project site to prevent the spread of the virus amongst workers and prevent worker-community spread. Furthermore, information will be provided on training, job protection and social security provisions. The IFC guidance, "Interim Advice for IFC Clients on Supporting Workers in the Context of COVID-19" dated 06 April 2020[11] will be followed.

[11] Interim Advice for IFC Clients on Supporting Workers in the Context of COVID-19, IFC, April 2019

13.5.1.5 Increased community health and safety risks from road transport

The Project will develop a Traffic and Transport Plan. In addition to the Traffic and Transport Plan, a road safety campaign will be implemented in local schools within the communities of Atmanay, Davydivka, Kyrylivka, Kyrylivka, Nove, Okhrimivka, Radyvonivka, Shelyhu and Yakymivka. The purpose of the road safety campaign is to raise general awareness of the risks associated with road crossings, discuss the Project's road movements, and describe the extra caution that children need to take in relation to both road traffic, and also with the construction works that will be taking place across the regional area when the WTGs and internal roads are being installed.

13.5.2 Operation

13.5.2.1 Local Employment during Operation

The Project will develop and implement an Operational Employment Plan that contains many of the same measures included in the version used for the construction Phase. The Operational Employment Plan will include the following:

- Include targets for females for both skilled and low-skilled roles; and
- An outline of the redundancy process that will be followed at the cessation of operations and the start of decommissioning.

13.5.2.2 National and Regional Economy During Operation of the WTGs

In order to strengthen the positive effects, the following enhancement measures will be implemented:

- The Project will record the capital spend and location of SMEs used during the operational period so that an accurate record is available of the companies involved, broken down by their geographical location; and
- The Project will record the Project's generation of energy and contribution to the national grid. This information will be collated and compiled into future Environmental and Social Performance Reports to provide stakeholders with accurate information about the Project's contribution towards the countries energy generation sector.

14 Impacts on Civilian Aviation

14.1 Baseline Information

The location of airports and airfields in the vicinity of the Project were identified using Google Earth and OurAirports[12]. A 150 km study area was utilised for identifying airports and airfields due to the potential for collision and / or aviation radar impacts.

The nearest international airport to the Project site is Zaporizhia international airport, located approximately 150 km to the north of the Project. There is an air base situated approximately 20 km to the north of the Project near Melitopol.

14.2 Potential Impacts

A number of impacts on aviation and radar (both direct and indirect) can occur as a result of the presence of WTGs. Direct impacts relate to WTGs presenting as an obstacle where the WTG produces a physical obstruction to the continued safety of a flight. Principally, this would occur where the aircraft are closest to the ground, for example, on take-off and landing from or to aerodromes, or when taking part in low-flying activities such as military low-flying [13]In addition to this, WTGs can act as en route obstacles, interfering with a safe flight.

WTGs can also cause radar and other navigational aid interference whereby the blades appear as "clutter" on radar screens and can be mistaken for aircraft. Mitigation for this to date for wind farms has included blanking (covering part of the radar screen where the WTG is present).

In relation to the Project, approval of the location and height of projects which may affect the safety and operation of radio equipment relating to civil aviation is required under the Order of the Ministry of Infrastructure of Ukraine of 30 November 2012, number 721.

[12] Ourairports.com

[13] https://www.bbga.aero/wp-content/uploads/2011/08/20130701ManagingTheImpactOfWindTurbinesOnAviation_Script_FINAL_V1.pdf

The Project will carry out consultation with relevant authorities (including the Ukraine Ministry for Infrastructure) prior to construction to obtain feedback on the likelihood of the wind farm impacting on civil aviation / radar equipment or the operation of communication, navigation and observation systems.

Mitigation in the form of anti-collision lighting and marking systems on the blades to provide aviation safety will likely be required to reduce any impacts. This should be confirmed with the airport operator.

With the implementation of mitigation, impacts are considered Negligible and not significant.

14.3 Telecommunications

Wind farms may cause interference with television signal. Should any complaints be received from local communities with regards to signal interference, then the Project Company will employ and independent engineer to investigate and provide mitigation in the event of a valid complaint.

14.4 Conclusions

With the implementation of mitigation, impacts relating to aviation and radar are considered Negligible.

15 Climate change Risk Assessment

15.1 Introduction

The Climate Change Risk Assessment (CCRA) provides a high-level review of the following:

- The current and anticipated climate change risks (transition and / or physical as defined by the Task Force on Climate-related Financial Disclosures (TCFD) of the Project's operations.
- The plans, processes, polices and systems required for the Project to manage these risks (i.e. to mitigate, transfer, accept or control).

The assessment will also include a review of the Project's compatibility with Ukraine's national climate commitments.

15.1.1 Applicable Requirements

The Equator Principles (EPs) are a financial industry benchmark for determining, assessing and managing environmental and social risks of projects. There are 10 EPs which require consideration when developing a project with international funding. The latest revision (EP V4) came into effect in October 2020. The updates included a requirement to undertake a CCRA for all Category A and, as appropriate, Category B Projects. Due to the nature, location and scale of this project, it is considered to fall under Category B – "Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures''.

15.1.2 Project GHG Emissions

15.1.2.1 Construction phase

GHG emissions during the construction phase of the Project relate to the use of fuels for aspects such as generators, transport, on-site equipment, and machinery. Although the quantities of emissions have not been calculated, these are expected to be low and significantly less than 25,000 tones CO_2 equivalent (t CO_2eq per year) as stated in the Equator Principles.

15.1.2.2 Operational phase

During operation of the Project, there will be minimal GHG emissions, limited to the movement of machinery during maintenance and repair works. Due to the nature of a wind farm, no emissions will be emitted during operation of the WTGs.

The Project consists of 179 WTGs with a capacity of up to 4.5 MW. This results in a production of 6,942.3 GWh of electricity per year resulting in a reduction of around 3,550,000 t CO_2 eq per year.

15.2 Mitigation

15.2.1 Climate Change

Increases in heavy rainfall events and high winds could damage Project infrastructure. It is envisaged that insurance would cover these extreme weather events thereby reducing moderate to high impacts to low.

A rise in air temperatures and irregular rainfall events could impact on water availability. During construction (and also operation, as applicable), water conservation measures should be implemented including recycling of water where possible (for example, use of grey water for dust-dampening measures as required).

15.3 Residual Effects and Summary

The residual risks associated with climate change to the Project are anticipated to be low with mitigation measures in place. No significant residual impacts are anticipated.

16 Environmental Management

This ESIA has summarised the EIA process undertaken to identify the impacts that will arise from the Project construction and operation and the mitigation measures required to prevent or reduce these. During the detailed design stage, further consultations and surveys will be undertaken to refine the design and construction techniques. One of the key mechanisms for environmental management during the design and construction stages is the Environmental and Social Management Plan (ESMP) and associated subject plans which will be developed by NBT.

The most effective form of mitigation is to design the Project to avoid environmental impacts at source. Many environmental impacts have been avoided by sensitive layout and/or by commitment to the use of particular construction techniques and mitigation measures. In addition, construction and reinstatement techniques, that minimise environmental impacts, are well established.

The ESMP will ensure that the requirements detailed within this ESIA together with the Equator Principles and IFC Performance Standards are incorporated into the construction and operation of the Project.

16.1 Environmental and Social Action Plan

An important part of ongoing project management is the Environmental and Social Action Plan (ESAP). The ESAP is a separate document which lists a series of actions that the developer will undertake throughout the Project lifetime. This will include:

- Noise monitoring will be undertaken as part of EHS management measures
- Project design to take account of further studies still being carried out and in particular any issues that may be identified.
- EHS management plan will include independent bird observers (IOE) on site who will monitor bird flights across the site and who will be able to decide if action must be taken.
- Where large numbers of birds are recorded or where there is an important species of bird, the project is designed to shut down on demand to avoid bird collisions.
- As part of the developer's commitment to Corporate Social Responsibility (CSR) a list of CSR plans and activities will be prepared and will be discussed with local communities.

17 Contact Details

Further detailed information is contained within the Environmental and Social Impact Assessment, Environmental and Social Management Plan, Stakeholder Engagement Plan and Environmental and Social Action Plan. These documents can be found at: www.zophiawindfarm.com

For any questions in relation to the Project please contact:

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