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SUPPLEMENTAL ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT

For International Lenders

DNISTROVSKIY 100 MW WIND POWER PROJECT

UKRAINE

May 2019

Document History

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1. Introduction

1.1. General Introduction

This Environmental and Social Impact Assessment has been compiled by Ukraine Power Resources, LLC ("UPR") on behalf of Dnistrovska Vitroelektronstantsia LLC ("Project Company") in connection with the proposed 100 MW Dnistrovskiy wind power project ("Project" or "Wind Farm"), located about 40 km north of the Black Sea coast in the Odessa region of Ukraine. This Statement presents the findings of the Environmental and Social Impact Assessment ("ESIA") carried out on the proposed Project. It describes the main features of the development of the Project, identifies potential significant impacts, and examines the management, mitigation and monitoring measures appropriate for the Wind Farm.

This Environmental and Social Impact Statement ("ESIA") has been produced in accordance with the international standards required by international financial institutions ("IFIs"), as the project may require financing from such international investment banks. In addition, in line with the IFIs' requirements, the ESIS also addresses Ukrainian legislative requirements relating to environmental impact assessments and environmental protection. The information presented here was used to support the preparation of Ukraine required Environmental Impact Assessment ("EIA"), the legislation for which was recently amended (Law of Ukraine "On Environment Impact Assessment").

1.2. Main Project Characteristics

The Dnistrovskiy wind farm will comprise up to twenty-six (26) wind turbine generators ("WTGs" or "Turbines") each with a rated output of between 3.8 and 4.0 MW. It was determined that the total installed electrical generating capacity of the Wind Farm will be 100 MW with the possibility of expanding up to 150 MWs if additional interconnection capacity is provided. UPR has shortlisted three Turbine options for the Project: GE 137-3.8 MW 131 HH, Nordex N131-3.9 MW134 HH and Vestas V136-4.0 MW 112 HH. A final decision on turbine supply will be made no later than the 4th Quarter of 2018.

The WTG currently being evaluated for the Project is the GE Wind 3.8 MW turbine on 131 meter towers and with rotor diameter of 137 meters.

- The construction of appropriate foundations for the Turbines and construction of site roads; the construction of appropriate infrastructure including underground power cables, a substation and connection to the main electrical grid;
- the transport of WTG components (e.g. blades, towers, nacelles) to the site;
- the erection of the Turbines;
- the operation and maintenance of the WTGs for approximately 20 years; and,

- replacement or decommissioning of the Turbines. In the event that decommissioning is chosen, the process will involve the removal of plant components, removal of associated infrastructure where appropriate, and reinstatement of the land.
- All raw materials and plant components will be obtained from offsite sources. Therefore, a key aspect of the project during construction is to ensure that appropriate transport routes are in place.
- Where possible, local labor will be used in the construction of the wind farm. However, the construction of the turbines will require specialist technical expertise that will be imported from outside the Project area.

1.3. Project Location

The design area of the Dnistrovskiy Wind Farm is located to the north of Bilgorod-Dniester. The site elevation is between 70 and 130 meters above sea level. In the East, the project area borders on the Dnistr Estuary, and in the West, it borders on agricultural land. The site is crossed by the Odessa-Izmail motorway (E 87) a road of local importance, which passes practically across the entire site of the WEU (Fig. 1).

Figure 13. Plan of the project territory placement of the Dnistrovskiy wind power plant

Located within the project area are the communities of Starokozache, Kozatske, Udobne, Semenivka and Moloha. On the boundaries and surrounding the project area are the Communities of Zelenivka, Petrivka, Krutoyarivka, Krasnaya Kosa, Vesele, Honcharivka and

Pivdenne. Full descriptions of the communities are provided in Section 10.4.1.3. Agricultural production is the dominant activity in the region.

The length of the project area is about 24 km, and its width is from 2 km to 8 km. The total area of the WES territory is approximately 96 km. The administrative design area belongs to Bilgorod – Dnistrovsky district of the Odessa region.

1.4. Project Categorization

The legislation and standards associated with the development, construction, operation and eventual decommissioning of the Project are discussed in detail in the following sections. In accordance with applicable environmental legislation and investment standards it is necessary to determine the classification of proposed developments in terms of their potential environmental and social impacts which in turn determines the type and depth of impact assessment necessary. In general, the highest category projects are deemed to have the potential to cause the most significant impacts, medium category project potentially have limited impacts and low category project have minimal or no impacts. In the parlance used by international investment banks, the classification of projects runs from Category A (highest), through B, to C (lowest).

To determine the appropriate classification of the Project we have:
• reviewed the proposed site layout plans;
• reviewed the engineering design of the proposed project;
• reviewed how the project will be constructed and decommissioned;
• determined the sensitivity of the environment which may be impacted by the proposed project
• identified project stakeholders.

Based on available information, analysis of similar projects, and a review of EBRD and IFC (World Bank Group) the Wind Farm has been classified as Category A for the following reasons:
• the scale and its location could potentially have significant impacts on the environment;
• the project could potentially have significant socio-economic impacts;
• there is precedence that similar sized projects elsewhere which have sought external investment have been classified as Category A projects.

In accordance with international banking standards, Category A projects are subject to:
• full Environmental and Social Impact Assessment (ESIA);
• evaluation of alternatives, including non-implementation;
• recommendation of mitigation or other measures to prevent or minimize impact; and.
• public disclosure.

This Environmental and Social Impact Statement (“the Statement”) presents the outcome of the assessment process described above. The following sections describe the contents of this Statement and the underlying regulatory and other mechanisms by which the impact assessment of the proposed Project is assessed.

2. ESIA Objectives

2.1. Contents of this Assessment

This Statement contains the following sections:

Section 1 – Introduction: including an overview of the main Project characteristics including location and rational for categorization.

Section 2 – ESIA Objectives: provides overview of contents of assessment and associated documentation.

Section 3 – Methodology: discussed methodology used in this assessment.

Section 4 – Applicable International Environmental and Social Standards: Provides background on International and Ukrainian regulatory and environmental and social standards that drive the ESIA process.

Section 5 – Scope of the ESIA: summary of scoping study process.

Section 6 – Technical Description: Provides a detailed description of the Project including the Project rationale, location, Project program, and design. Outside of the scope of BAT, but also described in this section, is the infrastructure associated with the Wind Farm and connection to the grid. Section 8 also provides details of project alternatives considered.

Section 7: Compliance with International Best Practices: This section reviews the wind farm design against the international standards (considered to be Best Available Techniques or "BAT") designed and in operation for similar wind farms.

Section 8 – Project Alternatives: Detailed overview of project alternatives considered.

Section 9 – Greenhouse Gas Emissions Assessment: Assessment of greenhouse gas emissions using EBRD methodology.

Section 10: The Existing Environment: Provides a background to the physical, natural history and human characteristics of the proposed Project area and surrounding areas which may be impacted by the proposed development.

- Section 11 Assessment of Impact: Provides and assessment of impact of the proposed Project in terms of the envelope of the existing environment described in Section C.

- Section 12: Management and Mitigation: Where potential impacts, realised impacts or potential risks have been identified in Section 11, Section 12 proposes how these impacts and risks may be managed or mitigated.

- Section 13: Summary of Impacts and Mitigation Measures. This section presents a summary of Sections 11 and 12 together with an estimation of the residual impacts once mitigation measures have been implemented.

- Section 14: Further Information: Includes contact information for the Company and a bibliography.

2.2. Documentation Associated with this Statement (Disclosure Package)

The collection of documentation generated by the ESIA process is called the "Disclosure Package". In addition to this Statement, the ESIA process has also involved the production of the following documentation:

- Stakeholder Engagement Plan ("SEP")
- Non-Technical Summary ("NTS")
- Environmental and Social Action Plan ("ESAP") and supporting management documents

The purpose and content of each is described below.

The Stakeholder Engagement Plan ("SEP") is a document which identifies project stakeholders, and sets out how the stakeholder engagement will be achieved and managed. Stakeholders are all persons or groups who have a vested interest in the proposed project during any phase of the project life time. Stakeholder engagement encompasses contact, communication and dialogue between the Project and stakeholders through consultation and disclosure. The SEP is a 'live' document and will therefore be regularly monitored, reviewed and updated to ensure that it is in line with the Project's developments, and incorporates any possible changes to key stakeholders.

The purpose of the Non-Technical Summary ("NTS") is to give information to everyone that may be interested in the Project. As the name implies, the document is written using non-technical language to ensure that the findings of the ESIA can be understood by the majority of the population.

The Environmental and Social Action Plan ("ESAP") details the terms of agreement between finance institutions and the client in order to ensure that the project implementation is undertaken in accordance with the requirements of the finance institution. Other documentation will also be produced which will be used to manage the project, including a Construction Environmental Management Plan ("CEMP") and an Operational Environmental Management Plan ("OEMP"). A key driver for the development of these documents is local regulatory requirements, but they also form part of the Environmental and Social Management System ("ESMS") required for effective management of projects by international finance institutions. These are developed at an

appropriate, predetermined time later in the project development in accordance with local regulatory requirements and the requirements of the finance institutions, if relevant to the Project.

2.3. Availability of the Impact Assessment Documentation

The documentation relating to the ESIA will be available at the following locations:

- The Non-Technical Summary ("NTS") and Stakeholder Engagement Plan ("SEP") will be placed on the "Ukraine Power Resources" website (www.ukrainepowerresources.com). The website will also contain information on where the full documentation will be available in hard copy format. It is expected that the full ESIA, the NTS and SEP in the Ukrainian language will be available at Ukraine Power Resources offices in Kiev as well as locally in Bilgorod-Dnistrovskiy.

- The full ESIA documentation, NTS and SEP, in English and Ukrainian, will be presented to the Bilgorod-Dnistrovskiy state district administration and at the local communities. Dates will be confirmed and announced shortly.

- Public hearings on the Ukrainian EIA were held in August 2018 in the villages of Udobne, Starokozache, Kozache, Semenivka and Moloha.

All presentations were attended by UPR senior management and CSR team. UPR continues to provide information on the progress of the Project to local communities through meetings which are held regularly as part of the Corporate Social Responsibility Program. Minutes of these meetings are kept at the corporate offices of the Project Company.

3. Methodology

3.1. Impact Assessment Approach

This section describes our general approach to the ESIA of the Dnistrovskiy wind farm project. The approach to this ESIA has been informed by:

- the requirements of the international investment banks, namely the requirements of the European Bank for Reconstruction and Development (EBRD), the World Bank Group, and the Overseas Private Investment Corporation;
- Ukrainian regulatory requirements, in particular as well specific regulatory requirements such as those associated with tree cutting and noise emissions;
- the requirements of the European Commission, namely EC Directive 2011/92;
- the nature of the project design;
- the environmental and socio-economic background of the proposed project area;
- the expertise of the ESIA team members in undertaking similar projects.

The following sections discuss the Impact Assessment process and the regulatory and other requirements to which the assessment adheres.

Throughout this report, potential environmental and social impacts that may be caused by the construction phase of the project are identified using the available information. Where possible an assessment has been made of the likely severity of these impacts based on current information and the experience of the assessors. A detailed assessment of these impacts and the measures to reduce the severity of the impacts will be proposed (termed “mitigation measures”) has been undertake within the ESIA. The impacts and mitigating actions are summarized within the Environmental and Social Action Plan (ESAP).

4. Applicable International Environmental and Social Standards

4.1. Introduction

As described in Section 1.4, the Project has been categorized as a Category A project. Since the developer associated with this project may be seeking finance from one or more finance parties, the Project is subject to the standards of international finance organizations. These standards and how they apply to the project and the assessment of impact are discussed in this section of the Statement. The standards that are applicable to this project are listed below:

- The policy and standards of the EBRD.
- The policy and standards of the IFC.
- The policy and standards of OPIC.
- Ukraine Legislation.

The purpose of the standards is to:

- ensure that all projects which are subject to investment undergo appropriate assessment;
- ensure that there are no impacts associated with the proposed investment which are contrary to the finance parties environmental and/or social policies; and,
- prevent reputational or financial damage to the investor.

Also, in order for the project to be in line with international standards, it will be necessary to comply with the requirements of Ukrainian legislation and EU directives. This is discussed in the section below.

4.2. Specific International Investment Requirements

Guidance on international investment requirements is provided within the EBRD Environmental and Social Policy (EBRD, 2014) and the International Finance Corporation (IFC) Performance Standards on Social & Environmental Sustainability (IFC, 2012). Other detailed documentation also applies, including the IFC Environmental, Health and Safety General Guidelines (IFC, 2007a) and the Environmental, Health, and Safety Guidelines for Wind Energy (IFC, 2015).
For the purposes of this description we will refer to the EBRD process and their terminology. The main steps are:

- Screening Study and Project Categorization;
- Stakeholder Engagement Plan;
- ESIA Scoping Study;
- ESIA;
- Public Consultation on the ESIA Disclosure Package;
- Management of grievances / objections; and,
- Project Monitoring.

For the purposes of the Project a screening assessment report was not produced. It was clear from the information available that an impact assessment would be required. The environmental and social assessment process itself can be split into the following stages:

- **Baseline Assessment**: Baseline data collection including surveys. Appraisal of current baseline conditions from data collected and surveys undertaken. Prediction and appraisal of how the baseline would be expected to change in future.

- **Impact and Effects Prediction**: Use of predictive techniques such as models or change indicators to identify likely impacts and to derive their potential effects.

- **Impact and Effects Assessment**: Allocation of significance and severity levels using defined thresholds and criteria.

- **Mitigation and Management**: Identification of measures to mitigate adverse effects, and assessment of their effectiveness.

- **Identification of Residual Impacts and Effects**: Allocation of significance and severity levels (with mitigation in place) using defined thresholds and criteria.

It should be noted that these stages are not undertaken exclusively after the completion of the Scoping Assessment. Instead, it is necessary to partially undertake the sub-stages named above, in order to inform the Scoping Study. Also note, whilst the Stakeholder Engagement Plan (SEP) feeds into the Scoping Study and then the ESIA itself, the SEP and the ESIA essentially run in parallel and inform one another throughout the ESIA process. The balance of each technical and social investigation is determined in advance and discussed with the local regulatory authorities before the ESIA is completed.

While the SEP and Scoping Study are key mechanisms in describing the works that must be undertaken to complete the ESIA Disclosure Package, as the Environmental and Social Assessment Process advances and further insight of potential issues are identified, this in turn feeds back into the scoping process. For example, ecological investigations may identify potentially sensitive species and/or significant impacts. This may therefore warrant and amendment to the original scope in order that further studies can be undertaken.

4.3. Applicable Legislation

The following sections provide an overview of the key national and international laws, regulations and designations associated with the proposed project and project area. The laws, regulations and designations presented in the following sections have been determined by the scale and nature of the project and the scope of the project assessment agreed with the Ukrainian regulatory

authorities, EBRD, IFC and OPIC. Since the regulations which are applicable to the Project are many and diverse, it was decided to include only the key requirements associated with the Project that are applicable to potential significant impacts. A full and detailed list of legislation associated with the project will be developed as part of the project management systems from construction, to operation, through to decommissioning.

The competent authorities and organizations which have or are likely to issue conditions and approvals for the purpose of the Detailed Plan of Regulation of the wind farm were the following:

- Architecture and Urban Planning Council
- Ministry of Ecology and Natural Resources of Ukraine
- Ministry of Defense of Ukraine
- Civil Aviation Directorate of Ukraine (Kiev)
- Military Aviation Directorate of Ukraine (Kiev)
- Municipality of Starokozache, Department for construction land, roads and communal issues (Starokozache)
- Odessa Oblast Public Works Department (Odessa)
- National Public company for electricity transmission "Ukrnergo" (Kiev)
- Regional Private company for electricity transmission "Odessa Oblernergo" (Odessa)

The location and boundary of the wind farm site is shown in Figure 1. The proposed site is located on flat agricultural farm land interspersed with tree rows and hedges.

4.4. Local Regulation of Construction and Operation of Wind Farms

The legal framework related to construction and operation of wind farms comprises: (1) regulations related to planning and construction, and (2) regulations related to energy production:

Regulations related to planning and construction

- Obtaining the urban planning conditions and restrictions – Urban planning and architecture authority (organizational unit of the district state administration or executive committee of the city council);
- Obtaining technical specifications (a set of conditions and requirements to engineering support of the construction project which must comply with its design parameters, in particular those related to water, heat, electric power and gas supply, sewage, radio broadcasting, outdoor lighting, waste water disposal, telephone networks, telecommunications, building management systems, fire protection and technogenic safety) – The specifications are provided by the authorities responsible for engineering support of the construction project (water, heat, electric power and gas supply, sewage, outdoor lighting, telephone networks, fire protection and technogenic safety, etc.);

- Negotiations on location and construction of facilities with actual height exceeding 50 meters – Ministry of Defense, State Aviation Authority, Ukrainian State Air Traffic Services Enterprise;
- Preparation of design specifications and estimates (Feasibility Study, Project, Detailed Design Documentation, Financial Estimate) pursuant to State Construction Standards (SCS) A.2.2–3–201 design documentation;
- Conducting a (comprehensive) expert review regarding integrity, reliability and durability of structures, their operational safety and engineering support; public sanitation and disease control; labor protection; ecology; fire protection and technogenic safety; energy saving and energy efficiency budget component of project construction – Expert organizations which have a special professional certification;
- Registration of a notice on commencement of preparatory works – State Inspectorate for Architecture and Construction Control or its local office;
- Obtaining a permit to perform construction works (for facilities of CC2 and CC3 class of consequences) – State Inspectorate for Architecture and Construction Control or its local office.

Regulations related to energy production:

- Filing an application for obtaining a license for electric power generation to National Commission for State Regulation of Energy and Public Utility Services (NEURC)*;*
- Issuance of a license for electric power generation (NEURC);
- Filing an application for membership in the Wholesale Electric Power Market (the "WEM") with the Wholesale Market Board;
- Admission to the Wholesale Electric Power Market – *The Wholesale Market Board*
- Signing "The Agreement between Participants in the Wholesale Electric Power Market in Ukraine" dated 15 November 1996.
- Providing information on availability of ASKOE, types of metering devices, level of accuracy of the system of electricity and other information foreseen by p. 2.1.6. Agreement between Participants in the Wholesale Electric Power Market in Ukraine (15 November 1996)

4.5. Environmental Impact Assessment of Wind Farms

There are many legal and regulatory requirements on environmental assessment and the project approval process in Ukraine. Those regulations that are directly relevant are listed, but not limited to the following:

- The Law of Ukraine on Environmental Impact Assessment, 2017 (transposing EU EIA Directive 2011/92/EC)
- The Law of Ukraine on Environmental Protection, 1991;
- The Law of Ukraine on Environmental Review, 1995;

- Ukrainian State Construction Norm on EIA Components and Content, DB A.2.2-1-2003 with amendments in 2010;
- The Law of Ukraine On Ratification of the Convention on the Environmental Impact Assessment in a Transboundary Context (Espoo Convention), 1999.

The legal framework related to environmental impact assessments of wind farms in Ukraine is set forth below:

- Notification to the authorized state agency (either local state administrations or Ministry of Ecology and Natural Resources of Ukraine) about planned activity which is subject to EIA.
- Preparation and submittal of the EIA report;
- Public hearings;
- Review and approval of the EIA report, any other information, including information obtained during public hearings – authorized state authority;
- Issuance of the permit for planned activity, e.g. construction permit.

4.6. Regulatory Controls on Overhead Power Lines

Overhead Power Lines will not be constructed as part of the proposed Project. Design and construction of overhead power lines ("OHL") is regulated by the Cabinet Resolution No. 209 "On Approval of the Rules for Protection of Electrical Networks" dated 4 March 1997.

4.7. Summary of Socio-Economic Administrative Boundaries and Regulatory Administration

4.7.1. Ukrainian Regulatory Background

The territorial organization of Ukraine is regulated by the Law of Ukraine "On Legal Succession of Ukraine" (No. 1543-XII) and "On State Border of Ukraine" (No. 1777-XII). Including Sevastopol and the Autonomous Republic of Crimea, Ukraine consists of 27 regions: twenty-four oblasts (provinces), one autonomous republic (Autonomous Republic of Crimea), and two cities of special status – Kiev, the capital, and Sevastopol. The 24 oblasts and Crimea are subdivided into 490 raions (districts) and city municipalities of regional significance, or second-level administrative units.

At the raion level, self-government is represented by raion councils. In addition to this, there are more than 12,000 councils governing urban areas and councils governing rural areas or villages, which are the smallest territorial unit for the governance of Ukraine. The present Ukrainian system of regional and local government is typical of post-Soviet states.

Ukraine is a unitary state, governed in the form of a republic. The Constitution of Ukraine establishes the separation of powers; the role of the President as head of state; the role of the Verkhovna Rada as the sole legislative body; the Cabinet of Ministers of Ukraine as the highest

body in the system of executive power; and the Supreme Court of Ukraine as the highest judicial body. The Parliament (Verkhova Rada) consists of 450 deputies whom Ukrainian citizens elect for a four-year term.

Chapter XI of the Ukrainian Constitution sets forth the principles of local self-government. The Law of Ukraine "On Local Self-Government in Ukraine" (21/05/1997) determines the basic principles of the activity of local self-governmental bodies, while "On Local State Administrations" Law of Ukraine No. 586-XIV dated 9 April 2009 establishes the principles, functions and responsibilities of local governments and officials. Local councils are led by a Head.

Key responsibilities of local self-governments include: ensure adherence to the Constitution and laws of Ukraine; ensure implementation of national and regional programs for social, economic and cultural development, and environmental protection; draft and implement oblast and raion budgets; and provide implementation reports on local budgets and programs.

4.7.2. Land Use and Property Transactions

The availability of a Detailed Plan of Territory (DPT) is a prerequisite to get ownership/lease rights for land in Ukraine.

As per the Law of Ukraine No. 3038-VI dated 17 February 2011 "On Regulation of City Planning Activity", Article 24, paragraph 3, 4: "In the absence of a zoning plan or detailed plan of the territory approved in accordance with the requirements of this Law, the transfer of land in state or communal ownership to natural persons and legal entities for city planning purposes is prohibited. A change of the designated purpose of land not corresponding to a zoning plan and/or detailed plan of the territory is prohibited.". Some Detailed Plans of Territory are publicly available, however if a detailed plan of the needed territory does not exist, a company must apply to the relevant government authority which will make an order to hire qualified expert organizations for its preparation and publication. A Detailed Plan of Territory within the settlement is considered and approved by the executive body of the village, city council within 30 days from the date of its submission and in the absence of a territorial zoning plan approved in accordance with the procedure established by this Law - the corresponding village, settlement, city council. Law of Ukraine No. 3038-VI dated 17 February 2011 "On Regulation of City Planning Activity", Article 19, paragraph 8.

In order for the location of the Project to comply with Ukrainian environmental, sanitary and urban building legislation and the requirements of DBN 360-92 and DSP-173-96 a detailed plan or the territory must be developed in accordance with the Bilhorod-Dnistrovskiy Regional State Administration of the Odessa region No. 131/ A-2018 dated 23.03.2018 which will determine the most favorable location for the Project from an environmental, sanitary, urban, economic and technical point of view.

4.7.3. Moratorium over Private Land for Commercial Agriculture

The Land Code of Ukraine No. 2768-III dated 25 October 2001 Section X, paragraph 15, subparagraph b prohibits the purchase or sale or other means of alienation of the land plots and change of the designated purpose (use) of the land plots for commercial agriculture owned by citizens and legal entities, the land plots allocated in kind (on the ground) to owners of the land shares for own agricultural activity, as well as the land shares, except transferring them by succession, the exchange of a land plot for another land plot in accordance with the law and the seizure (purchase) of the land plots for public needs, and except changing the designated purpose (use) of the land plots for the purpose of providing them to the investors, which are the parties to the products distribution agreements to implement activity under such agreements.

4.7.4. Lease of Public Land / Servitudes over Private Land

Generally speaking, the Project SPV requires two types of land rights, leases and easements.

Leases are granted by the relevant Communal Reserve or the State/District Reserve and are required for WTG foundations which can measure up to 30 meters x 30 meters. Leases can also be used to secure the main Crane Pad adjacent to the WTG foundation which measure up to 30 meters x 60 meters. In certain circumstances, the lease of land could also cover the Auxiliary Crane Pad(s) which can measure 10 meters x 10 meters. The local state land authority (through the Center for Administrative Services) and /or a certified land appraiser perform appraisals of the relevant land plots during the DPT process in order to fix an "arms-length" lease rent amount. Approval of the Urban Planning and Architecture Authority is required for all leases prior to signature by the Project SPV.

Servitudes are granted over private land and typically cover access roads which are no wider than 5 meters, pylons for overhead power lines measuring up to 40 meters x 40 meters per pylon, and substation placements which can measure up to 1 hectare. If the land in question is used by a person other than the landowner, the Project SPV must obtain a notarized consent for use of the land from the user. Servitudes are not subject to the moratorium for private agricultural land.

It is noteworthy that Ukrainian law does not require servitude rights to be secured below overhead power transmission lines. Servitude rights are only required under the cable supporting pylons.

If the cables are placed underground, long-term servitude agreements regarding the subsoil cables are required in accordance with the Ukraine Law "On energy lands and legal regime applicable to special zones of energy development projects" dated 09 June 2010.

In certain instances, the Sponsor negotiates with the land owner and the land user of land classified as commercial agricultural land to "return" a portion of the land to the State so that it

may in turn be leased to the Project SPV. The value of such land is valued on an "arms-length" basis.

4.7.5. Ukraine Information Disclosure Requirements

In accordance with the Law of Ukraine No. 2939-VI dated 13 January 2011 "On Access to Public Information", the information not legally qualified as restricted information shall be considered public. The right to have access to public information cannot be restricted.

Access to public information shall be secured in accordance with the following principles Section I, Article 4:

transparency and openness of activities of government agencies;
free receipt, distribution of information and any other way of distribution of information, which is provided or disclosed in accordance with the law, except when restricted by the law;
equality of rights, regardless of race, political, religious, and other beliefs, sex, ethnic and social origin, material status, place of residence, language, or other characteristics;

Access to public information is secured by Section II, Article 5:

systematic and timely publication of information through: official print media, official web-pages on the Internet, Unified State Portal of Open Data, information stands; any other means not prohibited by law.
provision of information on request.

4.7.6. Labor and Working Conditions

As provided by the Labor Code of Ukraine No. 322-VIII dated 10 December 1971, the right of Ukrainian citizens to work - that is, to receive work with a salary not lower than the minimum salary established by the State - including the right to free choice of profession, type of activity and work, is provided by the State. The State creates conditions for effective employment of the population, promotes employment, training and development, and if necessary, provides retraining of persons available as a result of transition to a market economy.

Employees have the right to rest in accordance with the laws on limitation of working hours and working week and on annual paid vacations, the right to healthy and safe working conditions, association in trade unions, the right to participate in the management of an enterprise, institution, organization, the right to material security under the procedure of social insurance in old age, as well as in case of illness, full or partial disability, the right to welfare assistance in case of unemployment, the right to apply to the courts to settle labor disputes, regardless of the nature of the work performed or position, except for the cases provided by law, and other rights established by law.

As basic working conditions, the following basic requirements are to be observed by an employer: the working week shall not exceed 40 hours, the duration of a weekly continuous rest must be at least 42 hours; overtime work is permitted only (1) under the circumstances provided for by the law, (2) upon the prior consent of a trade union (if any), (3) with a limited duration, and (4) with payment at double rates; the basic annual paid vacation of an employee shall not be less than 24 calendar days; transfer to another job, work at another company or in another location can be carried out only with the consent of an employee; changes in material working conditions (modification of the system and amount of labor remuneration, benefits, work regime, etc.) can be introduced upon provision of 2 months prior notice to an employee, etc.

4.8. Relationship between International ESIA and Ukrainian EIA Processes

The two processes are generally aligned in terms of the requirements for assessment of environmental impact. However, the international investment requirements can be seen as a standalone, integrated process and therefore need to encompass the requirements associated with regulatory mechanisms such as those which are part of the local 'planning process' and are outside the formal environmental impact assessment process. For example, issues associated with local grievances arising from land purchase for the project are managed locally by local regulatory authorities. In the ESIA process, these local issues must also be encompassed in the integrated impact assessment. To ensure compliance, the more stringent of the two was complied with when a variation between the two was noted. ESIA for Ukrainian legislative process has been compiled and was based on the information contained in this Statement.

4.9. Regulation of Protected Habitats and Species

4.9.1. National and International Habitat Designations

The north-east boundary of the proposed Wind Farm is situated in the vicinity of the Dnistr Estuary, which is part of the Lower Dniester National Park and included under the Ramsar Convention, an international treaty for conservation and sustainability of wetlands to which Ukraine is a signatory. The Lower Dniester National Park is included in the Emerald Network, an ecological network of areas of special conservation interest which was implemented under the Bern Convention.

The Dnistr Estuary is a bay on the north-western coast of the Black Sea, in the Dniester River. The bay resorts to land from south-east to north-west by 41 km, a width of 4-12 km, a depth of 2.6 m. The Dniester estuary is separated from the sea by a narrow sandbone of Bugaz, in the southern part of which there is a passage in the sea - the Tsar'gegradskaya mouth. In winter, the Dniester Estuary often freezes. The coast of the Dniester estuary is strongly dissected by the beam network. The depth of the beam network reaches 15-20 meters, with absolute predominance, along the left bank of the estuary of small, but deep ravines. The width of these ravines is 10 to 150 meters. Jari have steep slopes, with an angle of inclination up to 80 °.

The Dnister Estuary is the largest freshwater estuary in Ukraine and represents an important fish habitat in Ukraine with a number of rare and endangered fish species. Aware of the potential significance and sensitivity of the Dnistr Estuary, the Sponsors voluntarily decided to move the border of the Wind Farm over 1.3 km away from the boundary of the shoreline. There are no protected areas of state, regional and local importance within a 7 km radius of the site of the Wind Farm.

The coastline area in question is regulated by the Convention on the Protection of the Black Sea Against Pollution (the "Bucharest Convention"), the primary legal document that comprises the regional framework for the environmental protection of the Black Sea.

On a regional scale, the Nizhny Nhistorovsky National Park (NNNP), created in 2008, is located within the upper limits of the Dnieter estuary at a distance of approximately 7-8 km from the proposed Wind Farm. The most important ornithological resource areas are located a distance of approximately 10-12 km from the proposed Wind Farm. NNPP is a natural territory of the Dniester and Dnister Estuary delta with an area of 21,311.1 hectares with zones differentiated by individual protection regimes. The main objectives of the protected areas are measures aimed at protecting natural water-bog and steppe landscapes, biodiversity, including and species of birds confined to seasonal clusters (nesting, migration, wintering). The value of certain seasonal bird populations depends on the condition of the year. The largest changes in the number of birds occur in periods of nesting and wintering, so in some years the birds in these periods have either a large number or almost absent. Migration clusters are mostly stable in the Dnister Delta, especially in the northern part of the Dnister Estuary.

Figure 2 below denotes the regional territories of ecological significance near the Project area.

Figure 2 Territories of ecological significance

Fig. 2. Regional territories natural reserve fund.
- NFP territory (NNPP - Nizhnednistrovsky national natural park,
- the design area of the Dniester wind farm site

Рис. 3. IBA території.

1- Ramsar site "between the Dniester and Turunchuk"
2 - Ramsar site "Northern part of the Dniester estuary"

Being an accession country looking to join the European Union (EU), Ukraine also has a duty to begin integrating its legal framework with that of the EU. Relevant pieces of EU legislation to nature conservation are:

- Council Directive 2009/147/EC on the conservation of wild birds (known as the 'Birds Directive');
- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (known as the 'Habitats Directive');
- Directive 2011/92/EU (known as the 'EIA Directive')

Recent revisions of Ukrainian law in relation to the conservation and protection of nature have begun this process of integration with EU law. For example, an important step was made on November 21, 2014 with the signing of the Coalition Agreement of Ukrainian Parliament's Parties. This document includes a chapter on "Environmental Management Reform and Integration of Environmental Policy of Other Sectoral Policies." Additionally, Ukraine adopted the law "On Environmental Impact Assessment" (No. 2059-VIII) on May 23, 2017 which transposes the EU EIA Directive (Directive 2011/92/EU).

4.9.2. Ecological Protection for Wind Farm Developments

At present no official guidance with respect to ecology and wind farms exists in Ukraine. Available literature which has been considered in evaluating the potential environmental impacts of the Wind Farm and which have been included in the ESIA process include the following:

- Scottish Natural Heritage Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms (2014)
- Natural England Technical Information Note TIN069 in 2010 (Natural England, 2010). - -
- Birdlife International guidance on species potentially sensitive to impacts from wind farms (Langston and Pullan, 2003).
- European Commission guidance document on how best to ensure that wind energy developments are compatible with the provisions of the Habitats and Birds Directives.
- U.S. Fish and Wildlife Service (USFWS) Land Based Wind Energy Guidelines (rev__).
- New York State Department of Environmental Conservation Bird and Bat Study Guideline for Commercial Wind Farms.
- IFC Environmental, Health, and Safety Guidelines for Wind Energy (April 2007).
- UPR Corporate Guidelines for Conducting Bird and Bat Studies in Ukraine.

The initial Wind Farm site selection process considered known migration pathways and areas where birds (and bats) are thought to be concentrated. Examples of high-concentration areas typically include wetlands, designated wildlife refuges, staging areas, rookeries, bat hibernation areas, roosts, ridges, river valleys, and riparian areas. The Sponsors also configured turbine arrays to avoid potential avian mortality (e.g. group turbines rather than spread them widely or orient rows of turbines parallel to known bird movements). The Project is implementing appropriate storm water management measures to avoid creating attractions such as small ponds which can attract birds and bats for feeding or nesting near the wind farm.

4.9.3. Bats

All of the bat species in Ukraine are protected under the Law of Ukraine "On Environmental Protection" (No. 1264-XXII, VVR) and other legislation. Ukraine has ratified and, for the most part, implemented all of the international conventions regulating the protection of bats. The most important of these include the Convention on the Conservation of European Wildlife and Natural Habitats (the "Bern Convention") and the Convention on Migratory Species of Wild Animals (the

"Bonn Convention"). All European bat species are listed in Annex II to the Bern Convention (strictly protected species) except for Pipistrellis pipistrellis/Common Pipistrelle, which is listed in Annex III (protected species). All of the populations of European Bats are listed in Annex II to the Bonn Convention. The implementation of the Bern Convention in the EU is regulated by the EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (the "European Habitats and Species Directive") (Official Journal Of The European Union 92/43/EEC) and all of the bat species are listed in Annex II to that Directive.

4.9.4. Birds

The northern part of the Dnistr Estuary is an IBA territory, which is an important area for the protection of birds. The nearest areas of high biodiversity are located at a considerable distance from the Project site (up to 8 – 12 km). This territory is also part of the Nezhinodnistrovsky national natural park (NNPP). Since the territory in question is located in a national park, the IBA has a minor significance, as IBA territories are not protected and do not have the status of protected area. In national natural parks, protection of natural complexes is a priority task.

UPR commissioned a number of intensive ornithological studies from the experts at the Melitopol State Pedagogical University; the report shows the presence of bird species near the Project area that are listed in international and domestic environmental lists including:

- Red Book of Ukraine
- International Union for Conservation of Nature (IUCN)
- European Red List
- Bonn and Berne Conventions
- Washington Convention on international trade in endangered species of wild fauna and flora threatened of extinction (CITES)

The report concluded that the number of exotic species from the national lists of security within the Dniester WF during autumn migration is extremely small, and the populations are not threatened by the activities related to the construction and operation of the Dnistrovskiy WPP.

Based on a desktop study and review of all literature on the region, species diversity of birds in the Dniester Delta has evolved over time and has been and is influenced by a number of factors including abiotic, biotic and anthropogenic factors. In total, 301 species have been registered in the delta over the past 100 years. These include 70 sedentary species, 125 nesting species,80-100 migratory species, 60 wintering species, 20 nomadic species 20, and 35 species which rarely occur. Nesting birds nest in several habitats: forest, reeds, meadows, among others.

The main limiting factors influencing the state of birds are anthropogenic factors:

- transformation of natural ecosystems;
- destruction of nesting and fodder habitats;
- reduction of feed base;

- fires of reed beds in the spring;
- felling of forests;
- industrial harvesting of cane;
- Emergency discharges of the Dniester hydroelectric power station.

The largest changes in the number of birds occur in periods of nesting and wintering, so in some years the birds in these periods have either a large number or almost absent. Mainly, migration clusters are stable in the Dniester delta, and especially in the northern part of the Dniester estuary.

4.9.5. International Conventions

Ukraine is a party to the following international agreements and conventions related to bird and bat conservation:

- Agreement on the Conservation of African-Eurasian Migratory Waterbirds ("AEWA")
- Convention on Biological Diversity ("CBD")
- Convention on the Conservation of European Wildlife and Natural Habitats ("Bern Convention")
- Convention on the Conservation of Migratory Species of Wild Animals ("Bonn Convention")
- Convention on International Trade in Endangered Species of Wild Fauna and Flora ("CITES")
- Convention on the Conservation of Migratory Species of Wild Animals ("CMS")

Bern Convention (1981, 82/72/EEC): Convention on the Conservation of European Wildlife and Natural Habitats (Ukraine signed 18 August 1998)

The Bern Convention is internationally binding and aims to conserve wild fauna and flora and their natural habitats. The convention emphasizes the need to protect endangered natural habitats and endangered vulnerable species, including migratory species.

The rules relevant for the conservation of special species are listed in articles 6 and 10.

Article 6

Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild fauna species specified in Appendix II. The following will in particular be prohibited for these species:

- *all forms of deliberate capture and keeping and deliberate killing;*
- *the deliberate damage to or destruction of breeding or resting sites;*

- *the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation insofar as disturbance would be significant in relation to the objectives of this*

- *the deliberate destruction or taking of eggs from the wild or the keeping of these eggs even if empty;*
- *the possession of and internal trade in these animals, alive or dead, including stuffed animals and any readily recognizable part or derivative thereof, where this would contribute to the effectiveness of the provisions of this article.*

Article 10

The contracting parties undertake, in addition to the measures specified in Articles 4, 6, 7 and 8, to co-ordinate their efforts for the protection of the migratory species specified in Appendices II and III whose range extends into their territories.

The Contracting Parties shall take measures to seek to ensure that the closed seasons and/or other procedures regulating the exploitation established under paragraph 3.a of article 7 are adequate and appropriately disposed to meet the requirements of the migratory species specifie in Appendix III.

Bonn Convention (1982, 82/461/EEC): Convention on the Conservation of Migratory Species of Wild Animals ("CMS") (Ukraine signed 1999)

The convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) aims to conserve terrestrial, marine and avian migratory species throughout their range. This intergovernmental treaty, negotiated under the aegis of the United Nations Environment Program, is concerned with the conservation of wildlife and habitats on a global scale.

The relevant rules concerning migratory species are stated in Article III:

Article III
Endangered Migratory Species: Appendix I

4.
Parties that are Range States of a migratory species listed in Appendix I shall endeavour:

- *to conserve and, where feasible and appropriate, restore those habitats of the species which are of importance in removing the species from danger of extinction;*
- *to prevent, remove, compensate for or minimise, as appropriate, the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species; and*
- *to the extent feasible and appropriate, to prevent, recue or control factors that are endangering or are likely to further endanger the species, including strictly controlling the introduction of, or controlling or eliminating, already introduced exotic species.*

5.

taking of animals belonging to such species. Exception may be made to this prohibition only if: Parties that are Range States of a migratory species listed in Appendix I shall prohibit the

- *the taking is for scientific purposes;*
- *the taking is for the purpose of enhancing the propagation or survival of the affected species;*
- *the taking is to accommodate the needs of traditional subsistence users of such species; or*
- *extraordinary circumstances so require; provide that such exceptions are precise as to content and limited in space and time. Such taking should not operate to the disadvantage of the species.*

Furthermore it is based on the Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (in the following: Birds Directive).

Birds Directive: Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

The aim of the Birds Directive is to provide long-term protection and conservation of all bird species including migratory species naturally living in the wild within the European territory of the Member States and to regulate the management and use of birds.
The relevant rules concerning migratory species are listed in Article 5:

Article 5

Without prejudice to Article 7 and 9, member States shall take the requisite measure to establish a general system of protection for all species of birds referred to in Article 1, prohibiting in particular:

- deliberate killing or capture by any method;
- deliberate destruction of, or damage to, their nests and eggs or removal of their nests;
- taking their eggs in the wild and keeping these eggs even if empty;
- deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as disturbance would be significant having regard to the objectives of this Directive;
- keeping birds of species the hunting and capture of which is prohibited.

4.10. Noise Legislation

At present there are no guidelines, recommendations, or executive orders pertaining to a methodology for noise impact calculations of various investments, including wind farms. Permissible noise values are set forth in the following: SNiP II – 12-77 “Protection from Noise”,

GOST (State Standard of the USSR) 12.1.003-83 “Noise: General Safety Requirements” and DSP 3.3.6.037-99 “Sanitary Regulations of Industrial Noise, Ultra- and Infrasound.” This guidance sets the regulatory value at 45 dB(A).

Given the above, it is recommended to utilize the threshold values suggested by international analyses of noise impact on human health. A threshold value of 45dB(A), outside buildings, is set forth in the “Guidelines for community noise” (WHO 1999). Below this level outside buildings, no correlation was observed between the noise level and impacts on human health (primarily related to sleep disorders of people in the building). Above 45dB(A), it was observed that sleep disorders become more frequent as the noise level increases.

The IFC has produced Environmental, Health, and Safety Guidelines for Wind Energy (April 2007, updated August 2015) which states that noise impacts should not result in a maximum increase in background levels of 3 dB at the nearest receptor location.

4.11. Occupational, Health and Safety Law

The Law of Ukraine “On Labour Protection” is the main legislative document regulating occupational health and safety issues in Ukraine. The Law was adopted in 1992 and sets forth basic provisions to ensure constitutional rights to occupational health and safety and health in the workplace. These rights are also set forth in the Constitution of Ukraine adopted by Law of Ukraine No. 254/96 dated 29.06.1996.

Occupational health and safety falls under the responsibility of the Cabinet of Ministers of Ukraine. The State Labor Service is responsible for enforcing labor laws.

In addition to local Occupational, Health and Safety Law standards, international best practice will also be adopted.

5. Scope of the Environment and Social Impact Assessment

5.1. Overview of Scoping Study Process

The Scoping Study Report ("SSR") covers the scoping phase of the ESIA study and should be considered in conjunction with the project Social Engagement Plan ("SEP"). The 'scope' of the assessment refers to the geographical technical and potential impacts boundaries to the issues that need to be addressed in the formal ESIA process and subsequently discussed in this Statement. Therefore, its purpose was to:

- Engage stakeholders at an early stage of the proposed development so that they can contribute their views and provide relevant information;
- define the scope of the ESIA;
- identify the potential significant and non-significant environmental effects of the proposed development; and,
- define the methodologies to be used in the ESIA to assess these effects.

5.2. Scoping Study Report Contents

The Scoping Study Report was initially produced in Fall 2017 and went through several drafts before full agreement on the contents, completed in April 2018. The report contains the following sections:

- Section 1: Introduction
- Section 2: Identifies the regulations and guidelines that govern the ESIA process, including Ukrainian environmental laws and regulations, and international financial institution guidelines.
- Section 3: Presents the rationale for the proposed project development and alternatives considered.
- Section 4: Presents an overview of the proposed development including the construction methodology and expected timeline
- Section 5: Identifies and summarizes the scope of the ESIA

The report also contains the following appendices:

- Table 1.1 Scoping Matrix – Construction Phase
- Table 1.2 Scoping Matrix – Operational Phase

5.3. Environmental and Socio-Economic Issues Identified

The following issues were identified in the Scoping Report for assessment in the ESIA:

- Ecology and Nature Conservation Impact, including:
  - Habitats
  - Birds
  - Bats
- Landscape and Visual
- Traffic and Transport;
- Noise and Vibration;
- Socio-Economic Effect, including:
  - Land Use
  - Employment
  - Livelihoods
  - Community Health, Safety and Security
  - Infrastructure
- Health, Safety, and Public Nuisance;
- Ground and Water;
- Archaeology and Cultural Heritage;
- Air Emissions
- Electric and Magnetic Fields; and
- Electromagnetic interference.

5.4. Consultation with EBRD

The Scoping Report was submitted to EBRD in April 2018.

5.5. Determination of the Regulatory Authorities

The initial steps in the project planning of this project were undertaken in 2015. During the formal process of Detailed Plan of Territory preparation, Ukraine Power Resources officially submitted requests to a variety of competent authorities and organizations to obtain their specific conditions and approvals in respect to the project development and to take them into consideration.

The competent authorities and organizations which issued their conditions and approvals for the purpose of the Detailed Plan of Regulation of the wind farm were the following:

- Executive body of the following villages: Udobne, Semenivka, Kozatske, and Moloha.
- Bilhorod-Dnistrovskiy District State Administration

The Detailed Plan of Territory of the Dnistrovskiy Wind Power Project incorporated all conditions from competent authorities and organizations and was officially approved by the Bilhorod-Dnistrovskiy District State Administration in February 2018. Where applicable, the requirements of ‘the Plan’ have been incorporated in to the assessment of impact as well as the associated management, mitigation and monitoring measures.

The ESIA assessment has been undertaken to ensure that the requirements of the local regulatory authorities are encompassed to support the local EIA study. The local EIA was completed and submitted to in May 2018. Since the requirements of international financial institutions and banks are wider than the requirements of the local EIA, this Statement includes elements beyond the local regulatory requirements.

6. Project Technical Description and Project Alternatives

6.1. Introduction

This section provides an overview of the proposed Project. The Dnistrovskiy wind farm will comprise of up to twenty-six (26) wind turbine generators each with a rated output of between 3.8 and 4.0 MW. The main characteristics of the Project are:

- the construction of appropriate foundations for the Turbines and construction of site roads; the construction of appropriate infrastructure including underground power cables, a substation and connection to the main electrical grid;
- the transport of WTG components (e.g. blades, towers, nacelles) to the site;
- the erection of the Turbines;
- the operation and maintenance of the WTGs for approximately 20 years;
- replacement or decommissioning of the Turbines, where in the event that of decommissioning, the process will involve the removal of plant components and associated infrastructure where appropriate, and the reinstatement of the land;
- securing of all raw materials and plant components from offsite sources, where a key aspect of the project during construction shall be to ensure that appropriate transport routes are in place; and
- the use of labor that is local to the Project area, where possible, in the construction of the wind farm, with the exception of activities where the construction of the turbines will require specialist technical expertise that may not be available in the Project area.

Additionally, this section provides an overview of the technical design and operation of the wind farm together with an assessment of the how the design matches with international best practice for wind farms. The section also details the construction and decommissioning activities associated with the wind farm and finally presents an overview of the alternatives to the project design and location.

6.2. Outline of the Project

6.2.1. Project Rationale

In 2015, First Summit Energy ("First Summit" or "FSE") started prospecting for wind power projects in Ukraine. The Founders looked at over a dozen wind power projects in various phases of development. Most of these projects were located in the Pre-Carpathian Mountain area located in the Lviv region of western Ukraine or along the Black Sea coast in southern Ukraine. With the exception of wind power projects executed or being executed by Windkraft, Wind Parks of Ukraine and Guris (see Figure 3), none of these projects were determined by FSE to be "bankable."

In October 2017, First Summit made the decision to form a new business called Ukraine Power Resources ("UPR") and in November 2017 to acquire the rights to the 100 MW Dnister Wind Power Project ("Project" or "DWPP"). The Project was being developed by Amster Consulting, a company formed by a Belgian national who since 2011 had worked for the Turkish construction company, Güris Holdings A/S ("Guris") on the development of wind power projects in Crimea and in the Odessa region. At the time of acquisition, the Project special purpose company had been formed, DWPP had already secured preliminary approval to interconnect approximately 100 MWs from the Ukrainian national utility, Ukrenergo S.A. ("Ukrenergo") and environmental studies were well underway.

The focus on Ukraine has been a logical progression for First Summit, whose founder has over two decades experience developing, financing, building and operating wind power projects in emerging markets across the globe. Ukraine's vast size as well as its proximity to the European electricity grid, combined with a diminishing wind market in Western Europe, should propel the growth of renewable energy in the region for the next several decades.

Ukraine has an excellent wind resource, especially in the Odessa region which borders with Moldavia and Romania. The electrical infrastructure in Ukraine is highly developed and gives priority to new renewable energy generation sources. An attractive feed-in tariff combined with a recently adopted "bankable" PPA make for compelling project economics.

In evaluating the potential improvements in Ukraine's electricity generation infrastructure, UPR considered the attractiveness of the following projects as possible alternatives to wind power projects:

Technical Alternative 1: Construction of new thermal power plant ("TPP") (or prolongation of existing TPPs lifetime)

UPR deemed this alternative as inferior to the proposed Project given that TPPs require the combustion of fossil fuels, and in particular coal, much of which is now imported to Ukraine, which produces harmful emissions into the atmosphere. Moreover, the vast majority of TPPs in Ukraine were built more than half a century ago and require substantial investment in modernization.

Technical Alternative 2: Construction of new nuclear power facility (or prolongation of existing nuclear facility's lifetime)

UPR deemed this alternative as inferior to the proposed Project given that the generation of electricity would be carried out through the use of imported nuclear fuel and its subsequent disposal would occur within and outside of Ukraine. Moreover, all existing nuclear power plants

in Ukraine were put into operation more than 30 years ago. 9 of the 15 existing nuclear plants in Ukraine will reach the end of their useful life by 2020.

Technical Alternative 3: Construction and operation of new solar power plant.

UPR recognizes the many benefits of constructing a new solar plant, including clean and renewable electricity, but notes that while the feed-in tariff that is offered for solar PV generation is higher than for wind power, the financial returns are actually lower due to relatively low irradiation factors for solar PV in Ukraine. In addition, non-recourse, senior debt financing of solar PV protects is limited; for example, the EBRD has now curtailed its financing of solar PV projects under the feed-in tariff structure.

6.2.1.1. Why the Wind Farm is Needed?

The proposed wind farm is needed because, on a national level:

- It will provide a valuable source of renewable energy for use within Ukraine to support infrastructure development and the national renewable energy development goals, including those set forth in:
    - The Decree of the Cabinet of Ministers of Ukraine “On the National Action Plan for Energy Efficiency until 2020" as of November 25, 2015
    - The Order of the Cabinet of Ministers of Ukraine "On the National Action Plan for Renewable Energy for the Period until 2020" as of October 1, 2014 N902-p
    - The Order of the Cabinet of Ministers of Ukraine "On programs for increasing energy efficiency and reducing energy consumption" as of 17.12.08. No. 1567-p
    - Energy Strategy of Ukraine for the period up to 2035: "Security, Energy Efficiency, Competitiveness", approved by the order of the Cabinet of Ministers of Ukraine as of August 18, 2017 No. 605-p; and
    - The Law of Ukraine "On Amendments to Some Laws of Ukraine to Ensure Competitive Conditions for Electricity Production by Alternative Energy Sources" No. 514-VIII from 04.06.2015.
- It will provide the Bilhorod-Dnistrovskiy district and the southwestern area of the Odessa region with much needed power generation capacity;
- It will reduce the country’s reliance on fossil fuel combustion, as approximately 36% of its electricity production is from coal-fired thermal and CHP power plants;
- It will improve the safety of the country’s outdated electricity production, as approximately 55% of its electricity production is from Soviet-era nuclear power plants;
- It will help Ukraine achieve its 2020 targets as established in its EU Association Agreement (11% of total electricity production is to come from renewable energy sources by 2020, whereas in 2017 renewable energy, including hydro, was at 8.1% of total electricity production);

At the regional and local levels, the proposed wind farm is needed because:

- It will provide a much-needed reliable energy supply to the southern Odessa region of Ukraine
    - the region's electricity generating capacity consists of just one 32 MW CHP plant which produces electricity only during the heating season. This plant cannot meet consumer demand in a single district of Odessa, let alone the entire region
    - five large solar power stations with a total installed capacity of 218 MWs have been built in the Odessa region since 2012, but can only provide electricity during the daytime unless used with storage systems
- Reduce the southern Odessa Region's dependence on external sources of electricity;
    - the majority of the southern region receives electricity from the South Ukraine Nuclear Power Station in Mykolaiyiv region to the west of Odessa region
    - Southwestern districts of the Odessa region receive electricity from the Kuchurgan power station operated by the Russian company "Inter RAO UES"
- It will provide local jobs and other economic improvements, especially during the construction phase

6.2.2. Site Location

The Project is located to the north of Bilhorod-Dnistrovskiy in Odessa region, along a plateau that rises to the east of the Dnistr Estuary near the Black Sea coast. The project site is along flat agricultural farmland, 70 to 130 meters above sea level. Figure 3 below outlines the layout of the proposed windfarm.

Figure 14 DWPP 100 MW Turbine Layout

Within the project area (including 2-km buffer zones) there are four main types of natural and anthropogenic complexes:

a) the natural complex of the Dnistr estuary;
b) a beam network with ravines of different depths;
c) agricultural lands;
d) anthropogenically transformed habitats, settlements.

The territory of the Dnistrovskiy wind project site is represented exclusively by agricultural fields separated by artificial wood strips. Given that the territory of the Dnistrovskiy wind power plant is represented exclusively by anthropogenic landscapes, changes in these landscapes due to the construction of the proposed project will only relate to these artificial habitats, not natural habitats.

UPR applied for an environmental permit to proceed with the Project and held public hearings in five villages in the Project area in August 2018. The Project company received the environmental permit in October 2018.

The Project will require the long-term use of 11.875 ha of land across 30 land plots (of which 4 plots are reserved as alternatives for the 26 required wind turbine locations). Figure 6 below

shows the land plots that will be leased by the Project SPV on long-term leases for the lifetime of the Project:

Figure 15 DWPP Leased Land Plots

Cadastral number	Size (ha)	Cadastral number	Size (ha)
5120882800:01:001:1461	0.3333	5120887400:01:002:0560	0.3407
5120882800:01:002:0766	0.4895	5120887400:01:001:0426	0.32
5120882800:01:002:1153	0.4652	5120882800:01:001:1457	0.361
5120882800:01:002:1692	0.4836	5120882800:01:001:1459	0.32
5120887400:01:004:0079	0.5193	5120886400:01:002:0531	0.3363
5120887400:01:004:0121	0.438	5120886400:01:002:0527	0.3383
5120887400:01:004:1070	0.5476	5120886400:01:002:0524	0.3397
5120887400:01:004:0476	0.5132	5120886400:01:002:0522	0.32
5120887400:01:004:0399	0.4392	5120886400:01:002:0528	0.3328
5120887400:01:004:1454	0.7011	5120884400:01:003:0053	0.32
5120887400:01:004:1453	0.7	5120884400:01:005:0602	0.338
5120887400:01:001:0420	0.32	5120884400:01:001:0658	0.3326
5120887400:01:001:0423	0.32	5120884400:01:003:0051	0.32
5120887400:01:001:0418	0.32	5120884400:01:003:0050	0.32
5120887400:01:002:0601	0.3339	5120884400:01:001:0656	0.3118

6.2.3. Project Timetable

Key dates for the Project are as follows:

- Feasibility studies: completed
- Permitting: interconnection agreement: end November 2018
- Procurement for EPCM Contractors: started August 2018 and completed by end of December 2018
- Procurement for Turbine Suppliers: completion in 2018
- Execution (Construction) phase: Beginning in November 2018; project completion planned for December 2019
- Commissioning (Operations): expected by December 2019

The Project has been designed to have an operational phase of 20 years before turbines are replaced or it is decommissioned. Towards the end of the operational life of the wind farm a decision will be made as to whether the site will be redeveloped in order to continue as a wind energy production site, or to decommission the wind farm. The impacts of decommissioning involve many similar impacts to construction and have been considered in this Statement.

The Project electrical interconnection is planned to be performed in two stages. The first stage is scheduled for commissioning in mid-2019 and is planned to consist of 9 WTGs with a minimum capacity of 3.83 MWs each for a total capacity of 34.5 MWs with an interconnection capacity of 48.3 MWs. The second stage is scheduled for commissioning by the end of 2019 and is planned to consist of 17 WTGs with a minimum capacity of 3.83 MWs each for a total capacity of 65.1 MWs, with upgrades to the substations that result in a total interconnection capacity of 100.05 MWs. The construction of Phases 1 and 2 may occur as a single phase. The final type, size and number of Turbines to be connected for each Phase will be determined by December 2018.

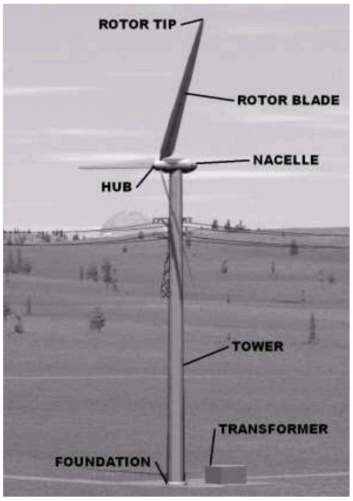
In line with the construction timeline described above, other aspects of the project will also be phased. Development of roads and foundations will be undertaken between November 2018 and July 2019, with the main access roads to the site and the development access roads to the turbine plots to be developed early in the construction phase. Development of roads will primarily consist of about 13km of road connecting route P70 near Bykoza to route P72 near Moloha and Nove.

6.3. Description of the Main Plant and Processes

6.3.1. Technical Features of the Proposed Wind Turbines

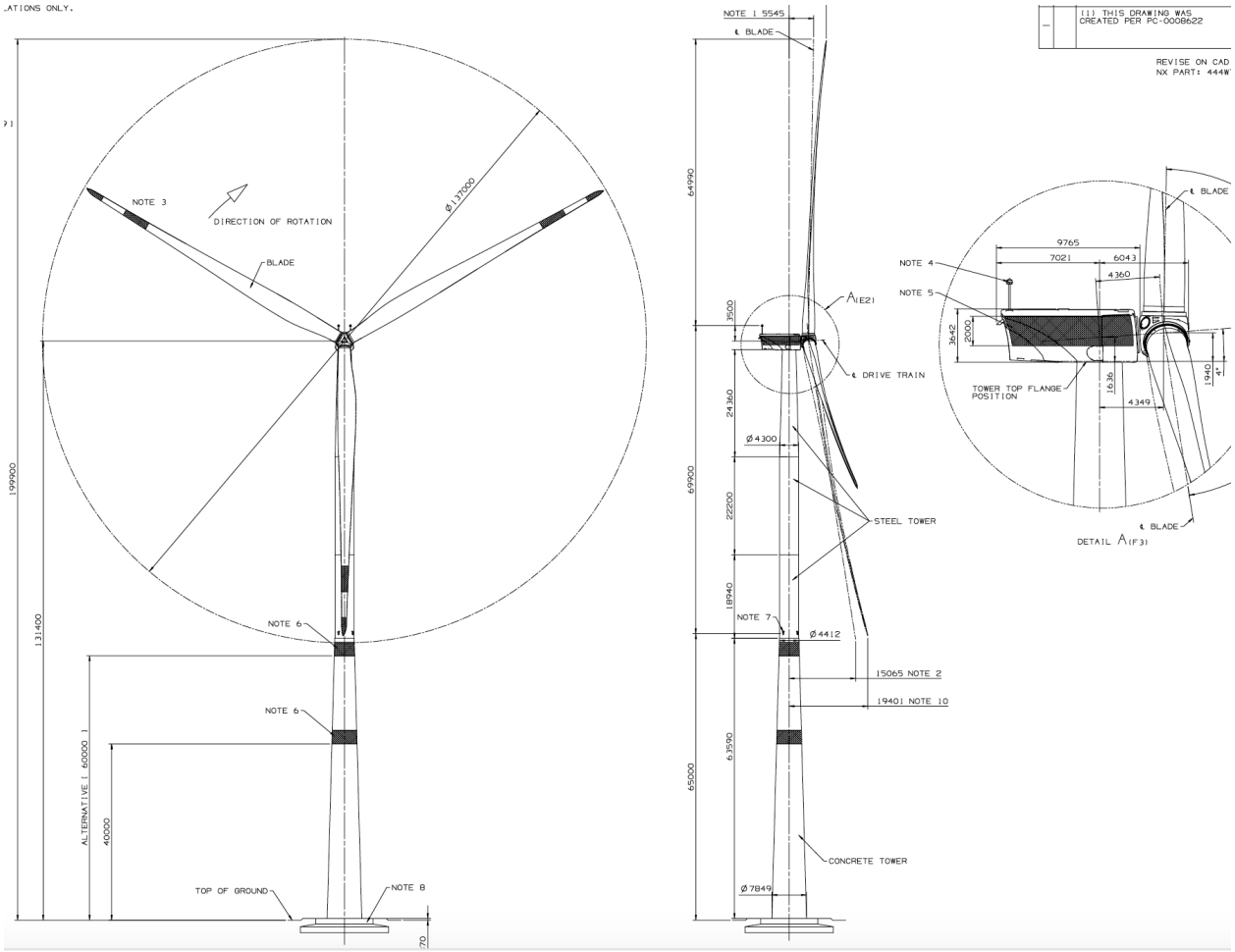
The wind turbines are three-bladed, upwind, horizontal-axis wind turbines. Each turbine consists of a tubular steel tower with a nacelle to which the rotor with three blades is attached. The nacelle houses the generator, gearbox, and control systems. A transformer is located in the base of each WTG tower. The selection of wind turbine design and manufacturer is currently in progress. UPR has shortlisted three Turbine options for the Project: GE 137-3.6/3.8 MW 131 HH, Nordex N131-3.9 MW 134 HH and Vestas V136-4.0 MW 112 HH. A final decision on turbine supply will be made no later than the 4th Quarter of 2018.

Figure 16 Typical Structural Components of a Wind Turbine (Source: IFC)



The wind turbines are large but are of a fairly "standard" size for on-shore wind farms. These larger units generate electricity more efficiently than smaller units. Figure 5 illustrates a generic wind turbine structure (taken from the IFC Environmental, Health and Safety Guidelines for Wind Energy 2015) and Figure 6 illustrates the proposed GE 137-3.6/3.8 MW 131 HH turbine.

Figure 17 Diagram of GE137-3.6/3.8 MW wind turbine generator



Assessments were carried out based on these guidelines. It must also be noted that the most extreme dimensions were utilized for the assessment to ensure that the "worst case scenario" had been dealt with. Figure 7 below summarizes the main technical characteristics of the proposed GE137-3/63/8 MW 131 HH wind turbine.

Figure 18 Technical Data GE 3.6/3.8-137 Wind Turbine Generator Systems (Source: GE Renewable Energy)

Turbine	3.6-137	3.8-137
Rated output [MW]	3.63	3.83
Rotor diameter [m]	137	137
Number of blades	3	3
Swept area [m^2]	14741	14741
Rotational direction (viewed from an upwind location)	Clockwise	Clockwise
Maximum speed of the blade tips [m/s]	82.0	82.0
Orientation	Upwind	Upwind
Nominal Rotor Speed [rpm]	11.43	11.43
Minimum Rotor Speed [rpm]	6.3	6.3
Maximum Rotor Speed [rpm]	~13.6	~13.6
Speed regulation	Pitch control	Pitch control
Aerodynamic brake	Full feathering	Full feathering
Color of outer components	RAL 7035 (light grey)	RAL 7035 (light grey)
Reflection degree/Gloss degree Steel tower	30 - 60 units measured at 60 ° per ISO 2813	30 - 60 units measured at 60 ° per ISO 2813
Reflection degree/Gloss degree Rotor blades, Nacelle, Hub	60 - 80 Gloss Units measured at 60 ° as per ISO 2813	60 - 80 Gloss Units measured at 60 ° as per ISO 2813
Reflection degree/Gloss degree Hybrid Tower	Concrete gray (similar RAL 7035); gloss matte	

6.3.2. Wind Farm Operations

6.3.2.1. Overview

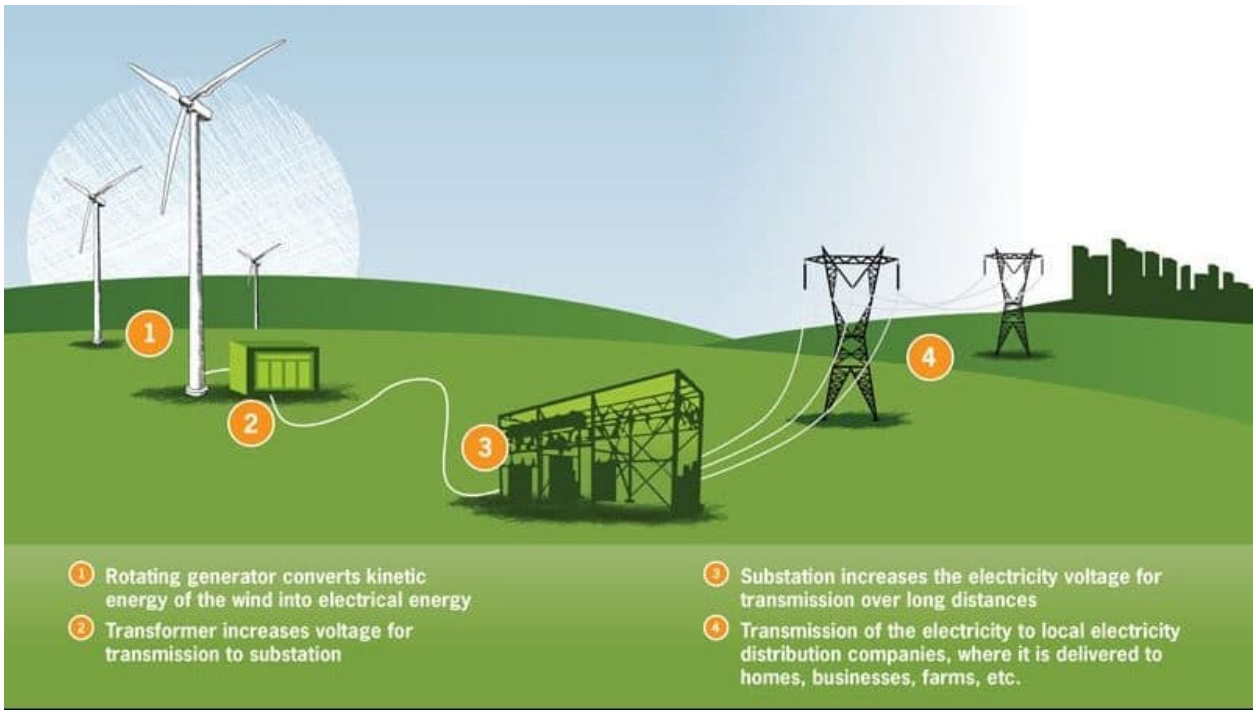
The following technical details of the wind farm specification are generic, and the exact figures will depend on the final equipment selection.

The five steps of electricity production and distribution from wind power are:

- wind turbine blades are turned by the power of the wind;
- the blades turn a rotating generator which converts wind energy to electricity;
- a transformer in the wind turbine nacelle increases the electricity voltage for transmission to the substation by underground cables;
- the substation increases voltage for transmission over long distances;
- the electricity is transferred to the grid and distributed.

These steps are presented in the Figure 8 below.

Figure 19 How a wind farm works (Source: Canadian Wind Energy Association)



6.3.2.2. Electricity Production

When the wind reaches and maintains constant speeds in excess of 2.5 m/s, the turbine rotor starts rotating and drives the gearbox that converts rotor shaft energy (i.e. mechanical energy) into electrical energy through an electrical generator. The wind turbine will start generating electricity at a minimum constant wind speed of 3 m/s, with rotor spins in a clockwise direction and a corresponding output at that speed of approximately 38 kW. At 6 m/s the output is approximately 858 kW but then rises sharply to the maximum power output at 12 m/s, where the turbine will generate the maximum design output of approximately 3830 kW. This will be held up to a constant speed of approximately 25 m/s. At higher wind speeds the turbine blades are

stopped for safety reasons and to prevent excessive wear and tear on the mechanisms. Most of the electricity produced by the wind farm will be transferred to the grid but a small amount of electricity will be used by the on-site control facilities and the wind turbines themselves may use electricity when wind speed is constantly in excess of 25 m/s and requires the activation of the hydraulic braking system of the turbine rotor.

The electricity produced by the turbine is transferred to the base of the turbine tower to a transformer unit where it is converted into electricity for transmission into the underground 35 kV wind farm network. Details of the Grid Connection are discussed in Section 6.5.

The transformer substation complex will measure 200x180 m, covering an area of 3.6 hectares, and comprises the following elements: a distribution substation and switchgear with 35kV and 110 kV power transformers, a control/management facility and service, parking, traffic access and landscape areas. The internal infrastructure (such as water supply, sewage and low-voltage power supply provided by a 35kV/400V internal transformer within the transformer substation) is provided to enable the operation of the transformer substation complex.

6.3.2.3. Management Control

Operation of the wind farm will most likely be through an on-site management facility rather than through a fully automated system which is controlled remotely. There will be personnel on site on a permanent basis for the direct control of the wind farm. Nevertheless, each turbine will have a control system for critical functions, monitoring weather conditions and data reporting which will be relayed back to the control center. On site staff may also include staff for security and for post construction bird monitoring. The presence of these staff is dependent on the local regulatory and other requirements.

On site there will be a local management control center which will be a separate unit but located either next to the transformer substation or at a separate construction plot covering a total of 2.45 hectares which will be established for the purpose of constructing the management complex, which will include the management facility and the supporting traffic, parking and landscape areas, and all the necessary infrastructure elements (internal water supply system, sewage, low-voltage power supply, etc.). The local control center will probably be permanently manned, but the final decision has not been made yet.

It is possible that Maintenance will also be undertaken by offsite staff. Maintenance will be undertaken on as needed basis in line with manufacturer's recommendations and requirements identified by the company technical staff. The impacts associated with the construction of the remote management control center is outside of the scope of this assessment. However, the effective ability to control the wind farm is included within the scope of this assessment.

6.3.2.4. Maintenance

Scheduled and reactive maintenance activities will be undertaken throughout the operational stage of the wind farm. Specific regular scheduled maintenance activities will encompass:

- Turbine checks to identify areas of rust, corrosion and wear, as well as checks of blades and all moving parts for fatigue and potential failure;
- Review of equipment which holds oil to ensure prevention of leakage and/or damage to equipment;
- Review of oil storage and storage of other hazardous substances to ensure effective containment;
- Review to ensure proper lubrication of the moving mechanisms and gears (rotor, gearbox, generator) and replacement of non-compliant quality oil;
- all parts and mechanisms whose deterioration may lead to noise emissions outside of the designed operating parameters.

Reactive maintenance activities will include replacement of failed or damaged equipment and parts that cannot be repaired.

Due to the nature of the operations, significant waste volumes are not expected during the operational stage of the wind farm. The largest volume of waste generation will occur in the event of plant or equipment failure and any requirements for replacement of plant or equipment as a result of failure. However, all plant and equipment are designed so as to operate in the environs of the location and therefore, such waste products are not expected but are planned for.

During the operation of the wind farm, typical waste products will be:

- waste oil (lubricating and hydraulic oils);
- packaging waste;
- metal scrap.

All waste products will be managed so as not to cause pollution to the environment and will be disposed of in accordance with local laws. Waste oils will either be removed from site immediately once maintenance is completed or stored on site in appropriate containment within a locked building on site.

6.4. Wind Farm Infrastructure

6.4.1. Overview of Support Infrastructure

The following support infrastructure shall be in place:

- Underground foundations approximately 18.4 meters in diameter with up to 14 piles up to 30 meters deep
- A rectangular area of gravel next to the foundations measuring approximately 50 x 25 meters to accommodate the crane and turbine components during construction.
- A network of 5-meter-wide access roads that connect all the wind turbines.
- An underground 35 kV electrical cable network (approx. 45 km) which will connect wind turbines to the Project substation.
- A 35/110 kV Project substation with approximately 3 of underground high voltage power lines connecting to the Odesaoblernergo network.

6.4.2. Associated Plant & Buildings

The following plant and buildings will be necessary in addition to the main wind turbine plant:

- Control building and Substation will be separated. The two buildings will house the switch gear, protection equipment, metering and control equipment, communication equipment and any other electrical infrastructure required to operate the wind turbine development.
- Construction compound: A temporary site compound would be required during the construction period. This would be used for storage of materials, as well as containing office and canteen facilities. It would also include an area for worker and visitor parking.
- Internal access roads: A series of internal access roads would be required to link the wind turbines to the infrastructure on the site. Existing tracks would be used wherever possible.
- Underground cables: Onsite electrical infrastructure would be likely to consist of underground cabling. The electrical connections from the wind turbines to the control building/substation would be buried in trenches running alongside the site internal access roads. Communication links between each wind turbine, the meteorological mast and the control building/substation would be buried in trenches alongside the site internal access roads.
- Internal electric power networks servicing the facilities of the transformer substation and the wind farm management facility, which will be established by constructing a connection point at the internal 35 kV transformer within the TS transformer switchgear and underground power lines.
- Should the construction of a telecommunication access network be necessary for the purposes of ensuring the secure control of the systems, it will be installed along the corridors of the existing roads within the scope of the plan and harmonized with the already constructed infrastructure, the requirements of the competent distribution enterprise and the rules on the construction and development of the Infrastructure Systems Zone covered by this plan.
- As for the utilities infrastructure in the area, it is planned that the needs for such infrastructure should be secured locally, on the transformer substation and management facility plots. The following are proposed solutions:

- Potable water will be provided by delivering water to the premises;
- A borehole well will be constructed on site for 'grey' (toilets etc.) water use and fresh water will be supplied at point of use for domestic purposes;
- The wastewater network will comprise a septic tank to be constructed on the plot and an internal sewage network connecting the facilities to the septic tank. The internal utilities infrastructure systems may be constructed separately for each of the two systems (the transformer substation and the management facility).

6.4.3. Transport and Site Access

The site is located approximately 60 km from the city of Odessa in southern Ukraine. The administrative design area belongs to the Bilhorod-Dnistrovskiy district of the Odessa region. The site is crossed by the Odessa-Izmail motorway (e 87) a road of local importance which passes practically across the entire site.

The main transport and site access issues for this project are associated with construction and decommissioning. Large plant items will be delivered to the site from the port at Bilhorod-Dnistrovskiy on large road vehicles. The route is shown in blue in Figure 10. Transport associated with construction is discussed in Section 11.2.3 and that associated with decommissioning is discussed in Section 12.5.3.

The long-term site access route has now been defined and the permitting for it has started. Due to the low number of transport movements associated with the operational phase, no additional transport route development, beyond that developed for the construction phase, will be required. During the construction phase, permanent access routes will be developed to all turbine plots and to the auxiliary plant/control compound. These routes will be used during the operational phase, with the exception of routes associated with movement cranes and large-scale turbine components.

6.5. Grid Connection

6.5.1. Proximity to the Grid

The turbines will be connected to the grid via a substation in the village of Starokazache within the Project site, which is owned and operated by Odesaoblenergo. The Project's substation will be constructed at a location that is just south of the village of Kozatske.

6.5.2. Wind Farm Power Distribution

The electricity produced by the wind turbines is transferred through underground 35 kV electrical cable system to the wind farm transformer station. The underground cable system will be at a minimum depth of 0.7 m. The medium voltage electricity is converted to high voltage (110kV) electricity at the 2 X 62 MVA Main Transformer Station (MTS). The MTS is planned

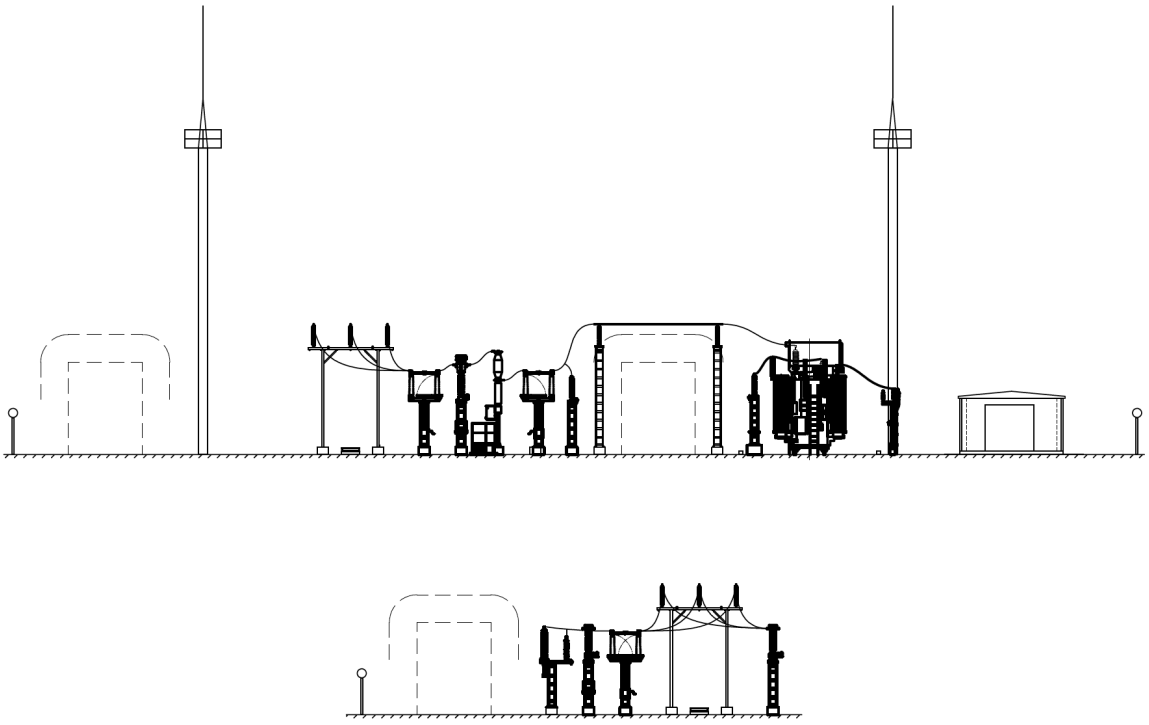
within the boundary of the proposed project area. The high voltage electricity from this transformer station will reach the design parameters for transfer to the national electricity grid. The transfer to the grid connection will take place along a new underground cable system.

Transfer of electricity into the system will be through a 110 kV underground cable running west of the wind farm MTS to the main grid connection at the Starakazoche substation.

The route of the underground is approximately 2.7 km. The main power line connection is the Starakazoche substation.

The Layout of the MTS compound is shown in Figure 9.

Figure 20 Layout of MTS compound



6.5.3. Construction

6.5.3.1. Wind Farm Construction

As is often the case with ESIAs of large-scale development projects, the details of the main equipment enclosures and laydown areas, methods of construction (e.g. the balance of on-site and off-site fabrication) and the precise building program is currently a subject of negotiations with EPC contract provider. The selection of the construction contractors is currently underway. The construction of the wind farm will involve several working teams that will work in parallel on construction, assembly and installations.

The wind turbines and ancillary plant will be manufactured off-site and delivered to site on large road vehicles. Construction activities will include:

- preparation of the site area for development;
- fill importing / exporting and site levelling;
- construction of site roads and construction pads;
- utilities and services connections to site;
- foundation piling / excavations and concrete footings pours;
- erection of building frames and cladding;
- installation of turbines;
- ancillary plant erection;
- services connections;
- building fitting-out; and,
- commissioning.

Each plot upon which a turbine is constructed will include the following:

- A Circular foundation within the circle of 18.4m in diameter. The foundation has a truncated cone shape, being 3.2 m thick at the middle part height of the anchor block, and about 1.2m at the edges. Each base is supported by up to 14 reinforced concrete piles. These piles are set out in one concentric circle about 16 meters in diameter. The average pile length is 30 m and the diameter 0.82m (created by drilling rather than percussion piling). The supplied estimate for the foundations indicates that each foundation will require approximately around 1050 m^3 of excavation, around 350 m^3 of this excavated material being used after construction of the foundation for backfilling, and around 700m^3 of concrete is required. The foundation which is located within the foundation platform will be 20m x 20m in size.
- A service platform for the crane. The platform will be sited near the turbine, covering 50 x 25m, and will be made of crushed stone to support the crane used in installing and eventually dismantling the wind turbine.

- There will also be an access road within the plot of land.

There is also a large plot of land for the ancillary structures (transformers, control center etc.).

The Construction Permit is currently pending. Therefore, it is proposed that the construction program will start during November 2018 and will run for approximately 14 months. According to this timetable it is anticipated that the facility should be operational in 2019.

6.5.3.2. Transport of Equipment and Construction Materials

The main transport activities will be carried out during the construction stage of the wind farm and will include the following:

- the main components of the turbines;
- the auxiliary plant associated with the wind farm;
- the main plant associated with the construction process, including cranes and concrete batching plant;
- temporary buildings and any other modular structures associated with the wind farm construction;
- road and concrete plinth construction materials, including aggregates, sand and concrete for the concrete batching plant, piling materials and other metal reinforcement materials.

The transport of plant, components and materials to the site can be split in to four phases as:

1. Transport of plant components by ship to the Bilhorod-Dnistrovskiy Terminal
2. Use of the main road network to transport components from the port to the vicinity of the site, and of construction materials, including other large-scale equipment and bulk construction materials, that are not brought in to the region via the port of Chenomorsk.
3. Local transport from the main roads through local, minor roads to the site access point.
4. Transport from local roads at the site boundary to all areas within the site on presently unimproved roads and tracks.

In order to provide optimum transport and assembly conditions for the wind turbines, certain requirements have to be met, as described below. These are based on general characteristics but may vary depending on the final turbine chosen for the project. In general, for each turbine, the access road must be capable to bear the following loads:

- Vehicles:
    - about 50 haul vehicles;
    - 12 to 20 trailers for crane assembly and dismantling;
    - 9 to 13 trailers for the turbine components (3 to 6 for the tower components, 3 for the blades,
    - 3 trailers for the nacelle, rotor and tracks, 2 for the controller, smaller parts and hoisting containers);

- Vehicle weight:
  - Maximum axle load will range between 12 and 20 tons, for public roads and on-site roads respectively;
  - total load in excess of 150 tons;
  - pressure on soil of the crane tracks in the region of 260kN/m^2.

Figure 21 DWPP Transport and Access Routes

All along the access road, height clearance must be minimum 5.5 meters and width clearance must be 4.5 meters. In particular, for blade transport, road width in the curves must be extended to a minimum of 7 meters, with a bend radius in excess of 45 m for the transport vehicle, also providing for 70 meter radius clearance in the direction of travel.

The main E-70 road provides an excellent connection route to the village of Bykoza. From the village of Bykoza, the public road connecting to the E72 route in the Moloha/Nove area will be

improved and repaired. This improved public route will provide access to route E72, which will be used as the main transport connection to the site. The main plant components and equipment will be imported via the port of Bilhorod-Dnistrovskiy Terminal. All large items such as cranes and the concrete batch plant as well as and construction materials (e.g. cement aggregates) will also be delivered to site via the route described herein. All plant, equipment and materials will enter the site at a predetermined and controlled point of entry with majority being held at the Logistics Compound (see below). The transport of all plant components and materials is the responsibility of the contractors

The final route will be determined in close cooperation with the selected turbine supplier and local community representative in such a way to, on the one hand, ensure the least possible disturbance to the local population and, on the other, ensure that citizens benefit from road reconstruction (as the reconstructed roads will remain in the ownership of the local government and will be used daily by the citizens).

To provide access for heavy equipment, improvement of the existing farm service roads will be required involving reinforcement of the embankments and the development of a suitable road system where one does not presently exist. Improvement will consist of removing and relocating the top layer, laying and compacting up to 3 layers of imported. Temporary transport requirements such as passing places on site roads for large scale vehicles, will be removed after construction and their condition reinstated for agricultural use. Access routes to the turbine plots will be 'permanent' project features, will be in use throughout the operational and decommissioning phases of the project.

Access road infrastructure will also include the development of temporary platforms for the parking and maneuvering of oversize vehicles. Agreements concerning these platforms are in progress. Once construction and assembly activities are completed, the platforms will be decommissioned, and the land they occupied rehabilitated and returned to its owners. The estimated time for the completion of the access roads is approximately 10 months.

6.5.3.3. Site Logistics Compound

To ensure the good conduct of construction-assembly and installation works, the contractor companies will also be responsible for site logistics and materials storage. The site logistics Compound will be developed close to the Main Transformer Station (see Figure 9), located to the west of Starokozache. The logistics Compound will be temporary and will incorporate office space and basic domestic amenities. There will be no permanent accommodation on site.

Once the construction stage is completed, the site logistics Compound will be decommissioned, any materials used will be recycled, the equipment will be taken to other works, and the land they occupied will be rehabilitated.

6.5.4. Concrete Batch Plant

The foundations that will support each of the turbines will be constructed in steel reinforced concrete. Each of the foundations is calculated to require about 700m3 of concrete, depending on the optimization of the design.

The concrete will be prepared on site using a concrete batching plant. This prefabricated plant will be provided and operated by the civil contractor yet to be selected. The batch plant would be able to produce 700 to 800 m3 of concrete per day, i.e. sufficient quantity for one foundation per working day (10 hours).

The batch plant will require a land area of 5,000 to 6,000 m2 and will comprise:

- 2 or 3 cement silos (up to 100t capacity each) to a maximum height of 15.1m;
- 2 or 3 shipping containers for equipment storage;
- 4 aggregate bunkers;
- water/ waste setting pit;
- parking for truck mixers and pumps.

The cement and the aggregates needed for concrete manufacture will be delivered to site by road. In order to optimize gravel transport fleet, it may be necessary to have an additional area of 3,000 m^2 to 4,000 m^2 for a gravel aggregates stock.

The batch plant must have a stable supply of good quality water for concrete production. The batch plant will be located within a few kilometers of Starokozache and it is currently expected that water will be provided from tanks or possible a groundwater well.

At a production level of 800m3 per day, the plant would require about 1500 t of gravel per day. To meet the production levels required a fleet of up to 12 trucks (making 5 round trips per day) would be required for the gravel transportation.

The prepared concrete will be transported to turbine foundations using rotating mixer trucks. Each of these trucks has a capacity of 8 to 9 m^3. This means that it will take about one hundred loads to complete each foundation. The trucks will use public roads and the project internal roads to reach the turbine foundations. The provision of a sufficient number of mixer trucks (around 5) and necessary associated concrete pumps is part of the civil contractor's scope of responsibility.

It is essential that the emissions from the cement batch plant are carefully managed. This will include particulate release from silo vents, fugitive dust emissions as well as the management of wastewater. The ESMP will include a series of mitigations to manage these risks. It is expected that the ESAP will expect the particulate emissions from release points, such as silo vents, should not exceed 20mg/Nm^3.

6.5.5. Decommissioning

The operational life of a wind farm is typically 20 years. At this stage the situation will be reviewed as to whether the wind farm should be decommissioned, or the wind turbines replaced. The decommissioning of a wind farm is not a complicated process and largely comprises the dismantling of the turbines and site clearance. The operational process does not typically involve the use of large volumes of hazardous materials which may result in releases of particularly harmful materials into the ground and therefore, with appropriate management during operation, it should not be necessary to conduct post operational clean up. Basic measures will be included in the design to ensure ease of decommissioning, such as incorporating construction and fabrication techniques that facilitate ease of dismantling and recycling, where appropriate. Key difficulties associated with the decommissioning of a wind farm are the removal of foundations (if considered necessary) and the disposal of turbine blades, if their design does not facilitate ease of recycling.

Prior to decommissioning, the operator or their representatives will produce a decommissioning plan that will be approved by the local authorities before decommissioning commences. The plan will include measures to recycle materials where ever possible. The decommissioning of the Wind Farm will start as soon as the activities of the Wind Farm operations cease, and approval has been obtained. The decommissioning stage will take an estimated 1.5 – 2 years and will include the following main activities:

- Dismantling and removal of the constitutive parts of the Wind Farm;
- Environmental rehabilitation in the affected areas.

Decommissioning works will be undertaken by contractors. In providing for specific decommissioning activities at the Wind Farm site, the site logistics Compound will be re-established using the same initial structure as during construction as will any platforms for storage and maneuvering of vehicles and cranes during decommissioning.

Decommissioning activities will be conducted under safety conditions and in consideration of environmental protection, under the relevant legislation in force at the time of decommissioning.

The turbine reinforced concrete base will not be completely removed. Instead, the concrete will be demolished and excavated down to a depth to be determined prior to decommissioning.

Nominally a depth of 1.0 m is expected to be sufficient to allow for agricultural activities to be undertaken safely once the pit has been filled with top soil. Similarly, any ground associated with the wind farm which has been affected will be reinstated. This includes areas of temporary roads, areas where the land has been compressed by heavy plant activities, and laybys and temporary platforms.

There will be no underground electrical cables laid less than 1 m deep as, according to the local regulations and the conditions, the minimum depth for laying the cables must be 1.2 m. All electrical cables laid more than 1 m deep will be abandoned in place and will not cause any long term significant environmental impact.

7. Compliance with International Best Practices

7.1. Background

A requirement for all developments that are subject to funding by IFI's is to ensure that the design is in line with the requirements of the host country or countries of the financing institution, as well as the home country where the development is proposed. In practical terms for IFIs this usually means that there is a requirement for the design to be in line with international best practice as far as is possible. The EBRD, in particular requires assurance that their investments are designed to European standards. Section 4 provides an introduction to the scope of the requirements associated with IFIs, including the EBRD, and how design standards are encompassed in the requirements of the IFIs. In brief, the EBRD Environmental and Social Policy and IFC HSE Guidelines.

In order to ensure that the design is in line with host country standards and international best practice, a review of the design against relevant standards has been undertaken. Various terms can be used to define such an assessment. For the purpose of this ESIA we have opted for the term 'Best Available Techniques' (BAT) assessment. BAT is defined in Article 2 of the IPPC Directive 2008/1/EC (as superseded by Directive 2010/75/EU on Industrial Emissions, the IED, Article 3) as:

"the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole:

(a) 'techniques' shall include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned;
(b) 'available techniques' means those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator;
(c) 'best' means most effective in achieving a high general level of protection of the environment as a whole."

For the purpose of this assessment, we have also encompassed worker and community health and safety issues, since they are key issues associated with the construction of wind farms. Such issues are not normally considered in BAT assessment undertaken for the purpose of the reviewing design of installations.

The key documents drawn upon for this assessment are as follows:

- Environmental, Health, and Safety Guidelines for Wind Energy (IFC, 2015);
- Environmental and Social Policy (EBRD, 2014);
- Wind Energy Tool Kit issued by the New York State Research and Development Authority (New York State Research and Development Authority, 2009)

Where other documents have also been drawn upon they are referenced in the text of this assessment.

7.2. Wind Farm BAT

The main issues associated with operation of wind farms, for which a BAT demonstration is required, are considered to be:

- Visual impact;
- Noise
- Prevention of species mortality or disturbance and prevention of habitat alteration;
- Light and illumination;
- Water quality and erosion prevention during construction;
- Community health and safety and nuisance (e.g. electromagnetic interference, aviation and radar, ice throw, interference with television signals);
- Implementation of appropriate management systems;
- Decommissioning and site closure and restoration.

7.2.1. Visual Impact

The visual impact of the turbines and their interaction with the surrounding countryside can typically be remedied by consideration of the character of the surrounding landscape, and the impact the wind farm may have from all perspectives. Consultation with local communities is important, to incorporate local community values into the wind farm design. Specific measures may also include (IFC, 2015):

- Minimizing ancillary structures, such as fencing, roads, overhead power lines and removal of defunct turbines;
- Avoidance of construction on steep slopes to prevent scarring of the ground and re-vegetation using only native species;
- Keeping the size and color (light grey or pale blue) of the turbines uniform, unless visual impact can reduced by painting the lower part of the tower in graduated green in order to blend into the landscape;
- Avoiding graphics or lettering.

In addition, the Wind Energy Toolkit (New York State Research and Development Authority, 2009) identifies aesthetics as the most important issue for local communities. The document

identifies the need for developers to accurately assess the potential for visual impact, and also recommends good communication, meaningful consultation throughout the process and planning as key to mitigating adverse community reaction. The use of large turbines to minimize their number and maximize their separation is considered to represent best practice for minimizing visual impact. The actual potential for impact should be assessed taking into account all the points from which it may be viewed (the "viewshed"), and in winter and summer when the character of the surrounding landscape is different.

In summary, the site should be designed so as to minimize visual impact where possible, the turbines should be painted a suitable color to blend in with the sky as viewed from the ground, whilst ensuring good visibility from aircraft. Light blue, or light grey is typically used. Graphics and logos should be avoided. These measures represent BAT for this project.

7.2.2. Noise

Noise control should focus on mechanical sources in the nacelle, and aerodynamic noise from the movement of air over the blades and rotor. For mechanical noise, the main control measures are usually in the form of good mechanical design and acoustic enclosure. Aerodynamic noise is best controlled by having as low a rotation speed as possible, commensurate with the required electrical generation efficiency, using for example variable speed turbines or pitched blades. Wind farms should not be positioned close to residential or other sensitive receptors (IFC, 2015b).

IFC guidance from its Environmental, Health, and Safety Guidelines for Wind Energy (2007) states that the noise impact should not result in a maximum increase in background levels of 3 dB at the nearest receptor location. The updated 2015 guidance no longer addresses sets a specific value. In addition to the 3 dB increase standard, noise levels shouldn't exceed the general noise levels set in the IFC Environmental, Health, and Safety Guidelines (2007) (which applies to all project types, not just wind projects):

Figure 22 IFC General Project Noise Level Guidelines (Source: IFC)

Table 1.7.1- Noise Level Guidelines[54]		
	One Hour L_{Aeq} (dBA)	
Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational[55]	55	45
Industrial; commercial	70	70

7.2.3. Prevention of Species Mortality or Disturbance

Wind farms can result in bird and bat collisions with the turbine blades or towers. More long-term impacts can arise from changes to habitat and changes to prey species and disturbance resulting in temporary or permanent displacement. Operators should select sites to avoid known migration routes or areas of high species concentrations. Turbines should be closely grouped and be orientated parallel to known movements, and surface water should be managed to avoid pond formation, which may be attractive to various species (IFC, 2015).

The potential for loss of habitat from wind farms is considered likely to be low, and general measures to minimize impact from construction and operation, as set out in the IFC General Guidelines, may be considered BAT (IFC, 2015). The Wind Energy Toolkit refers to minimizing tree removal, consideration of topography to avoid steep areas to minimize cut and fill, and mitigation through re-vegetation (New York State Research and Development Authority, 2009). Given that the Dnistrovskiy Wind Power Project will be constructed on agricultural land, which has already been altered from its natural state, the loss of habitat will be minimal and unlikely.

The Wind Energy Toolkit goes on to indicate that lattice type towers can attract roosting birds, notably raptors, and their replacement with tubular towers reduces potential for perching and collisions. It also considers bat deaths from collisions and barotraumas (rapid changes of air pressure near the turbine blades). It recommends pre- and post-construction monitoring, particularly in the spring and autumn migration seasons, to enable the impact of the development to be demonstrated. Mitigation measures might include turbine relocation in the extreme case, burying electrical cables, installing bird diverters from overhead lines, minimizing lighting on operational buildings and the substation and operational alterations during migration seasons to reduce strikes (New York State Research and Development Authority, 2009).

UPR commissioned a comprehensive suite of bird and bat studies which includes a Collision Impact Assessment; these studies were commenced in September of 2017 by the experts at the Melitopol State Pedagogical University. The studies were completed in the Summer of 2018, thereby resulting in a full-year of on-site avian studies.

The bird and bat assessment was undertaken using the methodology developed by Scottish National Heritage (SNH). The SNH Guidance describes a methodology for assessing in full the impact of windfarms on ornithological interests, taking account loss of habitat, due to the construction of turbine bases and tracks, displacement of birds as a result of disturbance, and potential mortality through collision. The SNH methodology is now considered to be international benchmark standard. In practice, most birds do take avoiding action: they may detect either an entire wind farm array, or an entire wind turbine, and alter their flight lines to avoid the structures; or they may at close quarters see an oncoming blade and take emergency avoiding action. Studies show that a high proportion of birds take effective avoiding action. However, as it is very difficult to assess “no-avoidance” (and the data available on avoidance factors is limited and often relates to topographic and climatic conditions) the methodology assumes that no avoiding action takes place.

The aim, normally, is to estimate the number of bird collisions over a period of time such as a year. The calculation proceeds in two stages:

Number of birds colliding per annum = number flying through the rotor (Stage 1) x probability of bird flying through rotor being hit (Stage 2)

In addition, the use of solid towers rather than lattices, the minimizing of the number of turbines by using a larger design, and their careful alignment in the same direction, will minimize potential impact on species. In addition, water management measures will ensure that on site ponding is avoided, to minimize attracting bird species. These measures represent BAT for this project.

7.2.4. Shadow and Flicker

Flicker caused by the sun casting shadows of the rotating turbine blades, can cause annoyance to human receptors. Similarly, blade glint from new turbines can cause annoyance, particularly at dawn and dusk when the sun is at a low angle. Paint should be non-reflective.

Furthermore, turbines should be oriented to avoid residential property being in the "flicker zone." If it is not possible to place turbines in a way that eliminates shadow flicker, the predicted duration of shadow flicker effects experienced at a sensitive receptor should not exceed 30 hours per year and 30 minutes per day on the worst affected day, based on a worst-case scenario (IFC, 2015).

7.2.5. Water Quality and Erosion Prevention

Surface water quality can be impacted by increased erosion and sedimentation. General pollution prevention measures and erosion prevention typical of construction sites are identified in the IFC Guidelines (IFC, 2015). There are no significant surface water bodies in the vicinity of the project though the Project borders the Dnistr Estuary to the East. In order to prevent soil erosion, construction on steep slopes should be avoided and erosion measures implemented. Where necessary surface water runoff management adopted and re-vegetation should be implemented.

7.2.6. Community Health, Safety and Nuisance

Community health and safety hazards specific to wind energy facilities primarily include the following the IFC guidelines for wind farms (IFC, 2015): The key issues and BAT measures are summarized below:

Aircraft and marine navigation safety

This is not anticipated to be an issue for the Dnistrovskiy wind power project given that the Project is not located within the radius of the effects of an airport.

Nevertheless, the operator will undertake to install suitable anti-collision lighting and marking systems, in consultation with the air regulatory traffic authorities before installation. The decision of the authorities is that out of turbines need to be marked with lights and only on the nacelle.

Blade and ice throw

EBRD Guidelines (E&S Eligibility Criteria for On-Shore Wind Projects, 2015) set forth a minimum distance of 700 m from the nearest residential area to mitigate all potential issues, including ice throw.

The IFC states that, in periods of significant frost and ice, de-icing will be undertaken, if the turbines are to continue to operate, in order to minimize risk of ice throw. This also has the added benefit of optimizing energy generation capability during these weather conditions. In situations where turbines are operating in cold climates, the installation of blade heating should be considered.

Another and/or additional option is to equip the wind turbines with vibration sensors that can react to any imbalance in the rotor blades and shut down the turbine if necessary. In summary the measures which may be applicable to this wind farm as delineated by the IFC include:

- Curtail wind turbine operations during periods of ice accretion;
- Post signs at the perimeter of the wind farm, in all directions;
- Equip turbines with heaters and/or ice sensors; and
- Use synthetic lubricants rated for cold temperature.

Electromagnetic Interference

There are a number of potential remedies should there be interference to telecommunication systems. However, it should be noted that the authorities have issued opinion to UPR that no such interferences are expected. In general, potential interferences may include (IFC, 2007b):

- Modifying placement of wind turbines to avoid direct physical interference of point-to-point communication systems;
- Installing a directional antenna;
- Modifying the existing aerial; and
- Installing an amplifier to boost the signal.

Remedies in the event of television interference can include:

- Site the turbine away from the line-of-sight of the broadcaster transmitter;
- Use non-metallic turbine blades;
- If interference is detected during operation:

- Install higher quality or directional antenna;
- Direct the antenna toward an alternative broadcast transmitter;
- Install an amplifier;
- Relocate the antenna;
- If a wide area is affected, consider the construction of a new repeater station.

Public access

Security will be provided to the site at various levels, as recommended by the IFC (IFC, 2007b), including (but not limited to):

- Locking of each individual turbine tower access door;
- Operating a permit to work system to prevent unauthorized access;
- Warning signs on site access roads;
- Control of access roads to the turbines and associated equipment;
- Fencing off maintenance and equipment storage areas; and
- Dissemination of information on safety zones and the hazards posed by the turbines in the local community.

7.2.7. Environmental Management and Accidents

The minimization of environmental impact, and the prevention of accidents that may have environmental consequences, should be managed by implementation of suitable management systems including environmental management systems. These should be developed for the installation to suitable standards such as ISO standards.

The systems should be in place throughout the project life cycle, in particular in order to minimize the risk of impact due to accidents and their consequences on the environment, including human receptors. Ideally, an integrated management system will be in place to cover environmental and health and safety management, certification to ISO14001, OHSAS18001 or similar standards as earlier as possible in the project lifecycle. Since the construction phase will be the project phase of potentially the most significant impacts, the management systems should be in place before construction begins.

7.2.8. Monitoring

Best practice associated with assessment of impact is to ensure that appropriate survey work of wildlife (habitats, birds bats etc.) and potential impacts on human receptors (e.g. noise) is undertaken both pre and post-construction. However, such monitoring is typically outside the scope of a BAT assessment. As defined in Section 7.1, BAT assessments are focused on the operational design of the facility and technologies that are integral to the operational design. Pre-Construction survey methodologies are discussed in of this Statement and post- construction monitoring is discussed in Section of this Statement.

Typically, in the case of industrial installations, emissions monitoring technologies are used in order to ensure that emissions are within the designated limits and to determine potential pollution impacts from the industrial installation. It can be argued that analogous to this in the case of wind farms is the use of permanent monitoring techniques, where they are determined to be necessary and where the feedback from the monitoring techniques will have a direct bearing on the day to day operational management of the wind farm. Such techniques could include monitoring of animals in flight and noise monitoring, where the data received may be used to alter the operations of the wind farm. The important factor being that the information feedback loop is short. In the case of monitoring of animals in flight, techniques such as visual observation, radar or thermal imaging could be used to provide early warning of, for example, migrating birds which are on a flight path through the wind farm. In the case of noise, continuous noise monitoring at sensitive locations may, when noise levels from the wind farm increase during certain climate conditions (e.g. where cross winds increase wind shear, resulting in high noise levels), lead the operator to switch to noise suppression mode.

There are no prescriptive or mandatory requirements in any of the key references detailed in Section 6.1 to implement any of the measures detailed above as a matter of course. The use of monitoring techniques which may provide live feedback to wind farm operators is gaining some traction, as described in some recent expert guidance notes, such as Natural England Technical Information Note TIN069 (Natural England, 2010). However, these requirements are only necessary if the local environmental conditions dictate that they are necessary. These are site specific BAT requirements rather than the more general BAT requirements described elsewhere in this section. Data collected during 2+ years of monitoring indicates that there are no bird and/ or bat flight paths through the proposed project area that will lead to significant bird and/ or bat mortality. Therefore, the installation of permanent monitoring techniques, such as radar, is not considered BAT for any wind farm.

Noise modelling undertaken using worst case scenarios indicate that significant noise impact is highly unlikely.

While the above techniques may provide additional information feedback loops to the operator and the regulator, their installation does involve some considerable CAPEX and OPEX costs. A key element of BAT assessment is associated with ‘cost-benefit’ and the ‘proportionality principle’. From the information available, in the case of both permanent radar and noise monitoring, the cost of installation and operation far outweighs any benefit and therefore, under the principle of proportionality any prescriptive requirements for their installation does not pass the proportionality test.

It is noted that the monitoring of the potential impact on the bird populations will continue following construction. The monitoring results will be reviewed after two years and the potential benefits of radar will be reconsidered.

In conclusion, the installation of permanent noise monitoring stations, is not considered to be BAT for the proposed installation.

7.2.9. Decommissioning, Site Closure and Restoration

Decommissioning should be undertaken so as to prevent undue risk to the environment. Much of the BAT associated with decommissioning should be incorporated into the design phase. While, the decommissioning of a wind farm is not a complicated process, largely comprising of the dismantling of the turbines and site clearance, the appropriate management controls should be in place. There are in general, similar to the standards required during the construction and operational process.

A key element of BAT for decommissioning concerns 'ease of decommissioning'. The project should be designed to allow for ease of decommissioning. Basic measures should be included in the design such as incorporating construction and fabrication techniques that facilitate ease of dismantling and recycling, where appropriate. Key difficulties associated with the decommissioning of a wind farm are the removal of foundations (if considered necessary) and other underground structures (such as cabling) and the disposal of turbine blades. At present, the design of turbine blades (i.e. thermoset polymer materials) does not facilitate ease of recycling. This is an industry wide issue, with the development of alternative materials construction (e.g. thermoplastic polymers) being researched in order to make wind farm construction more sustainable. The alternative disposal mechanisms are landfill which is a problem throughout Europe due to lack of landfill space, and incineration in waste to energy plant, which results in emissions of harmful gases and/or requires sophisticated abatement technologies which have their own environmental impact. However, since readily recyclable wind turbine blades are not presently an openly available technology, we consider that they are not at present a BAT requirement.

The design stage should appropriately consider these issues and ensure that the site can be restored to a status contiguous to its state prior to the development. Further, decommissioning of structures should be undertaken in such a way as to minimize health and safety issues to workers involved in decommissioning.

Typically, wind farm operational processes do not involve the use of large volumes of hazardous materials which may result in releases of particularly harmful materials into the ground and therefore, with appropriate management during operation, it should not be necessary to conduct post operational clean up. Where ancillary structures, such as transformers are part of the design, these should be designed so as to prevent releases to the environment of hazardous chemicals. In the case of transformers, the transformer pad should incorporate secondary containment in order to ensure that there have been no releases into the ground during the course of operations that will give rise to ground contamination issues.

In summary, decommissioning planning starts at the design stage and the design should facilitate ease of decommissioning. Where ever possible materials should be recycled and the site should

be restored to its state before development. There should be appropriate management systems in place to prevent harm to the environment and health and safety risks to workers and the public.

7.3. BAT Assessment

In general, as summarized below, the project has been located away from sensitive receptors, and designed to represent BAT, in terms of:

- The size and number of turbines to be used and the turbine design selected;
- Organization and management of construction;
- The measures to prevent impact from ancillary activities.

Figure 12 Best Available Technology (BAT) Assessment

Indicative Requirement	Control Measures for BAT	BAT Justification
Management Systems	Bespoke EMS to ISO14001 and OHSAS18001, or equivalents. Certification preferred but not essential.	EMS to OHSAS18001 and ISO14001 to be implemented. Appropriate management systems in place at all project phases Preventative maintenance regime incorporated into EMS.
Accidents	Accident Management Plan under EMS in accordance with relevant guidance including local regulatory requirements.	
Visual Impacts	Consult the community on the location of the wind farm to incorporate community values into design. Consider the landscape character during turbine placement Consider the visual impacts of the turbines from all relevant viewing angles when considering locations. Minimize presence of ancillary structures on the site by avoiding fencing, minimizing roads, burying intra-project power lines, and removing inoperative turbines. Avoid steep slopes, implement erosion measures, and promptly re-vegetate cleared land with indigenous native species only. Maintain uniform size and design of turbines (e.g., direction of rotation, type of turbine and tower, height). Paint turbines a uniform color, while observing marine and air navigational marking regulations. Avoid including lettering, company insignia, advertising, or graphics on the turbines.	Distance to nearest receptor approximately 0.8 km. Distance to nearest settlement 1km. Area is relatively flat. Erosion prevention measures to be employed. Re-vegetation will be using only native species. Turbines will be light grey without highly visible graphics or lettering. On-site electrical connections to be underground. Slopes to be avoided where possible. Erosion prevention measures such as native species re-vegetation to be used.
Noise	Mechanical noise from machinery (e.g., gearbox, generator) should be minimized by good engineering design and incorporation of acoustic enclosure techniques into the nacelle design. Aerodynamic noise from the turbine blades should be minimized by good engineering design, covering issues such as rotational speed (including the use of variable speed), turbine blade wake turbulence and pitched turbine blades (including variable blade pitch). Aerodynamic noise from the tower should be minimized by good engineering design of the tower configuration (e.g., lattice towers may give rise to greater noise emission levels than cylindrical towers). Siting of wind farms in close proximity to sensitive noise receptors (e.g., residential property, hospitals, and schools) should be avoided.	Distance to nearest receptor approximately 0.8 km. Distance to nearest settlement 1km. Larger turbines used, so fewer in number. Noise targets will be complied with at receptor locations. Use of modern design of wind turbine reduces noise from nacelle and turbine blade design. On-demand monitoring can be applied and the blade speeds can be modified as appropriate.

Indicative Requirement	Control Measures for BAT	BAT Justification
Species Mortality, Injury or Disturbance (birds and bats)	Selection of wind farm sites should consider known migration pathways or areas where birds and bats are highly concentrated (e.g., wetlands, designated wildlife refuges, staging areas, rookeries, bat hibernation areas, roosts, ridges, river valleys, and riparian areas). Turbine tower and blade heights should be maintained below observed typical elevations of migratory bird and bat pathways. Turbine rotational speed should be as low as possible to enhance visibility to birds and bats. Turbine arrays should be configured so as to avoid potential avian mortality (e.g., group turbines rather than spread them widely or orient rows of turbines parallel to known bird or bat movements); Storm water management measures should be designed so as to avoid creating attractions such as small ponds which can attract birds and bats for feeding or nesting near the wind farm. Tower design should avoid creating potential nesting sites for birds (e.g., lattice towers).	There are no significant migratory pathways through the windfarm. Project is >1.45 km from Dnistr Estuary and Dnistr Delta IBA boundaries Larger turbines to be used, in alignment. Large 3 blade rotors minimize rotation speed. Solid tower rather than lattices to avoid encouraging roosting. There will be no impact on surface water drainage during the operational stages. During construction, any ground compacted or otherwise damaged which may leading to pond formation, will be reinstated to an appropriate condition.
Shadow Flicker and Blade Glint	Wind turbines should be sited and orientated so as to avoid residences located within the narrow bands, generally southwest and southeast of the turbines, where shadow flicker has a high frequency. Turbine location should also take account of the potential for blade glint, although the likelihood reduces as the blades soil with age. Consideration should be given to the use of non-reflective coating on turbine towers to minimize sunlight reflection.	Project unlikely to cause significant shadow flicker. The distance to nearest receptor over 0.8 km. There is the potential that there could be some very minor impact for a few hours a day for a few days a year. The situation will be monitored and if there is an impact then UPR will close down the turbine for the 'at-risk' hours. Distance to nearest settlement over 1 km. Black polyurethane coated blades will not be required.

Indicative Requirement	Control Measures for BAT	BAT Justification
Habitat Alteration	Access road gradients should be minimized to reduce storm water run-off induced erosion. Road drainage design should take account of road width, surface material, compaction, and maintenance. Access road maintenance should be conducted in such a way as to minimize the potential for impact (e.g., use of de-icing measures). Disturbance of extant water bodies should be minimized (e.g., by the use of single span crossings). Drainage systems should be designed so as to minimize and control infiltration. The design and installation of the turbine tower should take account of the need to ensure structural stability of existing topography.	Site is relatively flat. Gradients will be minimized and road drainage designed to suit terrain. Erosion prevention measures identified above will minimize surface water runoff. Re-vegetation will be using only native species. On-site electrical connections to be underground. Erosion prevention measures such as native species re-vegetation to be used in order to maintain biodiversity.
Water Quality	The design and installation of turbine foundations, underground cables and access roads should consider the potential for increased erosion and sedimentation of surface waters.	Erosion prevention measures identified above will minimize surface water runoff.
Community Health, Safety and Nuisance: Aircraft Navigation Safety	The design and installation of wind turbines should take account of the fact that blade tips, at their highest point, may reach more than 100 meters in height. If located near airports or known flight paths, a wind farm may impact aircraft safety directly through potential collision or alteration of flight paths. Air regulatory traffic authorities should therefore be consulted before installation, in accordance with air and marine traffic safety regulations. When feasible, avoid siting wind farms close to airports or ports and within known flight path envelopes. Use anti-collision lighting and marking systems on towers	The nearest airport is over 45 km to the northeast of the project.

Indicative Requirement	Control Measures for BAT	BAT Justification
Community Health, Safety and Nuisance: Blade / Ice Throw	The design and siting of wind farm installations should establish safety setbacks (exclusion zones) such that no buildings or populated areas lie within the possible trajectory range of the blade. Whilst such safety setback ranges are unlikely to exceed 300 meters, the range can vary with the size, shape, weight, speed of the rotor and the height of the turbine. The design of the safety setback range should take account of climate issues (e.g., the potential for ice throw will be limited to colder regions). Wind turbines should be equipped with vibration sensors that can respond to any imbalance in the rotor blades and shut down the turbine. The wind turbine should be maintained in accordance with a planned preventative maintenance regime. The design of the wind farm installation should incorporate the use of warning signs to alert the public to potential risk.	Wind turbine operations will be curtailed during periods of ice accretion. Will post signs on the perimeter. Blade heating not used, but vibration sensors that can react to any imbalance in the rotor blades will be in place and shut down the turbine. Due to the low risk of ice formation (the site is not characterized as a 'cold climate') the installation of heated blade systems is not proportional and therefore, we consider it unnecessary. Synthetic lubricants used, rated for cold temperature; Preventative maintenance regime incorporated into ESMS.
Community Health, Safety and Nuisance: Electromagnetic Interference – Aviation Radar	The design and siting of wind farm installations should consider equipment, component designs and materials of construction that minimize radar interference, including the shape of the turbine tower, the shape of the nacelle, and the use of radar-absorbent surface treatments (e.g., rotor blades made of glass-reinforced epoxy or polyester). Wind farm design should consider the geometric layout and location of turbines and potential changes to air traffic routes. Wind farm design should consider relocation of the affected radar and radar blanking, or use of alternative radar systems, to cover the affected area.	The nearest airport is over 45 km to the northeast of the project site. Measures to be considered in light of any interference being caused and complaints received.

Indicative Requirement	Control Measures for BAT	BAT Justification
Community Health, Safety and Nuisance: Electromagnetic Interference, Telecommunication Systems	The design and siting of wind farm installations should consider locating the turbines away from the line-of-sight of the broadcaster transmitter. Consideration should be given to the use non-metallic turbine blades. If interference is detected during operation, the following measures should be considered: - Installation of higher quality or directional antenna; - Direction of the antenna toward an alternative broadcast transmitter; - Installation of an amplifier at the reception antenna; - Relocation of the reception antenna; If a wide area is affected, consideration should be given to the construction of a new transmission repeater station.	Distance to nearest receptor approximately 0.8 km. Distance to nearest settlement over 1km. Measures to be considered in light of any interference being caused and complaints received.
Community Health, Safety and Nuisance: Electromagnetic Interference – Public Access	The design and siting of wind farm installations should consider the use gates on access roads. Consideration should be given to fencing the wind farm site, or individual turbines, to prohibit public access close to the turbine; Consideration should be given to the prevention of access to turbine tower ladders. Consideration should be given to the posting of information boards about public safety hazards and emergency contact information.	Individual turbine tower access doors will be locked. Permit to work system to be in place to prevent unauthorized access. There will be no gates to be in place on access roads to the main turbine site since the site will be open. Ancillary plant will be housed in secure compounds and warning signs will be used at entrance roads (particularly during construction), at the wider wind farm site and at ancillary plant compounds. Control of access roads to the turbines and associated equipment. Dissemination of information on safety zones and the hazards posed by the turbines in the local community.
Decommissioning and closure	Selection of site, design, construction and equipment selection should take account of closure / decommissioning requirements. Outline Site Closure Plan should be developed at an early stage in the life of the facility. The Plan should be expanded and developed immediately prior to decommissioning and closure, taking account of site-specific issues, and should include measures for prevention of pollution during decommissioning / closure activities.	Basic design measures to be taken during design to minimize potential decommission and closure impacts. No significant hazardous substances to be used. Wind farm construction to employ materials and techniques that can be recycled. Recycling of blades is not at present an adoptable technology and is therefore not relevant.

7.4. Conclusions

In terms of the design we conclude the proposed wind farm and ancillary structures will comply with the BAT we have derived for this assessment. At present the appropriate design aspects have been incorporated into the project at an early stage and we expect that in order that BAT compliance is achieved throughout the project lifecycle, appropriate management systems will be developed from construction through to commissioning.

8. Project Alternatives

8.1. Introduction

We have included an outline of the project alternatives in this section because this work has already mainly been undertaken at an early stage in the project planning process. It is not the purpose of this Statement to present a detailed assessment of the project alternatives, in particular site alternatives. However, where applicable throughout this document, the proposed impact of the chosen site and design will be discussed in terms of the potential alternatives.

8.2. No Project Alternative

The no project scenario is that the wind farm is not built. In the event that the wind farm is not built there will be no negative impacts in terms of those that might be typical of wind farms (noise, visual impact, flicker etc.). The Bilhorod-Dnistrovskiy District, the territory in which the wind farm is supposed to be built will in this scenario feel a negative impact because they do not receive the financial and other positive impacts associated with the construction of the wind farm as a major private investment in this otherwise economically challenged area. From a national perspective, there will be a negative impact in that Ukraine will be more reliant on importing their energy requirements and also the country will not be developing renewable energy sources in line with its national goals.

8.3. Alternative Locations

As part of Ukraine Power Resources' scoping for a suitable location, alternative locations were investigated. During the pre-stage construction of the Dnistrovskiy wind farm, the planned project was located in closer proximity to the Dnistr Estuary (see Figure 11). The ornithological experts at the Melitopol State Pedagogical University concluded that the placement of nine (9) of these proposed turbines was in the risk zone for migratory birds on the coast of the Dnistr Estuary. The Sponsor's agreed to move these 9 turbines no less than 1.3 km from the Estuary and outside of the risk zone for migratory birds as recommended by the ornithological experts. The original location of the nine turbines is shown in Figure 12 below.

Figure 13 DWPP Alternative Location 1

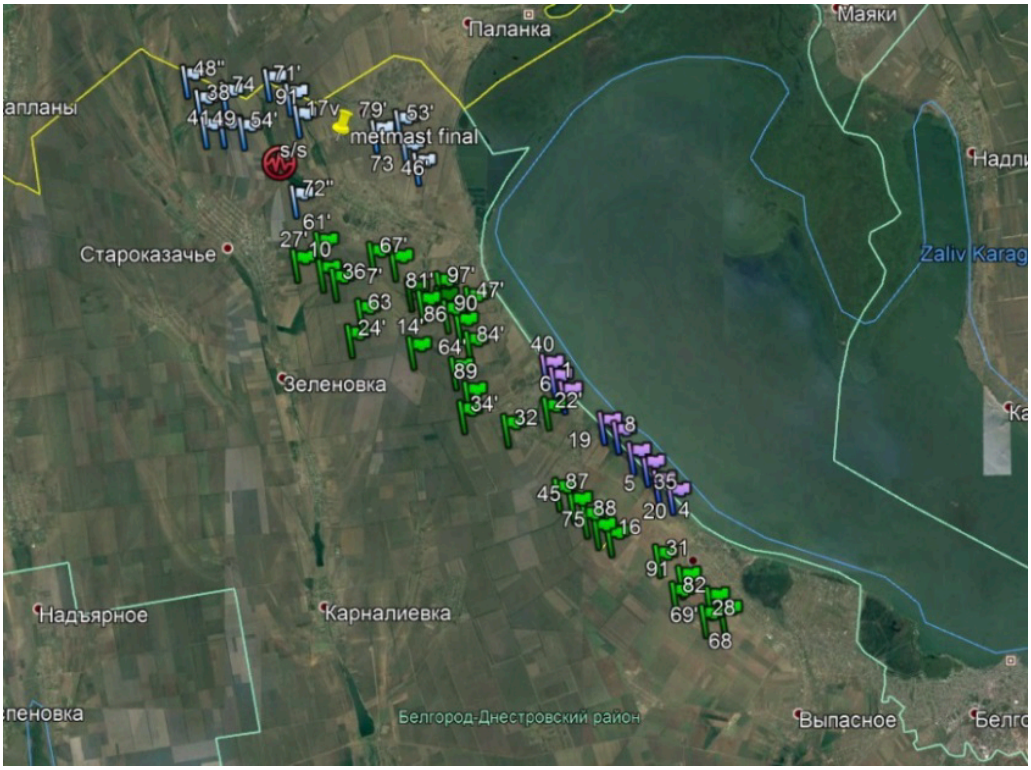


Figure 14 Original Location of 9 Cancelled Turbines

8.4. Alternative Project Configuration for Dnistrovskiy WPP

Early in the planning process, UPR considered alternative scenarios associated with the wind farm at the proposed site. These scenarios were revised as follows:

- Scenario 1: Increased distance of no less than 1.3 km from the Dnistr estuary and outside of risk zone of migratory birds
- Scenario 2: Increased spacing between the turbines in order to minimize noise and shadow cumulative impact

9. Greenhouse Gas Emissions Assessment

9.1. Greenhouse Gas Emissions Assessment

An assessment of the potential emissions of greenhouse gases from the proposed installation has been undertaken using the EBRD Methodology for Assessment of Greenhouse Gas Emissions (EBRD, 2010). The EBRD assessment methodology focuses on the following:

"... estimate the change in GHG emissions (ΔGHG) brought about by investments. This is the difference between the emissions following the implementation of the project investment and the emissions that would have occurred in its absence. "

Where 'GHG' is 'Greenhouse Gas Emissions'

Greenhouse gas assessments for renewable energy projects are undertaken using the methodology are based on the following assumption:

"Renewable energy power generation projects are assumed to displace the emissions associated with the national average grid electricity generation."

This is because other electricity generation techniques, specifically those associated with combustion of fossil fuels emit high levels of carbon dioxide (CO_2), an important greenhouse gas and contributor to climate change. This is relevant in Ukraine since most of the electricity (over 70%) is generated from combustion of fossil fuels, lignite in particular, with no electricity produced by wind power or nuclear power and, the remaining energy produced in large hydropower plants.

Although greenhouse gases will be released directly or indirectly as a result of construction of the wind farm (e.g. the production of the cement used for turbine foundations results in significant emissions of CO_2), these embodied GHG emissions are common to the construction of other types of power plant and may often be significantly lower in the case of wind farm development. Therefore, as per the EBRD requirements, the focus of the assessment is GHG releases during operation, or, as wind farms and other renewable energy plant do not produce CO_2 during operation but instead displace the energy demand from conventional sources, the assessment is based on CO_2 displacement.

The EBRD methodology is to use grid electricity emission factors which are expressed in grams of carbon dioxide emitted per kilowatt hour of electricity produced (gCO_2/kWh) to estimate the GHG emissions/displacement. The displacement factor for such projects in Ukraine is 0.792 tCO_2/MWh (US Energy Information Administration, 2007).

The estimated energy production of Phase I of the Project, based on figures supplied by First Summit Energy, is 142,548 MWh/per annum. This is approximately equivalent to a 40% net capacity factor of the proposed design, based on a 34.5 MW wind farm. The estimated energy

production of Phase II of the Project is 271,439 MWh/per annum. This is approximately equivalent to a 42% net capacity factor of the proposed design, based on 65.1 MW wind farm. Inclusive of Phase I and Phase II, the Dnistrovskiy Wind Farm will have estimated energy production of 413,987 MWh/per annum. In order to determine the CO_2 displacement the following simple calculation is undertaken:

Total MWh/per annum of DWPP x Country Grid Electricity Emission Factor = CO_2 displaced

413,987 MWh/per annum x 0.792 tCO_2/MWh = 327,877 tCO_2/per annum displaced

9.2. Conclusions

Review of the project alternatives indicates that of the practical alternatives considered, the proposed location and design is the most appropriate for consideration of detailed impact assessment. Further, the project will significantly offset greenhouse gas emissions from present conventional sources.

10. The Existing Environment

10.1. Introduction

The following sections provide a detailed overview of the Physical Environment, Natural History (i.e. ecology) and Human Geography (i.e. socio-economic baseline) of the proposed project site and its surroundings. The information presented is based on available information from local and governmental sources, publicly available databases, and survey work and research undertaken by DSENO LLC as part of feasibility studies commissioned by UPR.

10.2. The Physical Environment

10.2.1. Geology and Hydrogeology

UPR commissioned an engineering and geological survey by experts at DESNO LLC in January - February 2018 (technical report 11 / 01-18-А-ІГ-ТЗ). The survey area included the rectangular shape of 3.5 km by 7.5 km located 2.4 km to the North-East of the village of Starokozache.

The Project site is located in the southern part of Ukraine. The survey concluded that the Project site is located within the borders of the Black Sea Depression of the Danube-Dniester Lowland shown below in the engineering geological zoning map of Ukraine (Figure 15).

Figure 15 Engineering Geological Zoning of Ukraine, DWPP Territory (Source: DESNO LLC)

According to the present geomorphological division, this territory belongs to the South Moldova Undulating Plain, which is a transitional area from the Bessarabian Upland to the Black Sea Depression. Primary geomorphological elements and distinct features of the region include:

- Primary aquaculture plain (plateau)
- Erosion-accumulative forms of relief (river valleys, gorges, ravines, terraces)
- Gravity forms of relief (landslides)

The geological section (to the explored depth of 42.0 m) is made up of low-Pleistocene eluvial, Eolian-deluvial deposits. These deposits are discussed in more detail below. In the well drillings of roads, deposits of the Quaternary and Neogene age are found.

Figure 16 Fragment of Engineering Geological Map of the Area

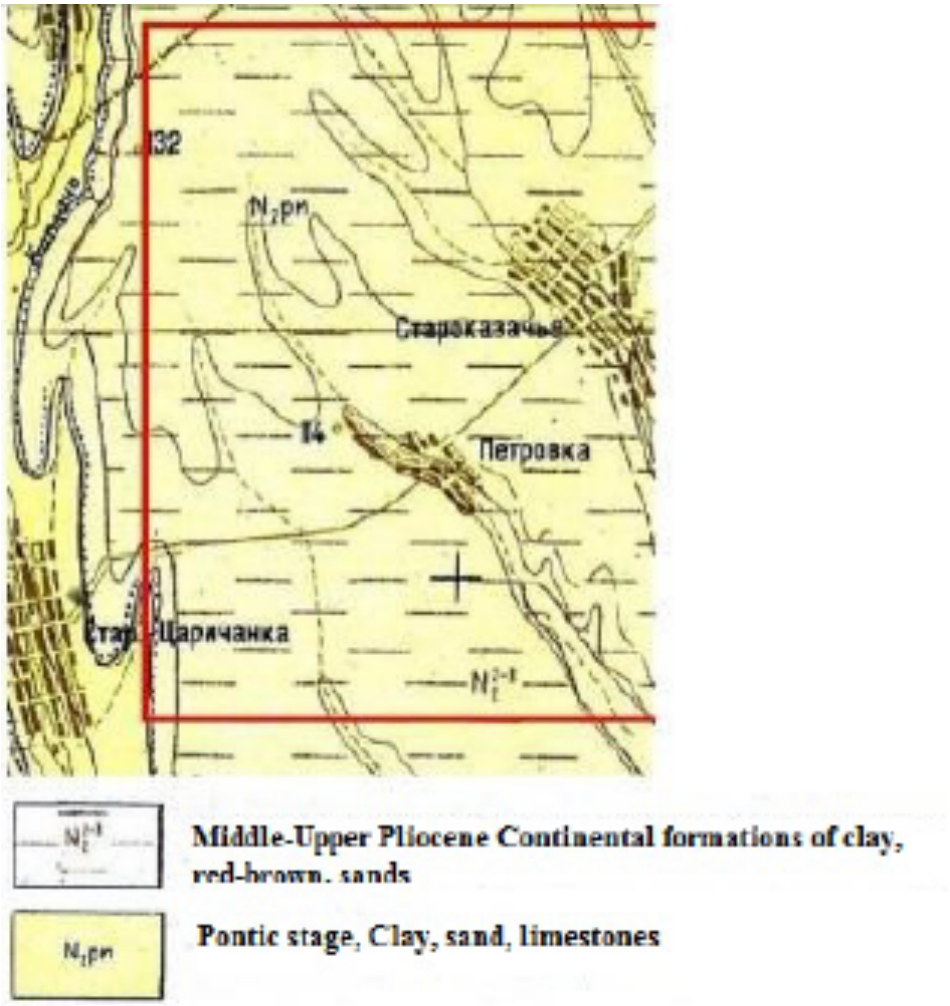
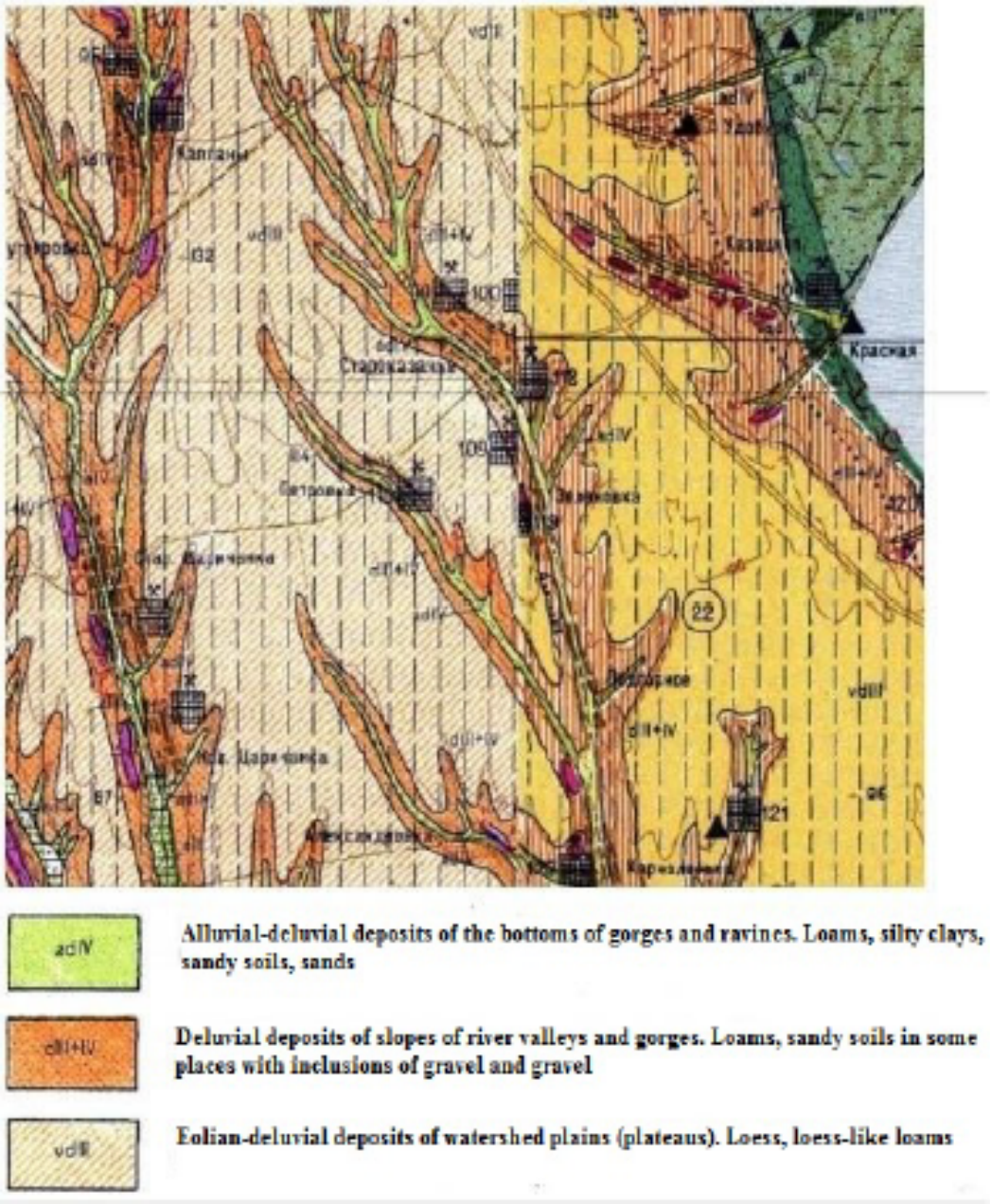


Figure 17 Geological Structure of the Area



The low-Pleistocene eluvial, Eolian-deluvial deposits include:

From the surface, under a soil-vegetation layer with a capacity of 0,5-0,8 m, to a depth of 12,5-19,0 m: Strongly perineal loam, light-pollinated, forest-like, pale yellow, gray-yellow, grayish-brown, solid (IGE-37AP), rarely permafrost loess-like loams, solid (IGE-39AP), in the thickness of which layers of 1,0-3,3 m of sandy loamy, solid, strongly pollinated (IGE-33AP) are traced. The total thickness of the wooded earthenware thickness is 10.9-18.1 m.

Below are the widespread loams of heavy dust, hard and semi-solid, hardly swollen (IGE-55a), rarely clay is light pulverized, semi-solid, hardly swollen (I .GE-57a), in the thickness of which traces lens-shaped layers of 1,0-5,0 m loam of lung pullout, (IGE-55b) and mild-plastic (IGE-55v), dusty sums, hard to fluid consistency (IGE-52a, b, c), rust sands of dusty, medium density (IGE-65b) and dense (IGE- 65v). The dense sand of the shallow (IGE-66v) and sawdust (IGE-65v), open capacity of 5.8 m, are gutted at the depth of 36.2 m (absolute -9.20 m). The total uncovered power of the median quaternary eluvial and Eolian-deluvial deposits is 18.0-27.5 m.

10.2.2. Seismology

General Background Information

The engineering and geological survey conducted by DESNO LLC includes a comprehensive evaluation of the project area's seismology.

This site has III category of complexity (complicated) of engineering-geological conditions according to Appendix H of SCN A.2.1-1-2014.

The territory in the area of Starokozache village of Odesa region is within the zone of intensity with 7 points with repetition of earthquakes 1 time in 500 and 1000 years (according to the SCN V.1.1-12: 2014). The soils belong to category III according to seismic properties (according to table 5.1 of the SCN V.1.1-12: 2014).

Turbine Design and the Seismic Environment

Wind-generators are devices which are designed, dimensioned and manufactured to be capable to withstand the assumed loads level with the predefined safety level. They also have certain degree of stiffness/strength that gives them stability and long life as well.

In terms of civil construction, wind-generators represent a dynamic loaded construction which consists of rotor, housing with aggregate at top of the steel pylon which is fixed to the basement via anchor block. The rotor and the housing with aggregate as well as the pylon with anchor block are delivered by the equipment supplier (i.e. General Electric). The manufacturer provides detailed instructions for instalment procedure both for pylon installation and for energetic assembly at the bottom of pylon including instructions for anchor block embedding.

Wind-generators belong to a type of low-cyclic rotating machine which leans on the foundation through the pylon and which transfers certain impacts onto the ground. Loads are managed through design in accordance with EN 61400-1 2005 and A1:2009 standards – Wind-generators – Requirements for designing. The following factors are taken into account in the design: gravity related and inertial loads (static and dynamic ones), aerodynamic loads – loads caused by air flow and by interaction with stationary and movable wind-generator elements; operational loads – loads caused by regular operations and wind-turbine control; and, other loads (impulse related

loads, ice related loads etc.). All major wind-generator assemblies (blades, gondola and pylon) are analyzed together, as an assembly in view of the specific requirements for aerodynamic response, stability, durability (resistance to fatigue of material) and other requirements as well.

As part of the Dnistrovsky Wind Power Project, a geotechnical assessment has been undertaken to determine the ground conditions in the locations of the proposed turbines. Information concerning geotechnical ground conditions, together with the information available concerning seismic activity (and seismic risk) and the design of the turbines will allow for suitable foundation design and turbine siting.

Given that the Project is located in the seismic activity region, the wind turbine, single-story production building, the substation and other installations shall be designed to ensure stability to 8 points of seismic activity (by the MSK scale), according to Building regulations and rules for construction in zones of seismic activity (SNiP II-7-81).

Detailed design of the foundations is currently being completed. The engineers working on the detailed design of the wind farm are working closely with prospective turbine manufacturers to ensure that proper information is available to design foundations and turbine structures. Due to the nature of the structures (i.e. that seismic issues will not lead to releases of significant volumes of hazardous substances) and that the need for turbine structures to remain intact within their seismic environment is of paramount commercial importance to the business (i.e. it is a very strong commercial driver), UPR considers that it is unnecessary to undertake any separate and detailed analysis as part of this ESIA.

10.2.3. Climate and Meteorology

10.2.3.1. Introduction

In order to characterize the climate of the Project area, DESNO LLC utilitzed data from the Bilgorod-Dnistrovskiy meteorological station. This station is the closest meteorological station to the Project area and is located 25 km away from Starokozache.

10.2.3.2. Regional Climate and Meteorology

According to the architectural and constructional climatic zoning of the territory of Ukraine, the survey area is situated in the Zone II – South-Eastern region (DSTU-N B.V.1.1-27:2010). Average climatic data is shown in Figure 18 below.

Figure 18 Climate Characteristics of the DWPP Project Area (Source: Bilgorod-Dnistrovskiy Meteorological Station)

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Avg. Temp (°C)	-1.7	-0.9	2.9	9.7	15.6	19.5	21.5	21.1	16.9	11.2	5.6	1.2
Min. Temp (°C)	-4.4	-3.5	0	6.1	11.7	15.5	17.3	16.8	12.7	7.5	2.7	-1.4
Max. Temp (°C)	1	1.7	5.8	13.3	19.5	23.6	25.8	25.5	21.2	14.9	8.5	3.8
Rainfall (mm)	35	35	28	33	43	58	57	39	40	25	37	40

The southern steppe of Ukraine is characterized by a moderately warm continental climate. During the winter months the air temperature in the Bilgorod-Dnistrovskiy area can drop to -27 to - 28 ° C, and in the summer months it reaches +35 to +38 ° C. The average temperature varies during the year by 23.2 ° C. Monthly temperature data is shown in Figure 8 above.

The Project area experiences an average of 470 mm of precipitation per year, with fluctuations ranging from 230 to 500 mm. Approximately 80% of precipitation occurs during the summer months. Between the dry and rainy months, the difference in precipitation is 33 mm. Given the uneven precipitation, the region is prone to droughts, particularly during high temperature periods in the summer. During droughts, the soil may lose moisture quickly. Given the frequency of droughts in the Project area, and the quick transition to higher temperatures in the spring, agrotechnical measures should be focused on preserving soil moisture.

Average monthly and seasonal precipitation is shown below in Figures 19 and 20, respectively.

The height of the snow cover in the area is an average of 2-4 cm. The snow cover is unstable and typically lasts for 30-40 days each year.

Figure 19 Average Annual Precipitation (Source: Bilgorod-Dnistrovskiy Meteorological Station)

Period	Average (mm)	Maximum (mm)	Minimum (mm)
January	24	86	3
February	26	100	1
March	28	83	6
April	25	69	3
May	33	91	2

June	62	142	8
July	40	164	12
August	18	152	0
September	26	161	0
October	26	107	0
November	25	68	0
December	24	57	3
For the year	*357*	*515*	*230*

Figure 20 Seasonal Precipitation Distribution (Source: Bilgorod-Dnistrovskiy Meteorological Station)

Periods	**Precipitation in mm**	**% annual**
Winter	74	20
Spring	86	24
Summer	120	34
Autumn	77	22
Vegetation	232	65

Relative humidity data is shown below in Figure 21.

Figure 21 Relative Humidity by Month (Source: Bilgorod-Dnistrovskiy Meteorological Station)

Period	Average	Average at 13.00 hours
January	90	82
February	84	80
March	82	71
April	77	57
May	73	50
June	70	50
July	65	42
August	63	43
September	68	48
October	77	61
November	82	77
December	86	84
For the Year	76	62

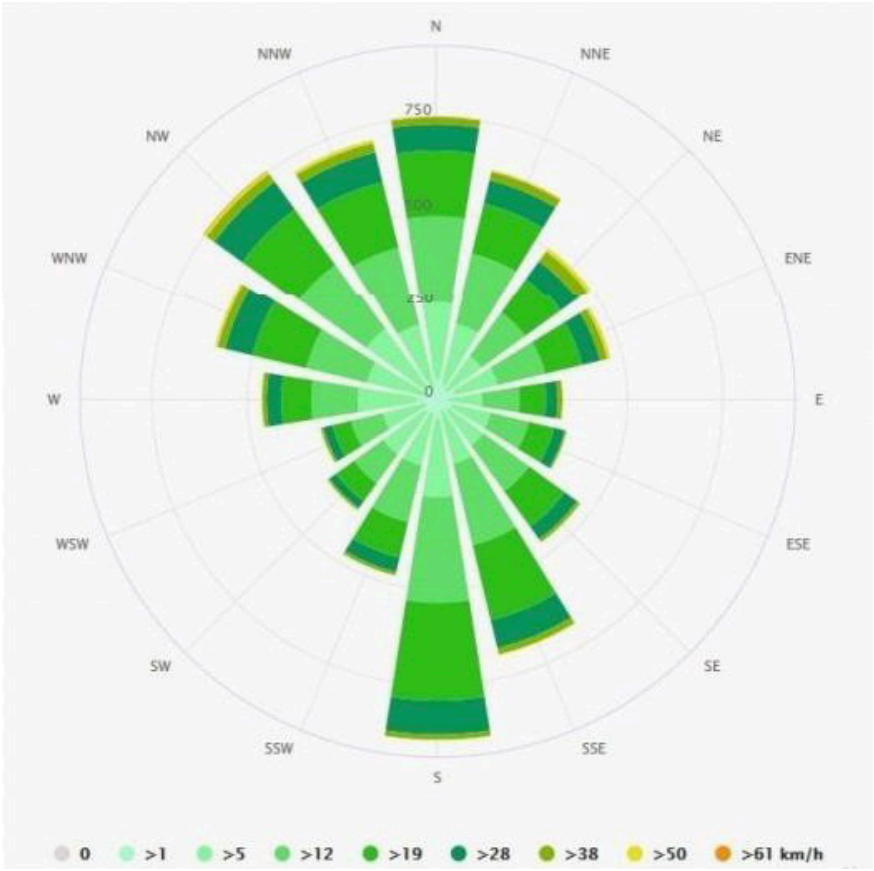
The depth of seasonal freezing of soils is 47 cm. On average, season frosts end in April and begin in November. The onset of the last spring frost and the first autumn frost are shown in Figure 9 below.

Figure 22 Onset of Last Spring Frost and First Autumn Frost (Source: Dnistrovskiy Meteorological Station)

Periods	The Last Spring Frost	The First Autumn Frost	Duration of the Frost-Free Period in Days
Average	5 April	5 November	213
The earliest	11 March	27 September	200
The latest	30 April	27 November	210

In the Project area, winds blow predominantly in the southern, southeast and northern directions. The wind rose in Figure 23 indicates how many hours a year the wind blows from a certain direction in the Bilgorod-Dnistrovskiy region.

Figure 23 Wind Rose for the Bilgorod-Dnistrovskiy Region



A 100 m high meteorological mast ("met mast") was installed at the site at an altutude of about 112 m above sea level and used for monitoring of wind speed and direction and climate conditions at the site. Given that the wind speeds at the mast are recorded at 58m (and higher) they are not comparable with wind speed values from the official meteorological stations.

Based on the wind speed analysis from the period of November 2017 to April 2018, the average measured wind speed at a height of 100 m is 7.3 m/s and the average predicted wind speed at a height of 131 m is 7.8 m/s.

10.2.3.3. Climate Change and Adaption

Monitoring of climate change in Ukraine has not been systematic and has been mainly performed by scientific and research institutions for their needs. The first official data on climate change analysis and projections were presented in 1998, in the First National Communication under the United Nations Framework Convention on Climate Change.

10.2.4. Landscape

10.2.4.1. Introduction

This section describes the features of the landscape in and around the proposed project area which determine its character and evaluates existing views and their amenity value.

10.2.4.2. Landscape Character

The key baseline landscape characteristic features of the site can be summarized as follows:

- The site is situated within a landscape which is sparsely developed in terms of the built environment, but highly developed in terms of agricultural activities. Where settlement occurs it comprises small to medium scale hamlets and villages with occasional isolated properties.
- The site occupies an area of open, large sized fields with a gently undulating plain.
- The site comprises arable fields with some grazing at the margins and in a limited number of grassy areas.
- There are a limited number of man-made or detracting features within the site. Overhead power and telecoms poles do not noticeably detract from the landscape's character due to their visual relationship with the surrounding village settlements and roads.
- There are roads in the near vicinity of the site,

Land Cover

The region is a predominantly agricultural in nature with arable crop, pastures and limited deciduous woodland areas. Dirt roads cross the site, allowing access to the large fields for farming. The crops grown within the site and surrounding areas are dominated by grapes

The site area comprises intensively managed arable farmland with limited semi-natural habitats. These include unmanaged field boundaries and road verges, areas of scrub and sparse deciduous woodland. The field boundaries appear generally species-poor with individual trees and shrubs present.

To the east of the proposed wind farm is the Dnistr Estuary, a natural wetland in the lower reaches of the Dnistr valley, which includes a man-made reservoir and the floodplain of the Turunchuk River.

Settlement

The landscape surrounding the site is relatively sparsely populated; there are a number of small settlements which range in size and density, including Udobne, Starokozache, Seminivka and Moloha.

Land Use and Pattern

The key influence on landscape pattern relates to agricultural practices. Field boundaries are largely unmarked. As a result, the pattern of the landscape can be defined as large scale agricultural fields.

Roads and Infrastructure

The road network through the Project area is based on a simple hierarchy. There are a limited number of main regional roads in close proximity to the site including M15, E87 and R30, among others.

Within the local villages the local roads are predominantly unsurfaced and comprise cobbles and compacted earth. Traffic on these routes is limited to a relatively small number of vehicles including cars, scooters/motorcycles, agricultural vehicles, and local buses. The most prominent infrastructure in the area comprise small to medium size overhead pylons and poles conveying electricity and telecoms serving the villages in the area. Telecom cables are generally located alongside the roads.

Designated Landscapes

The Project is not located on land belonging to nature reserves (including Nature Reserve Fund "NRF" Sites), national parks, or other designated landscapes. Protected areas of state, regional

and local importance are located no closer than a radius of 7 km from the site of the Project. On a regional scale, only the Nizhyodhistorovsky National Nature Park ("NNNP") is situated in the adjacent areas of the design territory of the Project. All IBA ("Important Bird Area") territories are located within the limits of the Dnistr Estuary. The Project is sited at least 1.45 km from the Estuary coast and at least 1.7 km from the Estuary.

10.3. Ecology

10.3.1. Introduction

The majority of the site is currently in agricultural use and is intensively farmed. Informal unsealed roads pass through and nearby the Project site, both to link nearby villages and to provide access for farmers.

To the east, the proposed wind farm borders the Dnistr Estuary (a Ramsar site) and Dnistr IBA. Ramsar sites are established under the Ramsar Convention for the conservation and sustainability of wetlands. IBA sites are established by Bird Life International for the protection of important bird species. There are no protected areas of state, regional and local importance within a 7 km radius of the site of the Wind Farm as concluded by the Ukrainian EIA that was conducted as required under Ukrainian law.

The Dnistr Estuary is the largest freshwater estuary in Ukraine and represents an important fish habitat in Ukraine with a number of rare and endangered fish species. The Dnistr Estuary is also a significant site for the southern fish industry of Ukraine and provides approximately 50% of the total catch of valuable species according to the size of fish catches in the Northwest Black Sea Coast. Aware of the potential significance and sensitivity of the Dnistr Estuary, the Sponsors decided to move the border of the Wind Farm over 1 km away from the boundary of the shoreline.

The Dnistr IBA was established in 2000 by BirdLife International. Key biodiversity at the Dnistr IBA site includes more than 15,000 pairs of breeding waterbirds. The turbines are located more than 1 km away from the IBA as agreed by the Sponsors. More information about IBA Criteria met is published on BirdLife International's website:
http://datazone.birdlife.org/site/factsheet/dnister-delta-iba-ukraine

10.3.2. Available Background Information

10.3.2.1. Review of Previous Reports

A description of the site and nearby areas of conservation interest, including formally designated protected areas, was presented in the National EIA which was required by Ukrainian law and published in August 2018.

Further information on the habitats within the site has been gathered from project-commissioned bat and bird survey reports produced to date and photographs taken within the site boundary.

The following reports were reviewed for information on habitats within the site:

- "Expert opinion and scientific report on the impact of the construction and operation of the Dniester wind-power station site on natural environments, vegetation, seasonal ornithological complexes and migratory birds, bats, which is based on Scottish Natural Heritage recommendations and other international documents within the Bilgorod-Dnistrovskiy district of Odesa region" (Laguna Public Environmental Organization, Bogdan Khmelnitsky Melitopol State Pedagogical University)
- "Monitoring of wintering ornithocomplexes and migratory movements of birds within the boundaries of the Dniester wind-power station – Stage II (Winter Period 2018)" (Laguna Public Environmental Organization, Bogdan Khmelnitsky Melitopol State Pedagogical University)
- "Monitoring the migration of birds and bats in autumn, feed activity of bats within the site of the Dniester wind-power station – Stage 1 (Autumn Period 2017)" (Laguna Public Environmental Organization, Bogdan Khmelnitsky Melitopol State Pedagogical University)

10.3.2.2. Review of Information on Protected Nature Reserves

Information about this protected nature reserve which lies adjacent to the eastern border of the site was sourced from:

- The European Union Website (www.natreg.eu);
- the UNESCO website (whc.unesco.org); and
- Important Bird Areas in Europe: Priority Sites for Conservation (www.birdlife.org).

10.3.2.3. Consultation

Laguna Public Environmental Organization and Melitpol State Pedagogical University named after Bogdan Khmelnytsky managed the bird and bat surveys at the site on behalf of UPR. All experts commissioned have a close working relationship with the regional and national regulatory organizations. Furthermore, the Ukrainian EIA process did not result in any objections from regulators or any of the stakeholders during the public consultation process.

10.3.3. Habitat Classification System

The European Nature Information System (EUNIS) (European Environment Agency, 2004) habitat classification system has been used to describe and categorize all habitats recorded within the site. Although Ukraine is not part of the European Union, this system of habitat classification describes many of the habitats of neighboring countries, including Hungary and Romania. As

such, it was considered that the habitat categories within the EUNIS system would be suitable to describe the habitats likely to be encountered within the site. In addition, the lack of alternative habitat classification systems for countries outside the EU, and the possible future accession of Ukraine into the EU, was further justification for using this habitat classification system.

The EUNIS Habitat classification system (devised by the European Environment Agency, 2004) is a comprehensive pan-European system to facilitate the harmonized description and collection of data across Europe through the use of criteria for habitat identification; it covers all types of habitats from natural to artificial, from terrestrial to freshwater and marine (http://eunis.eea.europa.eu/about.jsp).

The EUNIS Database (http://eunis.eea.europa.eu/index.jsp) is the European Nature Information System, developed and managed by the European Topic Centre on Biological Diversity (ETC/BD in Paris) for the European Environment Agency (EEA) and the European Environmental Information Observation Network (EIONET). This habitat classification system is inclusive and descriptive of the whole of Europe and includes habitat types found in the most recently joined member states.

Habitats present at the site that are included within Annex 1 of the European Habitats Directive 92/43/EEC have been noted. The European Union habitat types contained within Annex 1 have been used to establish a network of Special Areas of Conservation (SAC) – known as Natura 2000 sites. Annex 1 lists 218 European Natural habitats, including 71 priority habitats in danger of disappearance and whose natural range mainly falls within the territory of the European Union.

10.3.4. Nature Conservation Evaluation

There are a number of criteria can be used to assess the nature conservation value of a defined area of land and these include diversity, rarity and naturalness. In this ESIA, we refer to the internationally recognized guidelines for the U.K, prepared by the Institute of Ecology and Environmental Management (IEEM, 2006). The bullet points below set out a hierarchy of "importance" based on the IEEM guidelines, but with some adaptation to the Ukrainian situation:

International importance: e.g. Special Areas of Conservation, candidate SACs/Sites of Community Importance, Special Protection Areas, UNESCO World Heritage Site/Biosphere Reserves, and Wetlands of International Importance (Ramsar sites).

National importance: e.g. National Parks and equivalent Protected Areas.

Regional/Provincial importance: e.g. Local or regional Nature Reserves.

Local (Municipality level) importance: e.g. significant ecological features such as species-rich grassland, ancient woodlands and heathland.

Important within the site and immediate environs: e.g. Habitat mosaic of grassland and scrub. Negligible importance: Usually applied to areas such as built development or areas of intensive agricultural land.

10.3.4.1. Identified Protected Habitats

Dnistr Estuary (also known as "Dnistr Estuary")

The Dnistr Estuary is part of the Lower Dniester National Park and included under the Ramsar Convention, an international treaty for conservation and sustainability of wetlands to which Ukraine is a signatory.

The Dnistr Estuary is a bay on the north-western coast of the Black Sea, in the Dniester River. The bay resorts to land from south-east to north-west by 41 km, a width of 4-12 km, a depth of 2.6 m. The Dniester estuary is separated from the sea by a narrow sandbone of Bugaz, in the southern part of which there is a passage in the sea - the Tsar'gegradskaya mouth. In winter, the Dniester Estuary often freezes. The coast of the Dniester estuary is strongly dissected by the beam network. The depth of the beam network reaches 15-20 meters, with absolute predominance, along the left bank of the estuary of small, but deep ravines. The width of these ravines is 10 to 150 meters. Jari have steep slopes, with an angle of inclination up to 80 °.

The Dniester Estuary is the largest freshwater estuary in Ukraine and represents an important fish habitat in Ukraine with a number of rare and endangered fish species. It is also one of the largest sites in the southern fish industry of Ukraine. The basins of the Lower Dniester provide about 50% of the total catch of valuable fish species according to the size of fish catches in the Northwest Black Sea Coast.

Previously, the Dniester estuary was a transport artery with many lines of passenger ships. regular ships were going from Bilgorod-Dnistrovskyi river port to Roksolany, Ovidiopol, Zatoka, Carolino-Bugaz, Sukholuzhzhya and Sonyachna.

Dnistr Delta Important Bird Area (also known as "Dnistr IBA" or "Dnistr Delta IBA")

The wind farm is located near the Dnistr IBA ("Important Bird Area") which was designated by BirdLife International in 2000. See Chapter 10.3.8.4 for more details on the IBA including a list of qualifying species that trigger the IBA status.

10.3.4.2. Description of the Site and Surroundings

General Description

The site of the proposed wind farm development comprises intensively managed, arable farmland and modified habitats occupy 100% of the Project area. The modified habitats are represented by two components: 1) agricultural fields and orchards with ruderal vegetation, and

2) artificial trees and shrubs (shelterbelts). It should be noted that this type of vegetation is crucial given that it protects arable land from air erosion, retains moisture in winter, and shapes the environment and landscape. In this regard, it is important that it is minimally violated during construction of the Project. Moreover, it is desirable to provide compensation in case of damage of wood plantings (planting new forests, additions, old, etc.).

10.3.4.3. Protected Species (other than bats and birds)

Flora

Protected habitats of plant species and plant communities are defined based on inclusion in one or more of the following: Protected habitat specified in Annex I of the Directive on natural habitats 92/43/EEC; Species of plants from Annex II of the Directive on natural habitats 92/43/EEC; the Red Book of Ukraine (2009); CRL – European Red List; IUCN – Red List of the International Union for conservation of nature; Bern Convention; or a list of plant species that is not listed in the Red book of Ukraine, but is rare or under threat of extinction in the territory of the Odessa region.

There are no protected habitats of ruderal vegetation or wood-shrub vegetation in the immediate Project area.

Within the 10 km zone around the Project, the following protected habitats (see Figure 22) specified in Annex I of the Directive on natural habitats 92/43/EEC were identified:

Figure 24 Protected Habitats Specified in Annex I of the Directive on Natural Habitats 92/43/EEC and Status within 10 km Zone

Type of habitat	Protected habitat specified in Annex I of the Directive on natural habitats 92/43/EEC	Code acc. To Natura 2000 Network	Assessment of habitats		
			Tribute (FV)	Unsatisfactory (U1)	Bad (U2)
Critical (iv)	Ponto-Sarmatian steppes	62C0	-	-	+
Natural	Estuaries	1130	+	-	-
Natural	Accumulation of Salix alba and Populus alba	92A0	+	-	-

Critical habitats within the steppe plots were determined in accordance with paragraph 16 of IFC Performance Standard 6 (SD6) (IFC 2012). These habitats satisfy the requirements of criterion 4 (iv) of ecosystems, threatened and/or unique ecosystems. That is, ecosystems that are at risk of a significant reduction in area or quality and also have a small spatial distribution.

The following table shows plants which are likely to be found in the Project territory and are included in the Red Book of Ukraine.

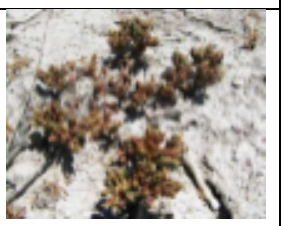
Figure 25 Plants likely to be encountered in DWPP Territory - Red Book of Ukraine

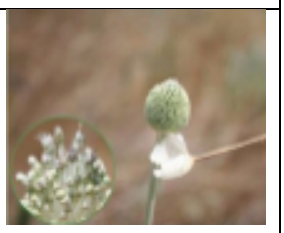
Species name	Species area	Growing location conditions	Protection status	Image
Spring adonis Adonis vernalis L. (Adonanthe vernalis (L.) Spach, Chrysocyathus vernalis (L.) Holub)	From the Iberian Peninsula to the Lena River Basin (Yakutia), from the north, south of the southern the coast of the Baltic Sea to the Pre-Caucasus. Out of continual spreading in Europe and Siberia, there are isolated plots. In Ukraine it grows in southern Polissya (rarely), in the forest-steppe, steppe and Crimea. 	It is confined mainly to the meadow steppe of unions Fragario viridis-Trifolion montani and CirsioBrachypodion pinnati, more rarely in real steppes of union Astragalo-Stipion and in the affected areas of the Union of Festucion valesiacae, sporadically on the edges (class Trifolio-Geranietea) and in light sparse forests (cl. QuercoFagetea). Mesoxerphyte	Inestimable	
Volga adonis Adonis wolgensis Steven ex DC. (Adonanthe wolgensis (Steven ex DC.) Chrtek et Slaviková; Chrysocyathus volgensis (Steven ex DC.) Holub)	It covers area between 25º and 86º e. long.: in European part Stretches between 39º and 52º n. w., in Asian 48º and 55º n. w. To the south of the habitat there are isolated locations: the Transcaucasus, south-east Turkey. In Ukraine it is in steppe zone, can be found in the south part of Left Bank of the forest and steppe regions. 	It grows in true, shrub, petrophyte steppe congregations of FestucoBrometea class. Sometimes grows on the edges of ravine forests (of Trifolio-Geranietea class). Xerophyte	Inestimable	
Swamo anacamptis Anacamptis palustris (Jacq.) R.M. Bateman, Pridgeon et M.W. Chase (Orchis	Middle-south-European species (moderate zone of Europe, the Mediterranean, Asia Minor, the Caucasus). In Ukraine - Carpathians, Polissya, Forest-steppe, Step (rarely), Crimea. It can be also found in Roztochya and Opillya, but without specific places of growth	In the Carpathians - in the belt of oak, beech, fir and spruce forests in cluster classes Querco-Fagetea, Vaccine-Piceetea. In Transcarpathia - in the foothills and lower mountain bands, on the wet meadows, among the shrubs, on the	Vulnerable	

palustris Jacq.)		decline, in the valleys of the rivers in the cluster classes Phragmiti - Magnocaricetea, Molinio Arrhenatheretea and Nardo-Callunetea. In plain forest, forest-steppe, and Crimean steppe areas - on overgrown meadows, along the edges of ditches, swamps, among wet shrubs in meadow communities of cl. MolinoArrhenatheretea. Higromenosfit		
Dnieper astragalus Astragalus borysthenicus Klokov (A. onobrychis auct. non L.)	Black Sea littoral species of the Black and Azov seas and estuaries 	Litoral sands, as well as sandy and sandy soil slopes along the shores of the Black and Azov seas and sea estuaries, the lower Dnieper sand hills, is part of the seaside and close to river sandy steppes (class Festucethea vaginatae). Xerophyte	Rare	
Pontic astragalus Astragalus ponticus Pall.	Asia Minor, the Balkans, the Pontic province of the Black Sea, the Lower Don, the Pre-Caucasus, the Crimea. In Ukraine - the steppe zone, the western and eastern parts of the southern coast of Crimea. Isolated location in Ustya village of Kamyanets-Podilskyi district, Khmelnytsky region. In the place of the fall of the river Smotrych in the Dniester. 	Construction eroded, washed, black earth and brown, enriched with soil carbonates, stony rocks, screes, crushed slopes, shales. Cenophobus. It is widespread in steppe congregation Festuco-Brometea and the order of AlyssoSedetalia. Xerophyte	Vulnerable	
Wooly-flower astragalus Astragalus dasyanthus Pall	It is widespread in the south-middle (Hungary), Middle Europe, in South Europe and the Balkans, in the Pre-Caucasus. In Ukraine it grows in the forest steppe and the steppe (a strip of mixed herb fescue-feather grass steppes and the northern part of the fescue-feather grass steppes), the Crimea (rarely)	Graded and rocky slopes, thickets of steppe shrubs (cluster Rhamno-Pruneteae), edges and lawns of ravine forests. It can be found in the composition of the meadow-steppe	Vulnerable	

		(Fragario Viridistifolion Montani union), steppe (Astragalo-Stipion, Festucion valesiacae) and petrofitno-steppe (Artemisio marschalliani-Elitrigion intermediae) phytocoenoses. Growing on the steppe slopes of mainly gorge systems and river valleys. Xerophyte		
Multicoloured bulbocodium Dulbocodium versicolor (Ker Gawl.) Spreng. (B. ruthenicum Bunge, B. vernum L. subsp. Versicolor (Ker Gawl.) K. Richt., Colchium versicolor Ker Gawl.)	The forest steppe and steppe zones on the Eastern European plain from Bessarabia to the Volga Highlands (Moldova, Ukraine, Russia), occasionally in Hungary, Romania, Serbia, and Italy. In Ukraine - mainly in the forest-steppe and steppe, an isolated locality in the Prut-Dniester plain (5 locations) 	Steppes of Festuco Brometea class, an ecotone between broadleaved forests and meadow steppes on the slopes of gorges. Mesophyte	Vulnerable	
Scythian pea shrub Caragana scythica (Kom.) Pojark.	Eastern Europe (southern Black Sea coast, Moldova, Lower Don (west), Ukraine - southern, steppe regions and in the foothills of the Crimea (Tarkhankut) 	Mostly eroded slopes and skeletal soils on the stretch marks of stony rocks (mostly limestone), often on ordinary black earths and chestnut soils with a relatively high salt content, as part of the Festuco Brometea and the order of Alysso-Sedetalia (Class Sedo-Scleranthetea). Xerophyte, carbonatphyl	Vulnerable	

Russian sea kale Crambe Sebeók	Caucasus, South-West Siberia, Middle Europe (Hungary, Romania), Mediterranean (Bulgaria). In Ukraine, occasionally, it can be found in the forest-steppe, steppe, Crimea. 	Grows predominantly on black earths within the union groups Astragalo-Stipion. In the northern part of the area it grows on chalky outcrops with the unions of Centaureo carbonatiKoelerion talievii. In Podillya it can be found in the extra-zonal meadow-steppe groups of the union Cirsio-Brachypodion	Vulnerable	
Lessing feather grass Stipa lessingiana Trin. et Rupr.	Common in the steppe zone of Eurasia (from the Transylvanian Plateau to Altai, Tarbagatai and Tien Shan, including Asia Minor, Mon. Iran and the mountainous regions of Central Asia). In Ukraine - Step, Mountain Crimea, occasionally - Forest-steppe (southern districts). 	The slopes of the river valleys, gorges, the banks of estuaries, the outcrop of stony rocks. In the past, the species determined the physiognomy of the landscapes of the true and southern steppes in the ordinary and southern black earths, as well as on chestnut and low-power stony soils. It is a typical species of the Astragalo-Stipion alliance, rarely grown in the union of the Festucion Valesiatae (Festuco-Brometeae class). Xerophyte	Inestimable	
Ukrainian feather grass Stipa ucrainica P. Smirn. (Stipa zalesskii Wilensky subsp. ucrainica (P. Smirn.) Tzvel.)	Pontic endemic, which grows in Northern part of the Black Sea coast, Azov Sea, on the Donbass, the Middle Russian Highland, in the Pre-Caucasus, in the Nizhny Novgorod and Volga-Don regions (in the east it becomes rare) and in Mon. Crimea In Ukraine - in the Black Sea and Priazovskaya lowlands, the flat part of the Crimea. 	Steps, whih are formed on southern black earths and chestnut soils. In a strip of dry fescue-feather grass steppes it serves as an digitizer of steppe herbivores (a group of Astragalo-Stipion, Festatus valesiacae). Xerophyte, optional carbonate.	Inestimable	

Ankara autumn crocus Colchicum ancyrense B.L. Burtt (C. bulbocodiodes M.Bieb., non Brot., C. triphyllum auct. non G.Kuntze)	Middle Europe (southeast), Balkan peninsula, Western, Minor Asia, Moldova (Chumay). In Ukraine - the Black Sea steppes, the Plain and Mountain Crimea. 	Steppes, rocky slopes, in the steppe and petrophytic steppe phytocenoses of the FestucoBrometea class and in the groups of sandy steppes of the Festucethea vaginatae class. Mesoxerophyte.	Vulnerable	
Rootless pisolithus Pisolithus arrhizus (Scop.: Pers.) S. Rauschert [Scleroderma tinctorium Pers., Pisolithus tinctorius (Micheli: Pers.) Coker et Couch, Pisolithus arenarius Alb. et Schw.]	Europe, Asia, North America, Africa, Australia and New Zealand. In Ukraine, there are isolated mushroom locations in the Left Bank Forest-steppe, the Left-Bank and Starobilsk grass-meadow Steps, the Right Bank and the Left-Bank Grain Steps, on the Southern coast of Crimea. 	Sandy or gravelly soils in pine and oak woodland or birch groves of arid regions.	Rare	
Powdered sea heath Frankenia pulverulenta L.	Mediterranean (predominantly east), Bulgaria, Romania, Russia (southern, steppe to southern West Siberia), Caucasus, Iran, Kazakhstan and Central Asia, China (southwest). In Ukraine, in the extreme south of the Steppe (from the mouth of the Danube to the Molochna River) and in Crimea. 	On the shores of salty ponds: wet saline soils and solonetzs. Grows in congregations of Asteretea tripolium and Salicornietea fruticosae classes. Halophyte. Xeremosephyte.	Vulnerable	

Cetrauria of the steppe, whole-steppe steppe, corycula steppe Cetraria steppae (Savicz) Kärnef. (Coelocaulon steppae (Savicz.) Barreno &Vazques, Cornicularia steppae Savicz).	The Volga region Caucasus, Kazakhstan, South Siberia. Forest-steppe and steppe zone (scattered), Mountain Crimea, southern coast of Crimea. 	Inter-cornel gaps (on the ground) in gramineous, gramineous and meadow wormwood grass, sandy arenas, southern mountain steppes, often with other nomadic lichens (roughly wrinkled parmelias, xanthoparminia Kamchadalskaya, thorny cetraria, etc.).	Vulnerable	
Round-legged onion Allium sphaeropodum Klokov (A. paczoskianum auct. non Tuzson)	North-western Black Sea coast, Transnistria. Western Forest-steppe, Right-bank steppe. The eastern boundary of habitat extends along the Ingulets River. 	Dry limestone stony-gravel soils, consisting of calcete-trophy groups and petrophytic-steppe phytocoenoses related to the order of Alysso-Sedetalia. Xerophyte	Vulnerable	
Netted crocus Crocus reticulatus Steven ex Adams (C. luteus M.Bieb., nom. illeg., C. variegatus Hoppe et Hornsch.)	Grows in Central Europe, the Mediterranean, the Pre-Caucasus, the northern part of the Western Transcaucasia, Asia Minor. In Ukraine - Right Bank and Left Bank Forest-steppe, steppe. 	On the steppe slopes of gorges and river valleys, among shrubs, on the margins and in the oak (Querco-Fageteae class). A characteristic element of the steppe groups of the Festuco-Brometea class. Complete numbers are formed predominantly in the meadow-steppe groups of the Union Fragario viridis-Trifolion montani. In the true steppes of the Astragalo-Stipion, large congregations are not formed, and in the steppe pastures (the Union of Festusion valesiacae) there are isolated individuals. Mesophyte	Inestimable	

Steppes (Grasslands)

Steppe vegetation is represented by fescue-wheat and fescue-feather groups. The dominant steppe communities consist primarily of the comb fescue (*Agropyron pectinatum*), fescue (*Festuca valesiaca*), feather duster grass (*Stipa capillata*) and Lessing feather grass (*S. lessingiana*).

Given that the nearest critical habitat with steppe plots is located more than 2 km from the nearest wind turbine, and there is a significant pasture load on the steppe habitats, the impact on the plant communities as a result of the proposed wind project will be negligible.

Mammals (including Bats)

The requirement to protect animals is determined by the Laws of Ukraine (1991-2002) and a number of environmental protection conventions. Of the 47 species of mammals that have been identified by zoologists in different years in the future wind-power station construction area, 20 (42, 6%) species are among those requiring protection (table 12.14). In systematic terms, they are as follows: 1 representative of the Shrews family, 10 – Flat-nosed bats family, 1 - Birch mice family, 1 – Birch mice family, 1 - Hamsters family, 1 - Squirrels family, 4 - Weasels family and 1 – Feline family.

Most species of mammals (20) are listed in the Red Data Book of Ukraine (2009) according to the nature conservation status. Highest status species include the last possess pond bat, steppe bush mouse and European mink i.e. "Endangered", as well as small Eurasian water shrew and gray or Austrian long-eared bat - "Rare".

Three species on the IUCN Red List were recorded on the territory adjacent to the Bilgorod-Dnistrovsky estuary including: pond bat, European mink and otter. 11 additional species on the European Red List of IUCN were recorded: small water shrew, pond bat, gray long-eared bat, gray hamster, steppe bush mouse, Odesa ground squirrel, wild boar, European mink, otter, forest cat and grey wolf. Figure 24 below indicates species according to their category in the Red List of IUCN, the European Red List of IUCN and the Red Book of Ukraine (RBU). The status of species, which indicates their endemicity or limited area of existence, is also indicated.

Figure 26 DWPP Territory Endangered Species - Mammals

Species	IUCN	ERL IUCN	RBU	Endemicity[1]	Limited Habitatance Area
Mammals					
Pond common bat (*Myotis dasycneme*) (Boie, 1825)	NT	NT	EN	NO	NO
Steppe bush mouse (*Sicista subtilis*) (Pallas, 1773)	-	LC	EN	NO	NO
European mink (*Mustela lutreola*) (Linnaeus, 1761)	CR	CR	EN	NO	NO

Figure 27 below shows the mammals that are likely to be encountered in the Project territory from the Red Book of Ukraine.

[1] Directive No. 6 of the IFC defines an endemic species as a species ≥ 95% of the global number of which is within the studied country or region.

Figure 27 Mammals likely to be encountered in the DWPP Territory - Red Book of Ukraine

Species name	Species habitat	Protection status	Protection status	Image
Red noctule Nyctalus noctula (Schreber, 1774)	Most of Europe and Asia to south-western Siberia, China, northern Vietnam. It is detected in Africa. In Ukraine - everywhere. 	The species is included in the Red List of IUCN, EUROBATS and the II annex to the Berne Convention. Preservation of old deciduous and mixed forests with hollow trees, as well as floodplain forests and plantations	Vulnerable	
Astrian long-eared bat Plecotus austriacus (Fischer, 1829)	It is widespread in most of the Southern and Central Europe, the Caucasus, Asia Minor, and Northern Africa. In Ukraine, the boundary of the range passes. Its distribution is limited mainly to the western and seaside regions. 	According to the latest report, IUCN has the category LC, EUROBATS, the Berne Convention – II Annex. It is under protection in the reserves of the Carpathian region, Roztochya, Podillya and Crimea. The condition of effective protection is the creation of large protected areas in the zone of deciduous forests of the Carpathians and Podillya, proper protection of underground locations.	Rare	
Late bat Eptesicus serotinus (Schreber, 1774)	Europe (except Ireland, north of England, parts of Scandinavia), Northern Africa, Middle East, Central Asia; to the east - to China. On the territory of Ukraine it is distributed everywhere. 	The species is included in the Red List of IUCN, EUROBATS and the Annex II to the Berne Convention. It is protected in all reserves of Ukraine. The prohibition of the disturbance of breeding and hybernation colonies. Conducting environmental campaigning.	Vulnerable	
Bicoloured bat Vespertilio	Covers Middle, Eastern Europe, Caucasus, Central Asia and South, South. Siberia,	Guard categories: EUROBATS; Berne	Vulnerable	

murinus Linnaeus,1758	Mongolia and North China, to the Far East. Ukraine is fully included into the habitat of the species. 	Convention (Annex II), Bonn Convention (Annex II); IUCN: LC. Protection measures shall include preserving the species shelters; dissemination of information about vulnerability and the need to protect bats		
Natuzius Common Bat Pipistrellus nathusii (Keyserling et Blasius, 1839)	Europe (except Northern), Asia Minor and the Caucasus. In Ukraine - everywhere. 	The species is included into the Red List of IUCN, EUROBATS and the II annex to the Berne Convention. The conservation of old deciduous and mixed forests with hollow trees, linear structures (forest belts, plantations along roads, etc.) between settlements and hunting is important for the protection of populations, and the prohibition of troublesome breeding colonies is important. It is guarded on the territory of all objects of the nature reserve fund, which are located on the territory of the Carpathians and Polissya, partly Podillya.	Inestimable	
Whiskered noctule Myotis mystacinus (Kuhl, 1817)	It is common in most parts of Europe (except the northern regions), in the Caucasus and in Asia Minor. In Ukraine, distribution is limited to western regions (alcathoe form) and seaside steppes and mountainous Crimea (aurascens). 	According to the latest report of IUCN has the category LC, EUROBATS, Berne Convention – Annex II. It is under protection in the reserves of the Carpathian region, Roztochya, Podillya and Crimea. Effective protection is possible when creating large reserves in the forests and cave areas of the Carpathians, Podillya and Crimea.	Vulnerable	

River otter Lutra lutra Linnaeus, 1758	It is spread in Europe, most of Asia, Northern and Western Africa. Nowadays, in Ukraine, the species is spread everywhere, except Crimea. In the late 1980's there was an expansion of the area, southern boundary of which shifted into the steppe zone. 	It is included into the II edition of the RBU. As a species whose state is close to the threatening, it is included in the Red List of IUCN, in the I annex of CITES, and as a species to be specially protected to the Berne Convention. It is protected on the territory of most state reserves and many objects of the NRF.	Inestimable	
Ermine Mustela erminea (Linnaeus, 1758)	Most of Europe, the mountains of the Caucasus and Central Asia, Siberia, Northern Mongolia, China and North America. In Ukraine it is spread everywhere, except Crimea and some steppe regions. 	It is included into the II edition of the RBU, the Red List of IUCN and as a species to be protected, to the Berne Convention. It is protected on the territory of state reserves (Danube, Lugansk, Ukrainian steppe, Black Sea, Carpathian, Kaniv, Roztochya, Polissya, etc.), national parks and other objects of the NRF.	Inestimable	
European mink Mustela lutreola Linnaeus, 1758	Central and Eastern Europe, Turkey, Caucasus and Urals. 	As a species under threat of extinction, it is included into the II edition of the RBU, the Red List of IUCN and as a species to be specially protected to the Berne Convention. It is protected in the Danube, Carpathian Biospheric reserve, Nyzhnyodnistrovskyi NRF and possibly in Kaniv State Reserves.	Endangered	

Birds

Endangered Species

Three environmental documents were analyzed in relation to birds: the Red Book of Ukraine (RBU), the European Red List of IUCN and the IUCN Red List of endangered species (IUCN RL). Attention among these types of documents was only given to those identified in IUCN as CR (on the verge of extinction) or EN (under threat of extinction) and in the Red Data Book of Ukraine as EN (endangered).

The Red Book of Ukraine (2009) includes 87 species of birds, 27 of which are classified as "endangered". Of these, 10 species are likely to be found on the territory of the discrete management unit (DMU) according to literary and multi-year data. One is likely to detect only the thin-beaked curlew (*Numenius tenuirostris*) and falcon (*Falco cherrug*) in the project area (among the bird species that have the status of CR or EN according to the European Red List and the Red List of IUCN).

Figure 28 indicates the identified species, along with their category in the Red List of IUCN, the European Red List of IUCN, and the Red Data Book of Ukraine (RBU). Status of species, indicating their endemicity or limited area of settlement, is also indicated.

Figure 28 DWPP Territory Endangered Species – Birds

Species	IUCN	ERL IUCN	RBU	Endemicity[2]	Limited Habitatance Area
Birds					
White pelican (*Pelecanus onocrotalus*)	LC	LC	EN	NO	NO
European pelican (*Pelecanus crispus*)	NT	LC	EN	NO	NO
Cormorant (*Phalacrocorax pygmaeus*)	LC	LC	EN	NO	NO
Osprey (*Pandion haliaetus*)	LC	LC	EN	NO	NO
Dove-hawk (*Circus macrourus*)	NT	NT	EN	NO	NO
Falcon (*Falco cherrug*)	EN	VU	VU	NO	NO

[2] Directive No. 6 of the IFC defines an endemic species as a species ≥ 95% of the global number of which is within the studied country or region.

Ruff (*Tringa stagnatilis*)	LC	LC	EN	NO	NO
Curlew thin-beaked (*Numenius tenuirostris*)	CR	CR	EN	NO	NO
Large curlew (*Numenius arquata)*	NT	VU	EN	NO	NO
Middle curlew (*Numenius phae*)	LC	LC	EN	NO	NO
Roller (*Coracias garrulus*)	LC	LC	EN	NO	NO

National and International Security Lists

Figure 28 shows the birds likely to be encountered in the DWPP territory from 6 national and international security lists including: the Red Book of Ukraine, International Union for Conservation of Nature ("IUCN"), the European Red List, the Bonn and Berne Conventions, and the Washington Convention on international trade in endangered species of wild fauna and flora threatened of extinction ("CITES"). See section 10.3.6.3 for a more detailed discussion of survey results and species of interest on national and international lists encountered during the winter, spring and summer studies.

Figure 29 Birds in the DWPP territory liklely to be encountered on environmental lists (Autumn 2017)

Ukrainian Name / English Name	Scientific Name	Status	ERL		RBU	IUCN		Bern	Bonn	CITES
			Category	Trend		Category	Trend			
European Cormorant	*Phalacrocorax carbo*	m, w, n	LC	increasing		LC	increasing	3		
Shelduck	*Tadorna tadorna*	m, w, n	LC	increasing		LC	increasing	2		
Mallard	*Anas platyrhynchos*	m, w, n	LC	stable		LC	increasing	3	1.2	
White-Fronted Goose	*Anser albifrons*	m, w	LC	stable		LC	unknown	3	1.2	
Blue Hawk	*Circus cyaneus*	m	NT	decreasing	RD	LC	decreasing	2		2
Duck hawk	*Circus aeruginosus*	m, w, n	LC	increasing		LC	increasing	2		2
White – Tailed Eagle	*Haliaeetus albicilla*	m, w, n	LC	increasing	RD	LC	increasing	2	1.2	1
Sparrowhawk	*Accipiter nisus*	m, w	LC	stable		LC	stable	2	1.2	2
Buzzard	*Buteo buteo*	m, w, n	LC	stable		LC	stable	2	1.2	2
Long-legged buzzard	*Buteo rufinus*	m, w, n	LC	increasing	RD	LC	stable	2	1.2	2
Buzzard	*Buteo lagopus*	m, w	LC	stable		LC	stable	2	1.2	2
Common Kestrel	*Falco tinnunculus*	m, w, n	LC	decreasing		LC	decreasing	2	2	2

Ukrainian Name / English Name	Scientific Name	Status	ERL		RBU	IUCN		Bern	Bonn	CITES
			Category	Trend		Category	Trend			
Куріпка сіра / European Patridge	*Perdix perdix*	m, w, n	LC	decreasing		LC	decreasing	3		
Pheasant	*Phasianus colchicus*	m, w, n	LC	increasing		LC	decreasing	3		
Common Gull	*Larus ridibundus*	m, w, n	LC	stable		LC	unknown	3		
Caspian Gull	*Larus cachinnans*	m, w, n	LC	increasing		LC	increasing	3		
Ring Dove	*Columba palumbus*	m, w, n	LC	increasing		LC	increasing	3		
Grey Pigeon	*Columba livia v. dom.*	m, n	LC	unknown		LC	decreasing	3		
Collared turtledove	*Streptopelia decaocto*	m, w, n	LC	increasing		LC	increasing	3		
Short-eared owl	*Asio flammeus*	m, w	VU	decreasing	RD	LC	stable	2	1.2	2
Northern Wheatear	*Oenanthe oenanthe*	m, n	LC	decreasing		LC	decreasing	2		
Blue-headed wagtail	*Motacilla flava*	m	LC	decreasing		LC	decreasing	2		
White Wagtail	*Motacilla alba*	m, w, n	LC	unknown		LC	stable	2		
Common Starling	*Sturnus vulgaris*	m, w, n	LC	decreasing		LC	decreasing	2		

Ukrainian Name / English Name	Scientific Name	Status	ERL		RBU	IUCN		Bern	Bonn	CITES
			Category	Trend		Category	Trend			
Magpie	*Pica pica*	m, w, n	LC	stable		LC	stable	2		
Rook	*Corvus frugilegus*	m, w, n	LC	decreasing		LC	decreasing	2		
Hooded Crow	*Corvus cornix*	m, w, n	LC	increasing		LC	increasing	3		
Jackdaw	*Corvus monedula*	m, w, n	LC	stable		LC	stable	2		
Crow	*Corvus corax*	m, w, n	LC	increasing		LC	increasing	3		
Blackbird	*Turdus merula*	m, w, n	LC	increasing		LC	increasing	3	2	
Great Titmouse	*Parus major*	m, w, n	LC	increasing		LC	increasing	2		
English sparrow	*Passer domesticus*	m, w, n	LC	decreasing		LC	decreasing	2		
Tree Sparrow	*Passer montanus*	m, w, n	LC	unknown		LC	decreasing	3		
Goldfinch	*Carduelis carduelis*	m, w, n	LC	increasing		LC	increasing	2		
Finch	*Fringilla coelebs*	m, w, n	LC	stable		LC	increasing	2		
All types			**36**		**4**	**36**		**36**	**8/10**	**9**

Legend:

RBU – Red Book of Ukraine:
I – Endangered species that are in danger of extinction; preservation of them is unlikely in case if the destructive effect of the factors that affect their condition will continue.
II – Vulnerable species that can be classified as "endangered" in the near future in case if the effects that influence their state of factors do not stop.
III – Rare species whose numbers are not large at the moment do not fall into the category of "endangered" or "vulnerable", although they are in danger.
RL - European Red List, IUCN categories were used during drawing up the new ERL (2011)
IUCN - Red Book of the International Union for the Conservation of Nature (October, 2005):
CR – Species that are in critical condition;
EN – Specie that are in danger;
VU – Vulnerable species;
NT – Species that are in state, which is close to dangerous;
LC – Species that are in the least danger;
LR – Species that are not in danger;
stable – stable state of number; decreasing – decreasing species number; increasing – increasing number; needs updating – needs clarification.
BC – Berne Convention:
2 – appendix (list of animal species subject to special protection);
3 – appendix (list of species of animals to be protected). Species description – **EN**
There are no species of amphibians and reptiles that are included in the EN category (species that are in danger) in the area of the projected construction site of wind-power station and DMU.

Most species of birds listed in the Red Book of Ukraine are not very numerous or are rare in the Dnistr Delta. Species that nest within the Lower Dnistr National Park are not likely to ever visit the Project territory. Figure 25 below shows the bird species listed in the Red Book of Ukraine that are likely to be encountered in the DWPP Territory.

During the autumn 2017 study however, only 4 species from the RBU were encountered, including *Dove-hawk (Circus cyaneus), White-tailed eagle (Haliaeetus albicilla), Long-legged buzzard (Buteo rufinus),* and the *Short-eared owl (Asio flammeus)* (see Figure 25). Usually, the proportion of birds from the Red Book of Ukraine does not exceed 2%, due to the large number of mass species including starlings, swallows, ruffs, rooks, sandpiper, and gulls, as evidenced by the Autumn 2017 studies.

Figure 30 Birds likely to be encountered in the DWPP Territory - Red Book of Ukraine

Species name	Species habitat	Protection status	Protection status	Image
Saker falcon Falco cherrug Gray, 1834	South part of the Central and Eastern Europe, as well as Asia (forest, steppe and desert belts, mountain ranges). In Ukraine it is common during nesting in the steppe and forest-steppe belts. In winter it can be detected in the Crimea. 	In Ukraine in the protected areas, nests not more than 1% of the Ukrainian population of the species. It is included in the Red List of IUCN and the European Red List. Included in Annex II of the CITES Convention, Annex II of the Berne Convention, Annex II of the Bonn Convention, RBU (1994)	Vulnerable	
Dwarf goose (small white-fronted goose) Anser erythropus (Linnaeus, 1758)	Inner tundra and forest-tundra of Eurasia from Norway to the Chukotsky Range. It hibernates in south-east of Caspian Sea, in the Azov-Black Sea region, north-western Europe, China. In Ukraine, during migrations, occasionally occurs throughout the territory, more regularly in North-Western Azov Sea coast, where it can be limited for wintering. Also, occasionally it can bewintering in the southern parts of Sivash.	It is included into RBU (1994), European Red List, in Annex I of the Council of Europe Directive on the Conservation of Wild Birds, Annex I of the Bonn Convention, Annex II of the Berne Convention and the AEWA Agreement. An international program for the reintroduction of nature in Lapland is under way. In Ukraine, together with other natatorial birds, are protected at the objects of the natural reserve fund.	Vulnerable	

				
Long-legged buzzard Buteo Rufnus (Cretzschmar, 1827)	South-eastern Europe, Minor, Central and South Asia, Transcaucasia, North, South-East Africa. In Ukraine, in the forest-steppe, steppe belts and Crimea. Separate braces are nesting in the forest belt. 	This species is protected in Ukraine in the "Elanetsky step" - branch of the Ukrainian steppe reserve and many wildlife nature reserves. It is included in the RBU (1994), CITES (Annex II), Bonn (Annex II) and Bernese (Appendix II) conventions. In order to protect the species it is enough to keep nesting places in the island, ravine forests and the old forest belts.	Rare	
Middle curlew Numenius phaeopus (Linnaeus, 1758)	Nesting in forest and partly forest-tundra strips of Eurasia. The main places of wintering are in Africa, South Asia, Australia. In Ukraine, it is regularly detected during migrations on the seacoast and rarely in Lviv, Volyn, Khmelnytsky, Zhytomyr region. Rare it can be detected during flight in Cherkassy and Dnipropetrovsk region. A small number of non-nesting birds can be detected during summer on the coast, some individuals are wintering. 	It has a European protection status, is protected by Bern and the Bonn conventions, the AEWA Agreement. In Ukraine, the Black Sea and Danube Biospheric Reserve, the Crimean natural reserve, Regional Landscape Park “Kinburska Kosa”, Dzharilgatsky Reserve play an important role in preserving the species. Effective control over the observance of the hunting ban on all types of curlews and the conservation of natural areas of the coastal halophytic meadows and saline steppes are essential.	Endangered	

Dikkop Burhinus oedicnemus (Linnaeus, 1758)	Forest, forest-steppe, semi-desert and desert zones of temperate and tropical zones of Eurasia and Northern Africa; to the north Eurasian nest migratory, south. - settled or partially settled; migratory populations hibernate to the north-western and eastern Africa south Arabian Peninsula In Ukraine: nests, perhaps in most parts of the territory, reliably - in the dryland zone, and in the north - along the big rivers. 	The species is included into the RBU (1994), the European Red List, in the Bern list (Annex II) and the Bonn (Appendix II) conventions. It is necessary to create guarded territories (Azov Sea Upland); the destruction of wild dogs and ravenbirds; prevention of cases of disturbing birds in the nesting period.	Inestimable	
Dove-hawk Circus macrourus (S. G. Gmelin, 1771)	Eurasia - from the lower reaches of the Danube to Transbaikalia and North-Western Mongolia. It hibernates in the south Asia, East and South Africa. In Ukraine in the middle of the XX century it was a fairly common species of almost the entire steppe belt, but then disappeared from nesting throughout the territory, and in recent years nesting cases were also not observed. 	Included into the Red List of IUCN (2000) (close to endangered), included in CITES (Annex II), Bonn (Annex II) and Berne (Annex II) conventions.	Endangered	
Roller Coracias garrulus Linnaeus, 1758	Steppe, forest steppe and south the forest belts of Eurasia from the Iberian Peninsula to the east to the valley of Upper Ob, West Altai, Pakistan, as well as northwestern Africa. It hibernates to the east Africa. Until the 1970's it was nesting throughout the territory of Ukraine. Now it has become very rare or disappeared in most of the Polissya and forest-steppe regions; in the steppe zone it is more numerous.	It belongs to the SPEC 2 category (a species the distribution of which is restricted to the European continent and has an unfavorable conservation status). It is protected by the Berne (Appendix II) and the Bonn (Annex II) conventions. In Ukraine, it is protected predominantly in the steppe zones at the sites	Endangered	

		of the NRF: the Black Sea Biospheric Reserve, the Lugansk Nature Reserve, the National Nature Park "Svyati Gory", Regional Landscape Park "Meotida", etc.		

Qualifying species of the Dnistr Delta Important Bird Area (IBA)

The Dnistr Delta IBA was assessed By BirdLife International in 2000 and the status of IBA was triggered give the presence of the following species:

Figure 31 Dnistr Delta IBA Criteria Triggered (Source: BirdLife International)

Species	Current IUCN Red List Category	Season	Year(s) of estimate	Population estimate	IBA Criteria Triggered
Greylag Goose *Anser anser*	LC	breeding	1992	130 breeding pairs	B1i
Common Teal *Anas crecca*	LC	passage	1992	25,000 individuals	A4i, B1i
Glossy Ibis *Plegadis falcinellus*	LC	breeding	1993	120-1,500 breeding pairs	A4i, B1i, B2
Black-crowned Night-heron *Nycticorax nycticorax*	LC	breeding	1993	1,000-2,500 breeding pairs	A4i, B1i, B2
Purple Heron *Ardea purpurea*	LC	breeding	1993	100-150 breeding pairs	B2
Great White Egret *Ardea alba*	LC	breeding	1992	110-330 breeding pairs	A4i, B1i
Great Cormorant *Phalacrocorax carbo*	LC	breeding	1993	2,000-2,500 breeding pairs	A4i, B1i
A4iii Species group - waterbirds	n/a	passage	1992	20,000-49,999 individuals	A4iii

Reptiles

There are no rare and endangered species of amphibians in the area of the Project. Figure 32 below shows the reptiles on national and international lists that are likely to be encountered in the DWPP territory. Figure 33 shows the reptiles that are likely to be encountered in the Project territory from the Red Book of Ukraine.

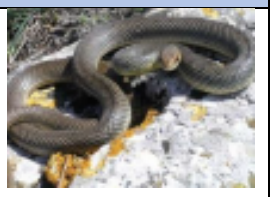
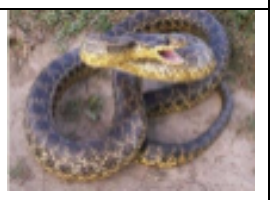
Figure 32 Reptiles in DWPP Territory likely to be encountered on environmental lists

Scientific name	English name	RBU	BC	CITES	ERL	IUCN
1. *Lissotriton vulgaris* (Linnaeus, 1758)	Common water lizard	-	3	-	LC	LC decreasing
2. *Triturus cristatus* (Laurenti,1768)	Pectinated water lizard	-	2	-	LC	LC decreasing
3. *Emys orbicularis* (Linnaeus, 1758)	Swamp turtle	-	2	-	NT	NT decreasing
4. *Lacerta agilis* (Linnaeus, 1758)	Quick lizard	-	2	-	LC	LC decreasing
5. *Lacerta viridis* (Laurenti, 1768)	Green lizard	3	2	-	LC	LC decreasing
6. *Hierophis caspius* (Gmelin, 1789)	European or Caspian whip snake	3	2	-	LC	LC decreasing
7. *Natrix natrix* (Linnaeus, 1758)	Common water snake	-	3	-	LC	LC decreasing
Total: 8		**2**	**7**	**-**	**7**	**7**

Legend:

RBU – Red Book of Ukraine:
I – Endangered species that are in danger of extinction; preservation of them is unlikely in case if the destructive effect of the factors that affect their condition will continue.
II – Vulnerable species that can be classified as "endangered" in the near future in case if the effects that influence their state of factors do not stop.
III – Rare species whose numbers are not large at the moment do not fall into the category of "endangered" or "vulnerable", although they are in danger.
RL - European Red List, IUCN categories were used during drawing up the new ERL (2011)
IUCN - Red Book of the International Union for the Conservation of Nature (October, 2005):
CR – Species that are in critical condition;
EN – Specie that are in danger;
VU – Vulnerable species;
NT – Species that are in state, which is close to dangerous;
LC – Species that are in the least danger;
LR – Species that are not in danger;
stable – stable state of number; decreasing – decreasing species number; increasing –
increasing number; needs updating – needs clarification.
BC – Berne Convention:
2 – appendix (list of animal species subject to special protection);
3 – appendix (list of species of animals to be protected).
Species description – EN
There are no species of amphibians and reptiles that are included in the EN category (species
that are in danger) in the area of the projected construction site of wind-power station and DCU.

Figure 33 Reptiles likely to be encountered in the Project Territory - Red Book of Ukraine

Species name	Species habitat	Protection status	Protection status	Image
Yellow-bellied Caspian, wood snake Hierophis caspius (Gmelin, 1789)	From Hungary and the Balkan Peninsula to the Caucasus, Asia Minor and northwestern Kazakhstan. In Ukraine, it is common in the steppe zone and the Crimean mountains. It rises to a height of 1000 meters over sea level. It inhabits anthropogenic habitats, especially rocky pastures, abandoned quarries, and ruins, occurring in settlements. 	The species is under the special protection of the Berne Convention (Annex II). Lives in 11 Natural Reserves and NRFs of Ukraine and in a number of nature reserves and regional landscape parks (many of them are of the usual kind). In view of the tolerance of the species to human-made landscapes, subject to the preservation of places of habitance and stopping the killing of snakes is not necessary in breeding the species.	Vulnerable	
Sarmatian wood snake, Elaphe sauromates (Pallas, 1814)	From the eastern part of the Balkan Peninsula to Asia Minor and western Kazakhstan. In Ukraine, it is common in the southern steppe zone and in the Crimean Mountains. 	The species is under the special protection of the Berne Convention (Annex II). It is guarded in 8 Nature Reserves and NRFs of Ukraine, 5 of them are quite common. It is desirable to expand the reserved network. An effective measure to increase the size of the species is to increase its fodder base (in particular, the attraction of birds – hollow habitants by hanging starling houses). Under the conditions of conservation of biotopes and the absence of massive snake catch there is no need for artificial creation of species of populations in nature.	Vulnerable	
Green lizzard Lacerta viridis (Laurenti, 1768)	Central and Southern Europe, southeast of Eastern Europe and north-western part of Asia Minor. In Ukraine, it occurs mosaically in the steppe and forest-steppe zones of almost exclusively Right-Bank Ukraine, as well as in Transcarpathia.	The species is under the special protection of the Berne Convention (Annex II). It is guarded in Kaniv Natural Reserve, NRF "Podilski Tovtry" and "Velykyi Lug", RLP "Granitno-stepove	Vulnerable	

		Pobuzhzhya". Necessary expansion of the reserve network and the fight against illegal fishing and the sale of lizards.		

Most of the reptile species in the project area are stable, safe, sufficiently numerous species. They have favorable conditions for the existence and reproduction of the number (feed base, biotopes for habitance, reproduction, development of youth and wintering) and are widespread throughout. Two species of green lizard and European whip snake are rare species with a small number that occur locally on the north-western slopes of the Dniester estuary in ravines and beams dense vegetation of trees and bushes on the territory of the region. They have a limited number of suitable biotopes in this territory, require special attention and protection. However, in Eastern Europe, all these types of reptiles generally have large, stable numbers and large areas outside the region. The main vulnerable factors for all species are the destruction of biotopes and shelters, especially during wintering and reproduction, the death of animals on the roads and the direct destruction by humans during the copulation period, the destruction of eggs laying and insufficient forage reserves.

Amphibians

There are no rare or endangered species of amphibians in the area of the Project. Figure 34 below shows the amphibian species likely to be encountered in the DWPP territory on national and international lists.

Figure 34 Amphibians likely to be encountered in the Project territory on environmental lists

Scientific name	English name	RBU	BC	CITES	ERL	IUCN
1. *Bombina bombina* (Linnaeus, 1761)	European fire-bellied toad	-	2	-	LC	LC decreasing
2. *Pelobates fuscus* (Laurenti, 1768)	Common pelobatid	-	2	-	LC	LC decreasing
3. *Hyla orientalis* (Bedriaga, 1890)	Eastern iris	-	2	-	LC	LC decreasing
		-	3	-	LC	LC stable

4. *Bufo bufo* (Linnaeus, 1758)	Grey or common toad					
5. *Bufo viridis*(Laurenti, 1768)	Green toad	-	2	-	LC	LC decreasing
6.*Pelophylax ridibundus* (Pallas, 1771)	Lake toad	-	3	-	LC	LC increasing
7. Pelophylax lessonae (Camerano, 1882)	Pond toad	-	3	-	LC	LC decreasing
8.Pelophylax ridibundus (Pallas, 1771)	Edible toad	-	3	-	LC	LC increasing
Total: 8		**2**	**8**	**-**	**8**	**8**

Legend:

RBU – Red Book of Ukraine:
I – Endangered species that are in danger of extinction; preservation of them is unlikely in case if the destructive effect of the factors that affect their condition will continue.
II – Vulnerable species that can be classified as "endangered" in the near future in case if the effects that influence their state of factors do not stop.
III – Rare species whose numbers are not large at the moment do not fall into the category of "endangered" or "vulnerable", although they are in danger.
RL - European Red List, IUCN categories were used during drawing up the new ERL (2011)
IUCN - Red Book of the International Union for the Conservation of Nature (October, 2005):
CR – Species that are in critical condition;
EN – Specie that are in danger;
VU – Vulnerable species;
NT – Species that are in state, which is close to dangerous;
LC – Species that are in the least danger;
LR – Species that are not in danger;
stable – stable state of number; decreasing – decreasing species number; increasing –
increasing number; needs updating – needs clarification.
BC – Berne Convention:
2 – appendix (list of animal species subject to special protection);
3 – appendix (list of species of animals to be protected).
Species description – EN
There are no species of amphibians and reptiles that are included in the EN category (species
that are in danger) in the area of the projected construction site of wind-power station and DMU.

There are ten types of amphibians in the region: common and pectinate water lizards, European fire-bellied tod, common pelobatid, the eastern iris, the gray and green toads and the three types of frogs - lake, pond and edible.

All species are common and widespread species of Eastern Europe, but some (water lizards, gray toad, pond and edible frogs) are rare for southern Ukraine. Most species are timed only for the flood-plain part of the Dniester, and only four (European fire-bellied toad, common pelobatid, greend pond toads) are widespread throughout the region. The most valuable areas for most species of floating biotopes, floodplain forests and meadows, for some synanthropic species (green toad) are the outskirts of settlements and the coast.

The immediate Project area is agrocenosis, where amphibians have the smallest number and variety. Types of amphibians in this territory have long, stable, numerical numbers, adapted to economic and recreational activities of humans have enough habitats for existence and reproduction, a good forage base and favorable conditions for reproduction of the number. Amphibians are able to migrate in more acceptable habitats and conditions in case if the construction is conducted during the warm period. The main vulnerable factors for amphibians are the destruction of biotopes and storages during the cold period of the year during wintering, the destruction and dying of spawning water, the death of animals on migration routes to spawning water, unfavorable weather conditions or anthropogenic interference during wintering and spawning.

10.3.5. Bats

10.3.5.1. Introduction

The construction and operation of wind turbines may have negative impacts upon bats in a number of ways:

- Through loss or degradation of habitats (construction);
- disturbance and displacement (construction and operation);
- through collision with moving rotor blades (operation); and
- barrier effects (operation).

Impacts can affect the bat population in the local area, and migratory populations passing through the area at specific times of year.

Internal conventions, laws and standards with regards to bats

Being an accession country looking to join the European Union, Ukraine also has a duty to begin integrating its legal framework with that of the EU. In order to assess the impact of construction

and operation of the proposed wind farm on bats and to conform to European standards, the following documents have been reviewed:

- Publication series No 3: Guidelines for consideration of bats in wind farm projects (Rodrigues et al, 2008);
- Bat mitigation guidelines (English Nature, 2004);
- Bats and onshore wind turbines (interim guidance) (Natural England, 2009);
- Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (otherwise known as the 'Habitats Directive').

National Laws

All of the bat species in Ukraine are protected under the Law of Ukraine "On Environmental Protection" (No. 1264-XXII, VVR), and other legislation. Ukraine has ratified and, for the most part, implemented all of the international conventions regulating the protection of bats.

10.3.5.2. Methodology

To inform the environmental impact assessment, a number of bat surveys were conducted at the site by experts at the Bogdan Khmelnitsky Melitopol Sate Pedagogical University. Bat surveys were designed to collect data on roosting, foraging, commuting, and migrating bats within the boundary of the proposed wind farm and the settlements in the adjacent areas.

Three different methods of research were used to identify bat activity including point-to-point space listening, transect space listening, and stationary point space listening during night time.

Research methodologies are presented in detail in the report "Expert opinion and scientific report on the influence of the construction and operation of the Dniester wind-power station site on natural environments, vegetation, seasonal ornithological complexes and migratory birds, bats" which is based on the recommendations of the "Surveillance and Monitoring Methods for European Bats Guidelines produced by the Agreement on the Conservation of Populations of European Bats (EUROBATS)," the Scottish Natural Heritage and other international documents within the Bilgorod-Dnistrovskyi district of the Odesa region," prepared by the Melitopol State Pedagogical University named after Bogdan Khmelnitsky, NGO "Laguna", Azov-Black Sea inter-departmental ornithological station, Biodiversity Research Institute of ground and water ecosystems of Ukraine "Bioriznomanittya"), the objective activity of bats and their seasonal and daily dynamics were analyzed objectively and sufficiently for environmental assessment.

Survey Limitations

Due to residences and other structures within the area surrounding the site, it is possible that bat roosts have not been identified. However, it is considered likely that the majority of roosts have been identified, and moreover, that this includes the most significant roosts.

10.3.5.3. Summary of Findings

Summary of Conclusions

The studies concluded that there are no accumulation areas of bats, fixed paths of flight, mass shelters for daytime rest or hibernation of bats within the Project area. The voice activity of bats, which was investigated by means of three different methods, reveals that there are few bats present within the Project area and that these bats are well dispersed throughout the territory of the Project.

Survey Results

11 species were recording in the Project area (see Figure 35). The most frequently observed species were the *Pipistrelluskuhlii* (Kuhl, 1817) and the *Pipistrellus nathusii* (Keyserling et Lasius, 1839).

Figure 23 Species composition of bats observed in the territory of the Project in Autumn 2017 - Spring 2018

No.	Species	Dates of observations					Total	
		23-24.09	28-29.03	23-24.04	17-18.05	18-19.05	Abs.	%
1	Нічниця *Myotis sp.*	5					5	0.28
2	Whiskered bat *Myotis mystacinus*	1					1	0.06
3	Brown Long-Eared Bat *Plecotus* sp.	3					3	0.17
4	Dora Noctule *Nyctalus noctula*	59	2	27	10	5	103	5.73
5	Kuhl's Flitter-Mouse *Pipistrellus kuhlii*	648	4	504	42	98	1296	72.08
6	Nathusius' pipistrelle *Pipistrellus nathusii*							
7	Pipistrellum *Pipistrellus pipistrellus*	128		2			130	7.23
8	Common bat *Pipistrellus pygmaeus*					3	3	0.17
9	*Hypsugo savii*	3					3	0.17

10	*Vespertilio murinus*	11		125	26	52	214	11.9
11	*Eptesicus serotinus*	3		22		1	26	1.45
	Not defined	6		5	2	1	14	0.78
	Total	**867**	**6**	**685**	**80**	**160**	**1798**	**100**

Bat Activity

Three different methods were used to study bat activity in the Project area (see Section 10.3.5.2); these methods all yielded similar results and concluded that bat activity is highest during the months of April/May and September within the Project area.

Using the the point-to-point space listening methodology, it was determined that bat activity was highest in September 2017 and May 2018. 35 and 74 recorded sounds were recorded, respectively, in these months. During these months 54 sounds, or 8% of all recorded sounds, were registered.

Studies using the transect space listening method concluded that bat activity was the highest during the month of April 2018 when 46 sounds, or 29, 5% of the total number of sounds, were recorded.

Stationary point space studies, which were performed with the help of the ultrasound detector Pettersson D500x, were the most informative for assessing the daily dynamics of bats. The total number of recorded sounds was 1266. Half of the sounds were registered in April (652 sounds, or 51, 5%). As expected, for the autumn period, the maximum number of sounds was recorded in September (420, or 33, 2%).

The stationary point space studies conducted during the night concluded that there is a seasonal difference in the voice activity of bats: during the autumn, bats were most active in the first half of the night, and in the spring they were most active in the second half of the night. Furthermore, during March and November, a cessation of active fodder behavior and low rates of voice activity was observed.

Bat Migration

Mass bat migration – a flight in pack – is a rather rare phenomenon based on literary sources. For bats which carry out migration and forage flights the most important factor is the availability of food. The authors of the commissioned bat studies observed through various studies within the local Azov-Black Sea region that bats tend to frequent areas where lighting attracts insects that are food for them. Higher bat activity has also been recorded within the same region along a narrow strip (150-200m) along the shoreline of water bodies at various levels (i.e. Azov Sea, Black Sea, Milk and Dnistr Estuaries).

The bat studies concluded that there are not any well-established flight paths located within the boundary of the Project. Furthermore, there are no major areas of accumulation of bats during the day or hibernation periods; only a small number of bats are present in the Project area and they are well dispersed.

It was further concluded through the analysis of bat activity in the Project region that the most frequently visited sites were near open water and near or within settlements. The study determined that the Project does not pose a risk to migratory bats given that it is located outside of the settlements and at least 700 meters or more away from the Dnistr Estuary, enough for safe feeding of bats in the coastal strip.

10.3.6. Birds

10.3.6.1. Introduction

This section describes and evaluates the current ornithological interest within the survey area. The survey area includes the area that will be taken by the proposed turbines and a 1 km buffer between the proposed turbines and the Dnistr Delta IBA.

The chapter describes the potential impact of the proposed wind farm on birds, presents the mitigation measures incorporated into the scheme design and assesses the predicted residual effects of the proposed development in respect of birds.

The proposed wind turbine development has the potential to have an impact on birds including:

- collision mortality;
- displacement due to disturbance;
- habitat loss or habitat degradation;
- barrier to movement.

Impacts during the operational life of a turbine are the primary concern; however, impacts can also occur during both the construction and decommissioning phases.

10.3.6.2. Methodology

Overview

Bird studies were conducted in accordance with all local and international standards including the Scottish National Heritage Guidance, “Recommended bird survey methods to inform impact assessment of onshore wind farms” (May 2014), which is widely considered to be the international gold standard. The full Guidance can be found on the Scottish Natural Heritage website at https://www.nature.scot/professional-advice/planning-and-development/renewable-

energy-development/types-renewable-technologies/onshore-wind-energy/wind-farm-impacts-birds .

Research methodologies are presented in detail in the report "Expert opinion and scientific report on the influence of the construction and operation of the Dniester wind-power station site on natural environments, vegetation, seasonal ornithological complexes and migratory birds, bats" which is based on the recommendations of the "Surveillance and Monitoring Methods for European Bats Guidelines produced by the Agreement on the Conservation of Populations of European Bats (EUROBATS)," the Scottish Natural Heritage Guidance, and other international guidance. The report was prepared by the Melitopol State Pedagogical University named after Bogdan Khmelnitsky, NGO "Laguna", Azov-Black Sea inter-departmental ornithological station, and the Biodiversity Research Institute of Ground and Water Ecosystems of Ukraine "Bioriznomanittya."

Species of special interest and target species

For the ornithological studies, species of special interest and target species were considered to be species that occur within the local region (based on scoping surveys and local expert knowledge) and fulfil one of the following criteria:

- The IUCN red list of species under threat[3]
- European IUCN red list
- Red book of Ukraine (RBU)

Habitats which are marked in the IUCN as CR (critically endangered) or EN (endangered) in the Red Book of Ukraine as EN (endangered) were considered. Description of the bird species includes population estimation and its comparison with the evaluation in the national / global scale, regional dimension and discrete management unit ("DMU") which is the Project area and surrounding zone that was assessed in the studies (Figure 36).

Defining critical habitats and species of plants and animals was performed in accordance with Paragraph 16 of Performance Standard 6 (SD6) IFC.

This includes areas that meet one or more of the following criteria:

Criterion 1: Species under critical threat (CT) and/or threat (T);
Criterion 2: Endemic and/or restricted-range species with limited habitats;
Criterion 3: Migratory and/or grain species;
Criterion 4: Unique ecosystem and/or ecosystems which are under the high risk of extinction;
Criterion 5: Key evolutionary processes.

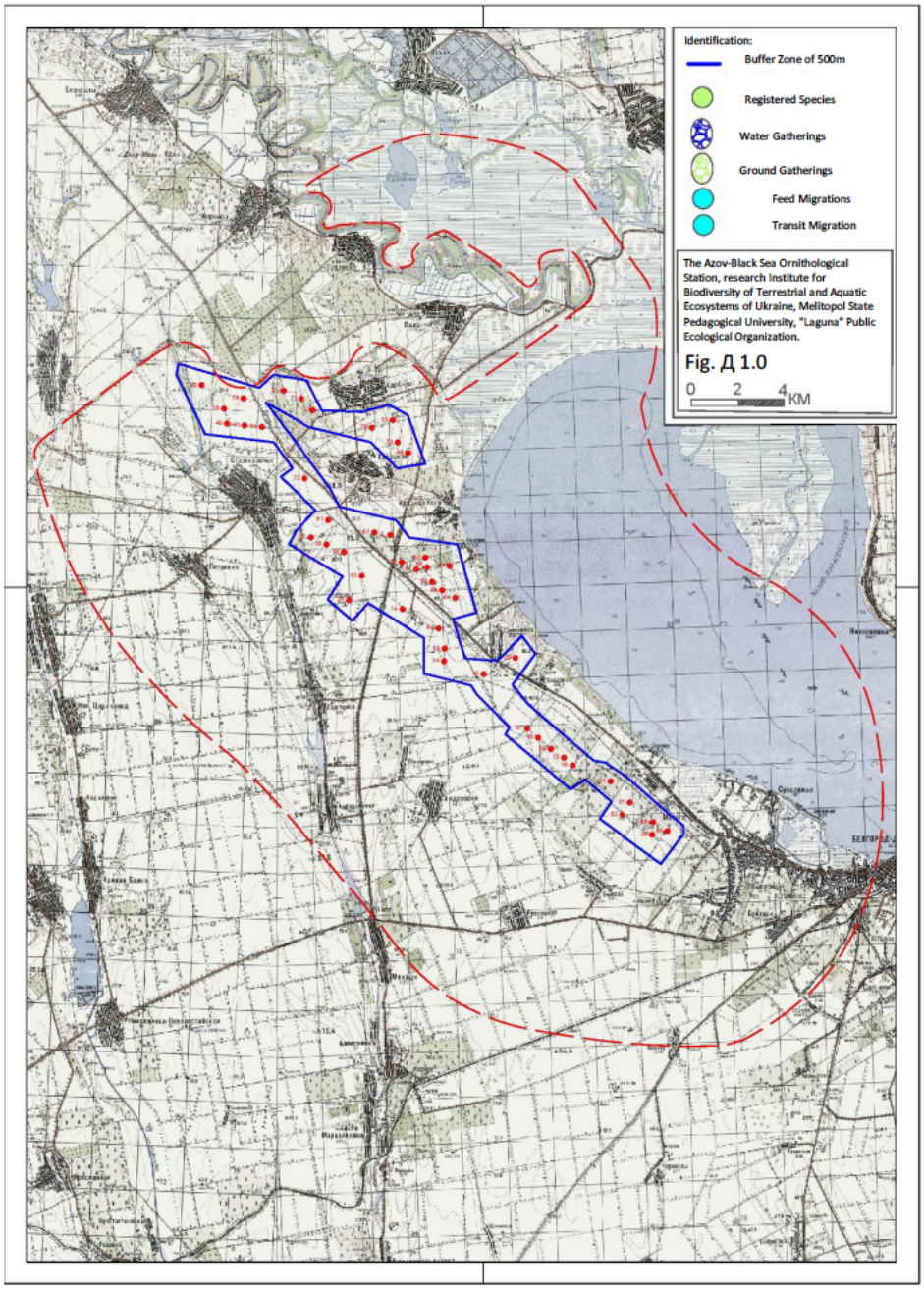
[3] Online at http://www.iucnredlist.org

As indicated in Paragraph G56 of IFC Performance Standard No. 6, the definition of critical habitats should also include any other areas of significant diversity and value, as evaluated on a case-by-case basis. Paragraph G56 presents the following 7 examples:

- Areas that are required for rewinding of the species under critical threat (CT) and/ or threat (T), as well as refuges for such species (habitats that are used during stressful periods (e.g. flood, drought or fire));
- Ecosystems of known special significance for the species under critical threat (CT) and/or threat (T) for the purposes of climate adaptation;
- Concentrations of vulnerable (V) species in cases where there is uncertainty regarding the inclusion in conservation lists, and the actual status of species can be "endangered" or "critical threat";
- Plots of major/relict/pristine forests and/or other areas with extremely high levels of species diversity;
- Landscape and ecological processes (e.g., ponds, areas which are critical to erosion control, modes of external factors (e.g., fire, flood)) required for maintaining of critical habitat;
- Habitat necessary for the survival of key species; and
- Sites of high scientific value such as areas containing concentrations of species new and/or unknown to science.

Additionally, the European Commission guidance, "Wind Energy Developments and Natura 2000," (2011) was considered.

Figure 36 DWPP Discrete Management Unit ("DMU") Territory



10.3.6.3. Survey Results

The following sub-chapters contain summarized results from the ornithological studies of the Project Area conducted by the experts at the Melitopol State Pedagogical University. The studies were commenced in September of 2017 and were completed in Summer of 2018, thereby

resulting in a full year of on-site Avian studies. Collectively, the studies concluded that the overall impact of the Project on migratory and nesting birds is acceptable. For the complete study results, the following report should be consulted: "Expert opinion and scientific report on the influence of the construction and operation of the Dniester wind-power station site on natural environments, vegetation, seasonal ornithological complexes and migratory birds, bats."

10.3.6.3.1. Autumn Study 2017

Migratory Movements

During the autumn migration study, approximately 40% of all recorded birds were found within the Project area while the other 60% were recorded outside the Project area within the buffer zones and water areas of the Dnistr Estuary. Figure 37 below presents the distribution of recorded birds by zone.

Figure 37 Bird distribution within the Project area, buffer zones and adjacent areas

Functional Zones				Total	
				Abs.	%
Wind farm	6003	380	629	**7012**	**40.2**
Buffer zones	895	587	654	**2136**	**12.3**
Estuary water area	3017	3087	2160	**8264**	**47.5**
Total	**9915**	**4054**	**3443**	**17412**	**100**

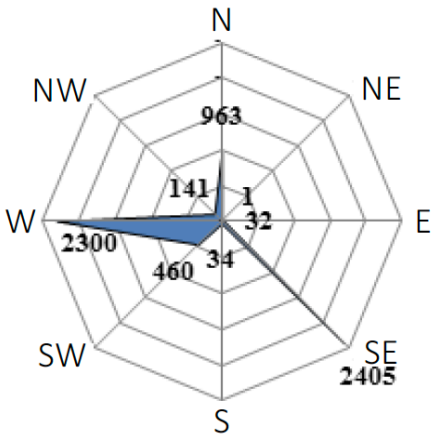
The results of the migratory study establish that wetland bird species are the dominant species of migratory birds in transit. These wetland birds rarely visit the Project area. Their main flight path is above the waters of the Dniester estuary and their flight altitude corridor is 200-250 m. Given that migratory concentrations are composed of near-water bird species, whose flight paths take place only within the water and coastal areas of the Dniester estuary, the Project is not expected to interfere with the flight paths of these birds given that the Project is located a considerable distance of over 1.3k m from the Dnistr Estuary and coastal zones. Figure 38 below presents the main direction of migratory birds recorded; the direction of bird flights is analyzed in Figure 39 with the number of recorded birds shown on each directional access.

Figure 38 Main Direction of Autumn Migration of Birds within the Project area and the surrounding areas in 2017

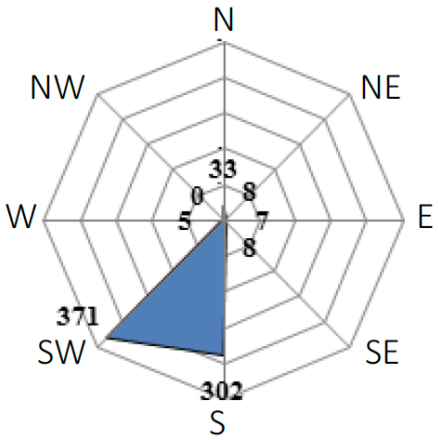
Direction	September		October		November		Total	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%
N	963	15.2	33	4.5	4	0.5	**1000**	**12.6**
NE	1	0	8	1.1	582	67.4	**591**	**7.4**

C	32	0.5	7	1	2	0.2	**41**	**0.5**
SN	2405	38	8	1.1	13	1.5	**2426**	**30.6**
S	34	0.5	302	41.1	58	6.7	**394**	**5**
SE	460	7.3	371	50.5	151	17.5	**982**	**12.4**
From	2300	36.3	5	0.7	2	0.2	**2307**	**29.1**
NE	141	2.2	0	0	51	5.9	**192**	**2.4**
Total	**6336**	**100**	**734**	**100**	**863**	**100**	**7933**	**100**

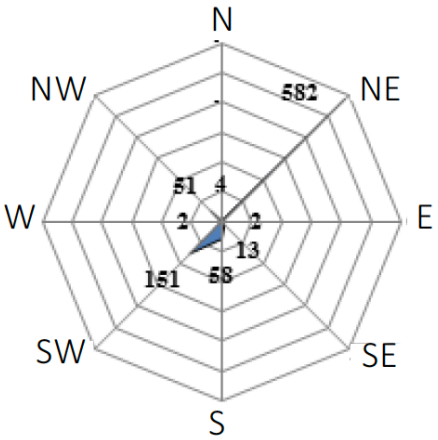
Figure 39 Autumn 2017 Migration Directions



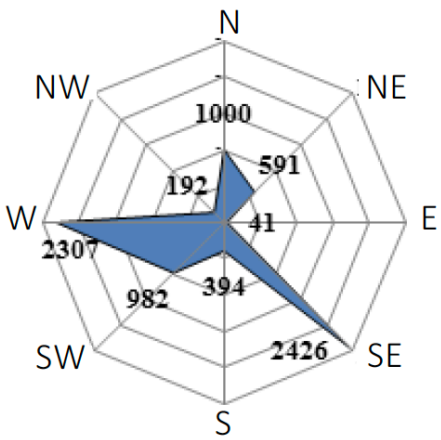
september



october



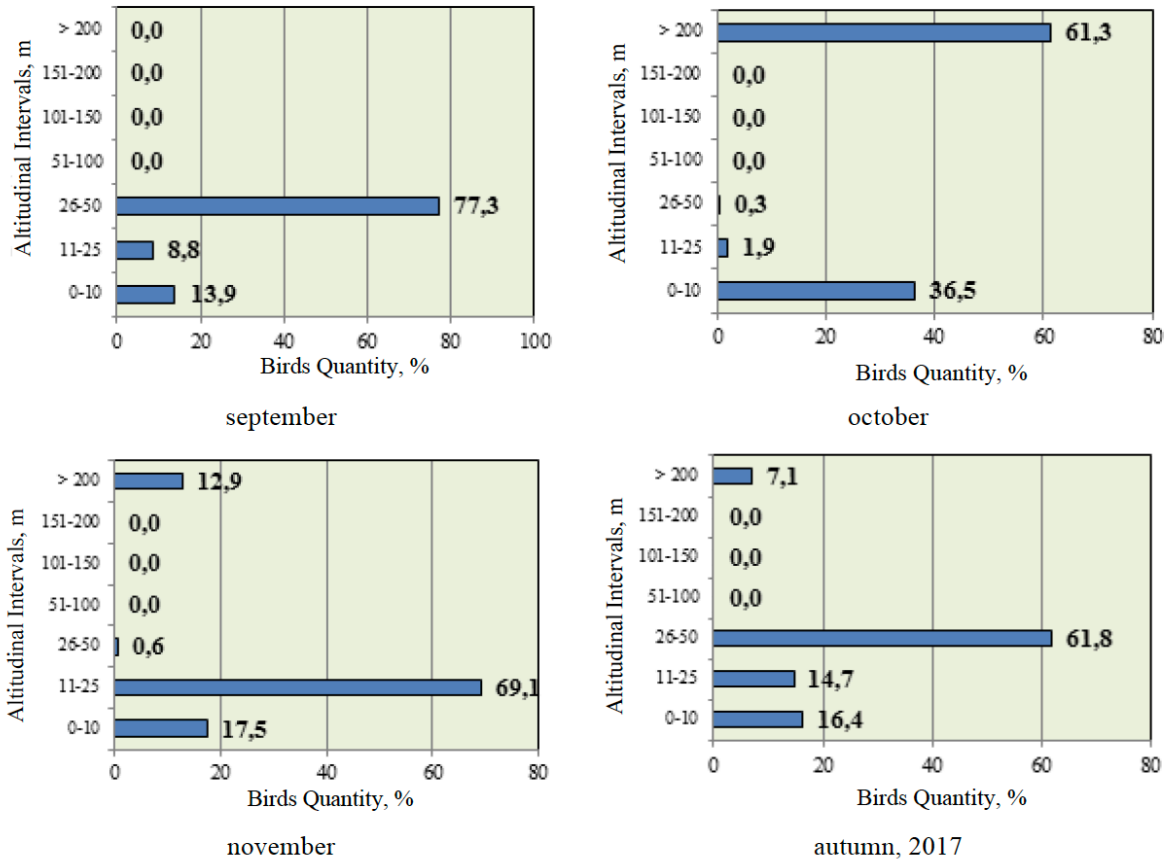
november



autumn, 2017

A detailed analysis of the flight altitude of migratory movements recorded during September-November 2017 is presented in Figure 40. 92.9% of all recorded bird migratory movements took place at heights up to 50 meters. Movements in this range are considered very safe given that it is well below the moving blades of the turbines. Considering the technical characteristics of the GE137-3.6/3.8 wind turbine, the altitude range from 50 to 200 m is also considered safe.

Figure 40 Flight Altitude of Birds in Autumn 2017



Species of Special Interest and Protected Territories

There are no conservation areas of state, regional and local significance within 7 km of the Project site. At the regional scale, the Lower Dniester National Nature Park (LDNNP) is located north-east of the Project site. Important Bird Area (IBA) sites are also located within the Dniester estuary.

The closest conservation area is a section of the Lower Dniester National Nature Park which is located at a distance of more than 7-8 km from the Project site. The most valuable and significant

bird territories within the LDNNP are located at a distance of 10-12 km from the Project. The Lower Dnistr National Nature Park is a natural area of the Delta of the Dniester river and the Dniester estuary with an area of 21,311 ha. The national park was created in 2008 and is differentiated by different zones and protection regimes which are presented below in Figure 41. The protected zone is show in relation to the Project in Figure 42.

Figure 41 Lower Dniester National Park Protected Zones

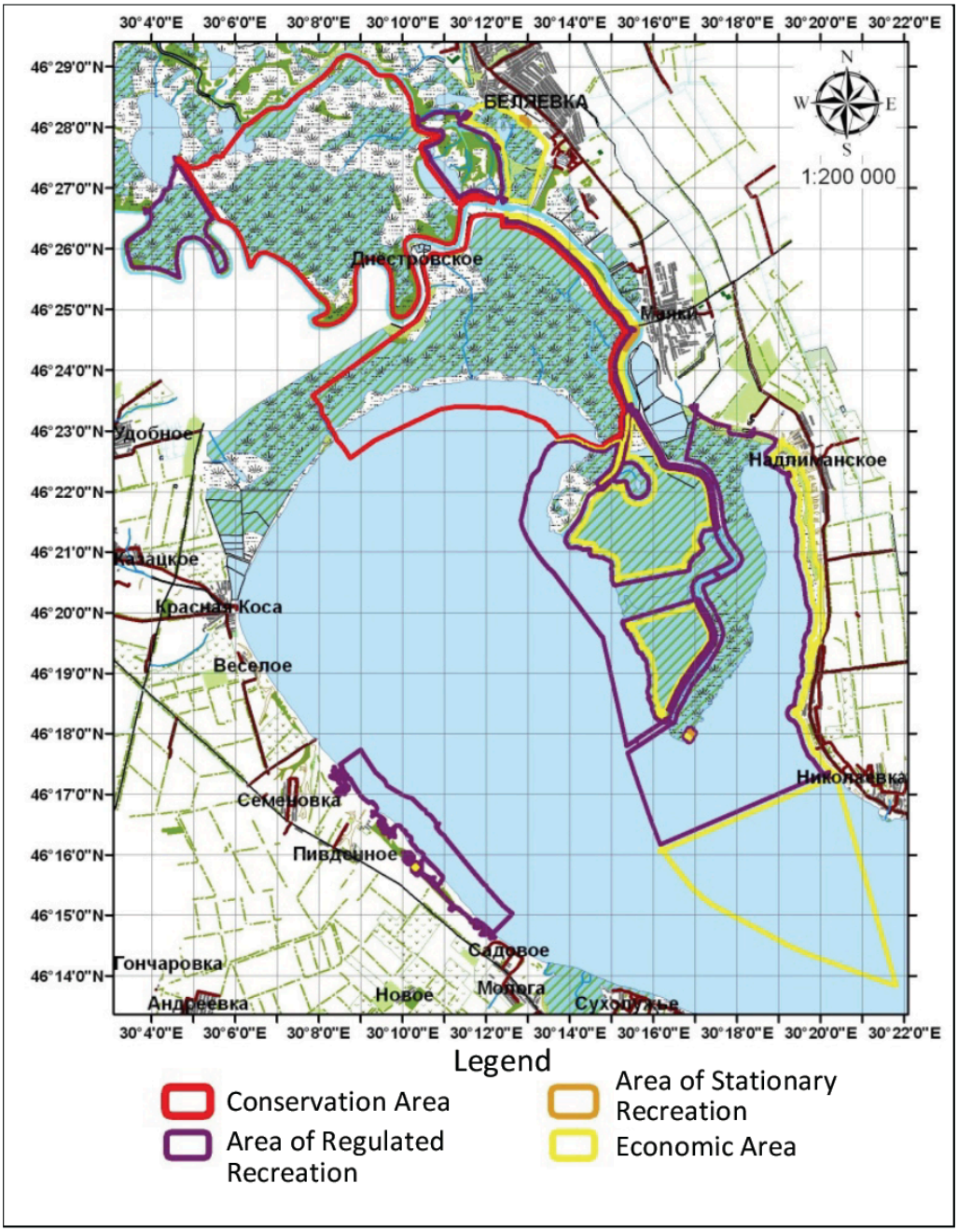
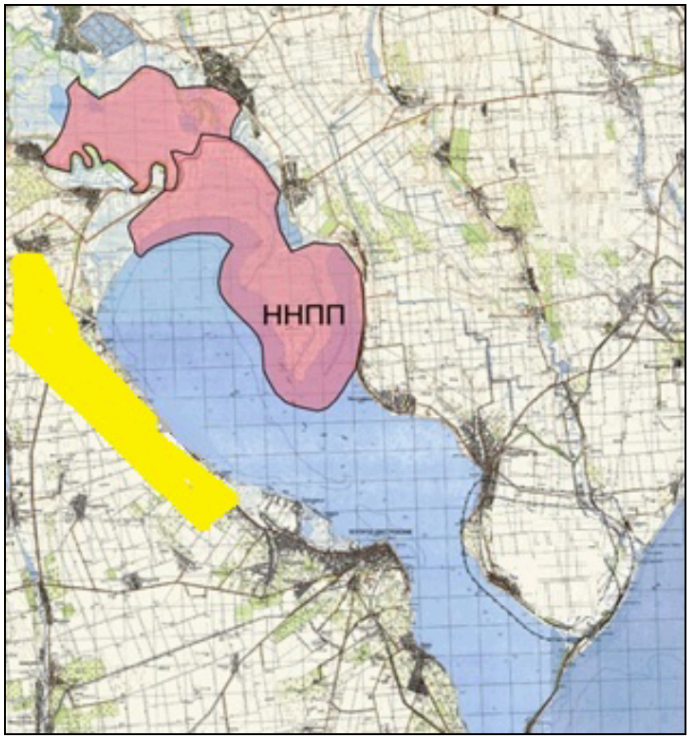


Figure 42 Project Area in relation to Lower Dniestr National Nature Park



Within the Project area the following species were encountered from the Red Book of Ukraine: Long-legged buzzard (*Buteo rufinus*), Dove-hawk (*Circus cyaneus*), Short-eared owl (*Asio flammeus*) and White-Tailed Eagle (*Haliaeetus albicilla*). The number of these species encountered was very low: just 4 total birds were encountered, each from a different species (see Figure 36). The other species belong to the group of wetland birds and have been recorded within the waters of the ponds in the surrounding areas.

Figure 43 Species of the Red Book of Ukraine, Autumn 2017 Study

No.	Species	23.09	15.10	03.11	Total
1	Dove-hawk (*Circus cyaneus*)		1		**1**
2	White-tailed eagle (*Haliaeetus albicilla)*	1			**1**
3	Long-legged buzzard (*Buteo rufinus*)			1	**1**
4	Short-eared owl (*Asio flammeus*)			1	**1**
Total	**Species of RBU**	**1**	**1**	**2**	**4**
	Birds of RBU	**1**	**1**	**2**	**4**
	Species, autumn 2017	**23**	**27**	**24**	**36**
	Birds, autumn 2017	**9915**	**4054**	**3443**	**17412**

Additionally, bird counts and distribution were recorded during the autumn migration for species on the following environmental lists: the International Union for Conservation of Nature (IUCN), the European Red List (ERL), Bonn and Berne Conventions and the Washington Convention on international trade in endangered species of wild fauna and flora threatened of extinction (CITES) (Figure 44).

Figure 44 Distribution of birds on environmental lists Fall 2018

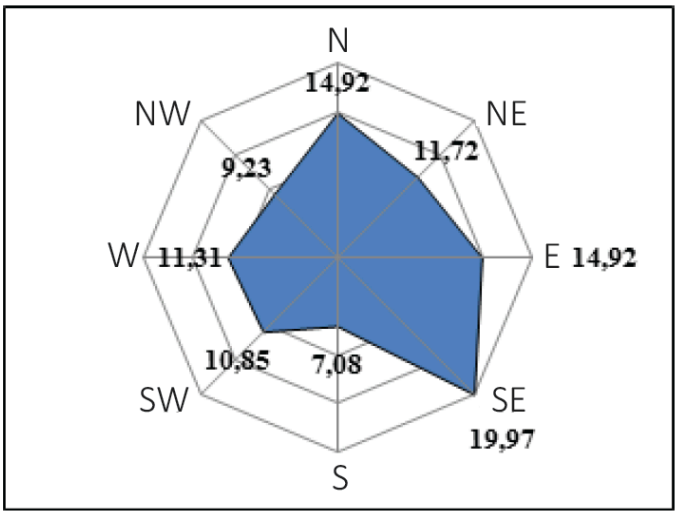
Ukrainian Name / English Name	Scientific Name	Status	ERL		RBU	IUCN		Bern	Bonn	CITES
			Category	Trend		Category	Trend			
European Cormorant	*Phalacrocorax carbo*	m, w, n	LC	increasing		LC	increasing	3		
Shelduck	*Tadorna tadorna*	m, w, n	LC	increasing		LC	increasing	2		
Mallard	*Anas platyrhynchos*	m, w, n	LC	stable		LC	increasing	3	1.2	
White-Fronted Goose	*Anser albifrons*	m, w	LC	stable		LC	unknown	3	1.2	
Blue Hawk	*Circus cyaneus*	m	NT	decreasing	RD	LC	decreasing	2		2
Duck hawk	*Circus aeruginosus*	m, w, n	LC	increasing		LC	increasing	2		2
White – Tailed Eagle	*Haliaeetus albicilla*	m, w, n	LC	increasing	RD	LC	increasing	2	1.2	1
Sparrowhawk	*Accipiter nisus*	m, w	LC	stable		LC	stable	2	1.2	2
Buzzard	*Buteo buteo*	m, w, n	LC	stable		LC	stable	2	1.2	2
Long-legged buzzard	*Buteo rufinus*	m, w, n	LC	increasing	RD	LC	stable	2	1.2	2
Buzzard	*Buteo lagopus*	m, w	LC	stable		LC	stable	2	1.2	2
Common Kestrel	*Falco tinnunculus*	m, w, n	LC	decreasing		LC	decreasing	2	2	2

10.3.6.3.2. Winter Study 2018

Migratory Movements

Bird migratory movements during winter 2018 were rather evenly distributed, with the South-Eastern (19.97%), Northern (14.92%) and Eastern (14.92%) directions being the most frequently recorded flight directions (Figure 45). This distribution is typical for winter when most birds fly in search of food in various directions.

Figure 45 Direction of bird migratory movements in Winter 2018 (number in %)



The vast majority of bird flight movements were observed in the following altitude intervals:

- 0-10 m (1496 observations, 86.82%),
- 11-25 m (201 observations, 11.67%), and
- 26-50 m (21 observations, 1.22%).

During winter 2018, only 5 birds (0.29%) were recorded in flight within the potentially dangerous altitude interval between 51-150 (Figure 46). The exponential trendline observed (Figure 46) is consistent with the altitude distribution of birds traditionally observed in the region during these winter months.

Figure 46 Altitude intervals of bird migration in Winter 2018 within Project area

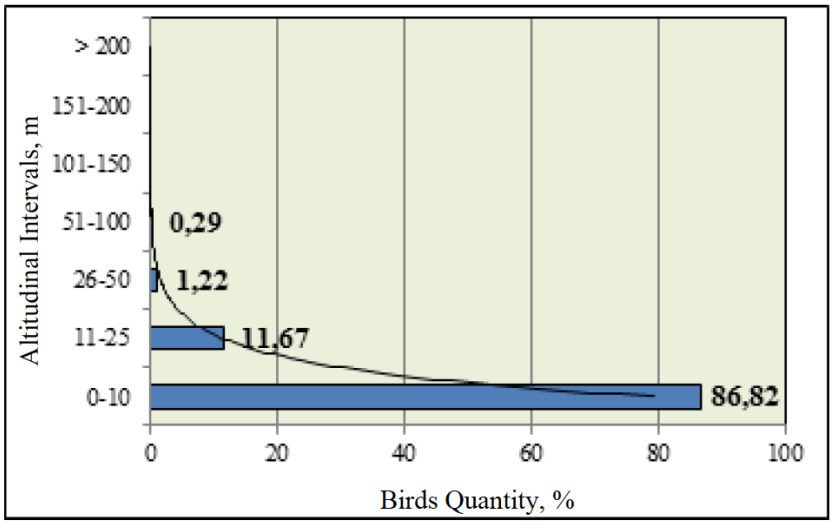


Figure 47 presents the characteristics of the 5 birds that were observed at potentially dangerous heights.

Figure 47 Characteristic of species recorded at potentially dangerous heights

Species	Date	SS	N	Type of flight	H	THrisk, (sec)	∑THrisk (sec)
Buteo buteo	21.02.2018	1	1	transit	55	49	49
Buteo buteo	23.02.2018	1	1	transit	55	34	34
Buteo lagopus	20.02.2018	2	1	transit	55	86	86
Buteo lagopus	20.02.2018	3	1	transit	55	54	54
Buteo buteo	21.02.2018	3	1	transit	55	40	40
Total			**5**			**263**	**263**

Species of interest and protected areas

3 species from the Red Book of Ukraine were observed during the winter 2018 study (Figure 41): Field Harrier (*Circus cyaneus*) – 2 observations; White-Tailed Eagle (*Haliaeetus albicilla*) – 1 observations; and Steppe Buzzard (*Buteo rufinus*) – 2 observations.

Figure 48 Species of Birds Encountered from Red Book of Ukraine in Winter 2018

#	Ukrainian Name / English Name	Scientific Name	Obs. Point 1	Obs. Point 2	Obs. Point 3	Route Count	Total
1	Blue Hawk	*Circus cyaneus*	1	-	1	-	**2**
2	Long-legged buzzard	*Buteo rufinus*	-	1	-	1	**2**
3	White – Tailed Eagle	*Haliaeetus albicilla*	-	-	1	-	**1**
Total		**Species**	**1**	**1**	**2**	**1**	**3**
		Birds'	**1**	**1**	**2**	**1**	**5**

Additionally, bird counts and distribution were recorded during the winter study for species on the following environmental lists: the Red Book of Ukraine, International Union for Conservation of Nature (IUCN), the European Red List (ERL), Bonn and Berne Conventions and the Washington Convention on international trade in endangered species of wild fauna and flora threatened of extinction (CITES) (Figure 49).

Figure 49 Distribution of Birds on Environmental Lists Winter 2018

Ukrainian Name / English Name	Scientific Name	Status	ERL	RBU	IUCN	BERN	BONN	CITES

			Cat.	Trend		Cat.	Trend			
Great-Crested Grebe	*Podiceps cristatus*	m, w, n	LC	decreasing		LC	unknown	3		
Баклан великий / European Cormorant	*Phalacrocorax carbo*	m, w, n	LC	increasing		LC	increasing	3		
Mute Swan	*Cygnus olor*	m, w, n	LC	increasing		LC	increasing	3	1.2	
Whooper Swan	*Cygnus Cygnus*	m, w	LC	increasing		LC	unknown	2	1.2	
Mallard	*Anas platyrhynchos*	m, w, n	LC	stable		LC	increasing	3	1.2	
Common pochard	*Aythya ferina*	m, w, n	VU	decreasing		VU	decreasing	3	1.2	
Tufted Duck	*Aythya fuligula*	m, w	LC	stable		LC	stable	3	1.2	
Blue Hawk	*Circus cyaneus*	m, w	NT	decreasing	EXOT	LC	decreasing	2	1.2	2
Duck hawk	*Circus aeruginosus*	m, w, n	LC	increasing		LC	increasing	2	1.2	2
Sparrowhawk	*Accipiter nisus*	m, w	LC	stable		LC	stable	2	1.2	2
Buzzard	*Buteo lagopus*	m, w	LC	stable		LC	stable	2	1.2	2
Long-legged buzzard	*Buteo rufinus*	m, w, n	LC	increasing	EXOT	LC	stable	2	1.2	2
Buzzard	*Buteo buteo*	m, w, n	LC	stable		LC	stable	2	1.2	2
White – Tailed Eagle	*Haliaeetus albicilla*	m, w, n	LC	increasing	EXOT	LC	increasing	2	1.2	1
Pdacalc small	*Falco columbarius*	m, w	LC	unknown		LC	stable	2	2	2
Common Kestrel	*Falco tinnunculus*	m, w, n	LC	decreasing		LC	decreasing	2	2	2
Куріпка сіра / European Partridge	*Perdix perdix*	m, w, n	LC	decreasing		LC	decreasing	3		
Pheasant	*Phasianus colchicus*	m, w, n	LC	increasing		LC	decreasing	3		
Common Gull	*Larus ridibundus*	m, w, n	LC	stable		LC	unknown	3		
Caspian Gull	*Larus cachinnans*	m, w, n	LC	increasing		LC	increasing			
Blue Rock Pigeon	*Columba livia*	m, n	LC	unknown		LC	decreasing	3		
Ringed turtledove	*Streptopelia decaocto*	m, w, n	LC	increasing		LC	increasing	3		
Woodpecker Syrian	*Dendrocopos syriacus*	m, n	LC	stable		LC	stable	2		
Common Starling	*Sturnus vulgaris*	m, w, n	LC	decreasing		LC	decreasing	2		
Jay	*Garrulus glandarius*	m, w, n	LC	increasing		LC	stable	2		
Magpie	*Pica pica*	m, w, n	LC	stable		LC	stable	2		
Rook	*Corvus frugilegus*	m, w, n	LC	decreasing		LC	decreasing	2		
Hooded Crow	*Corvus cornix*	m, w, n	LC	stable		LC	increasing	2		

Crow	*Corvus corax*	m, w, n	LC	increasing		LC	increasing	3		
Fieldfare	*Turdus pilaris*	m, w	LC	decreasing		LC	stable	3	2	
Blackbird	*Turdus merula*	m, w, n	LC	increasing		LC	increasing	3	2	
Blue Tit	*Parus caeruleus*	m, w, n	LC	increasing		LC	increasing	2		
Great Titmouse	*Parus major*	m, w, n	LC	increasing		LC	increasing	2		
English sparrow	*Passer domesticus*	m, w, n				LC	increasing	2		
Tree Sparrow	*Passer montanus*	m, w, n	LC	unknown		LC	decreasing	3		
Finch	*Fringilla coelebs*	m, w, n	LC	stable		LC	increasing	3		
Common Bunting	*Emberiza calandra*	m, w, n	LC	stable		LC	decreasing	3		

Legend: Status: m - were met during seasonal migrations; **w** - were met in winter; **n** – were met in nesting period.

RBU - Security status of the red data book of Ukraine: **EN** – endangered; **IM**- impressionable; **EXOT** – exoticak; **UV** – is invaluable.

IUCN – conservation status the International Union for nature protection: **EN** – endangered; **NT** – morethreatening condition; **VU** –vulnerable; **LC** –least risk.

ERL - conservation status the European red list: **VU** (Vulnerable) susceptible species that may soon be classified as "endangered" if it continues the effect of the factors affecting their condition; the **EN** – (Endangered) endangered species, species under threat of extinction, the preservation of their unlikely, playback is not possible without the implementation of special measures.

BONN - Bonn Convention: Appendix I (1) includes species threatened with extinction; Appendix II (2) includes species whose status is unfavorable, maintain and regulate the use of which requires international agreements, as well as those species whose status could be improved substantially in result of international cooperation, which can be made on the basis of international agreements. The same species may be listed both in Appendix I and Appendix II.

BERN - Bern Convention, or the Convention on the Conservation of wild flora and fauna and natural habitats in Europe, includes Annex II (2) - list of fauna species which is subject to special protection; Annex III (3) - the species to be protected.

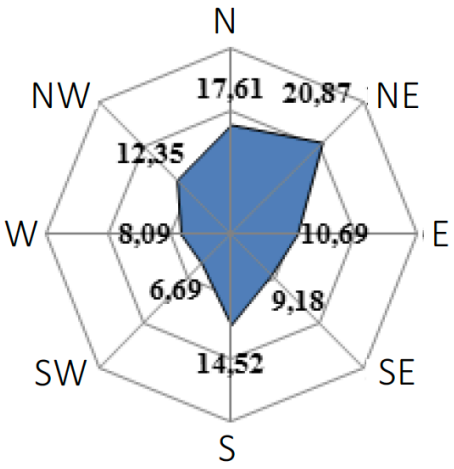
CITES - the Washington Convention on international trade in endangered species of wild fauna and flora threatened with extinction: Appendix I includes species "threatened with extinction, trade in which is causing or may cause to their existence adversely affected. Trade in specimens of such species should be particularly strictly regulated with the purpose, not to put further endanger their survival and must only be allowed in exceptional cases"; Annex II (2) includes: "a) all species that are currently not necessarily threatened with extinction but may be at such risk if I specimens of such species is strictly regulated to avoid such use, which is incompatible with their survival; and b) to be subject to regulation in order to the trade in specimens of certain species referred to in subparagraph (a) of this paragraph, can be established effective control".

10.3.6.3.3. Spring Study 2018

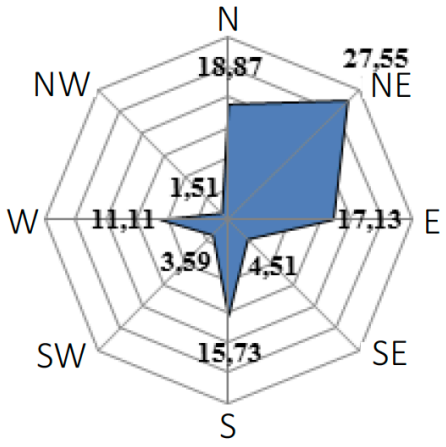
Migratory Movements

The most common direction of bird migration during the spring was north (including north, north-east and north-west directions) (49.62% of migrants). Additionally, 15.03% of migrant birds chose the southern direction, which is associated with feeding flights of passerines (mainly starling and rook). More detailed characteristics of the directions of spring migration are shown in Figure 50.

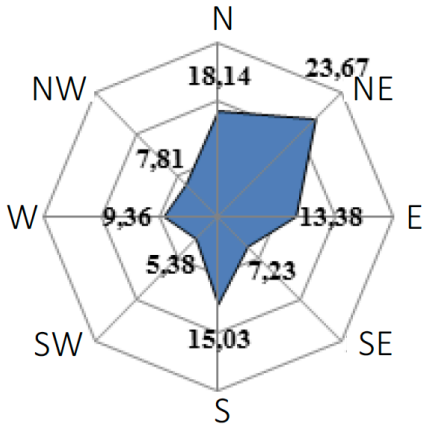
Figure 50 Direction of Bird Migratory Movements in Spring 2018



march



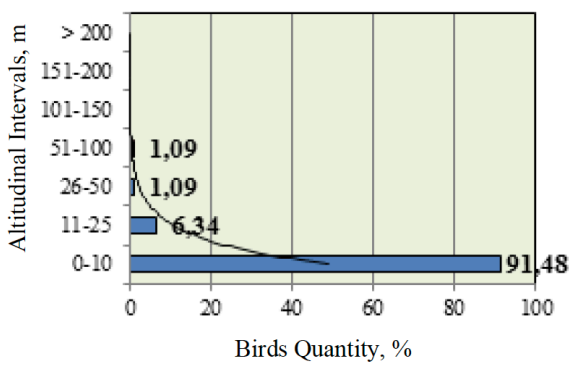
april



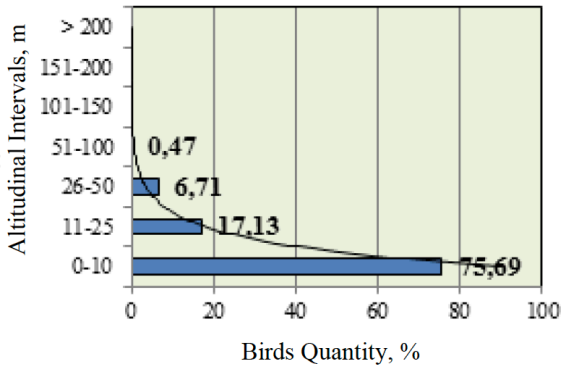
spring, 2018

99.17% of the migratory bird movements in spring 2018 were recorded at a safe altitude < 50 m. Only 17 observations (0.83%) were recorded at potentially dangerous altitudes (50 – 200 m) which are those that fall within the range of the turbine blade rotation. Even if the potentially dangerous interval is expanded to a highly conservative range of 26 to 200m, only 4.3% of birds observed are at risk. Consequently, the potential impact has been assessed as low. A more detailed analysis of the flight altitude intervals of the spring migrants is presented in Figure 51.

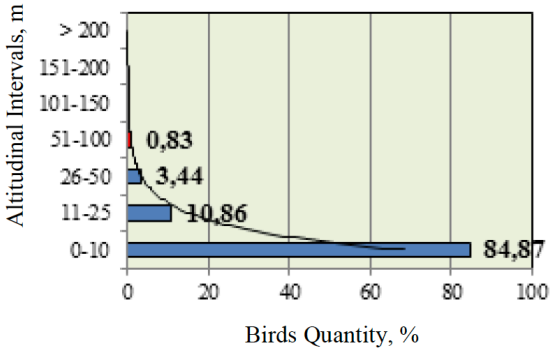
Figure 51 Altitude Intervals of Bird Migration Spring 2018



march



april



spring, 2018

Among the 17 migrant birds (0.83%) registered at potentially dangerous altitude only 3 species were observed – the Common buzzard (*Buteo buteo*), Western marsh harrier (*Circus aeruginosus*), and Black-headed gull (*Larus ridibundus*). Notably, rare birds chose safe flight altitudes.

Figure 52 Characteristics of species recorded at dangerous height

Species	Date	SS	N	Type of flight	H	THrisk, sec	∑THrisk, sec
Circus aeruginosus	24.03.2018	1	1	feed	60	61	61
Buteo buteo	24.03.2018	1	1	transit	55	30	30
Circus aeruginosus	26.03.2018	1	1	transit	60	19	19
Buteo buteo	21.04.2018	1	1	transit	55	46	46
Buteo buteo	22.04.2018	1	1	transit	55	38	38
Circus aeruginosus	24.03.2018	2	1	transit	60	35	35

Larus ridibundus	25.03.2017	2	7	transit	60	26	182
Buteo buteo	26.03.2018	2	1	transit	55	49	49
Circus aeruginosus	21.04.2018	2	1	transit	60	45	45
Buteo buteo	26.03.2018	3	1	transit	60	50	50
Buteo buteo	22.04.2018	3	1	feed	55	36	36
Total			**17**			**435**	**591**

Species of special interest

During spring 2018, 2 species from Red Book of Ukraine were recorded in the study area (Figure 53): the Hen Harrier (*Circus cyaneus*) – 1 observation, which was observed during point counts from observation points; and the Oystercatcher (*Haematopus ostralegus*) – 1 observation, which was registered on route counts. Collectively, just 0.06% of all birds recorded in the spring of 2018 were included on the RBU list.

Figure 53 Birds Encountered from the Red Book of Ukraine Spring 2018

No.	Ukrainian Name / English Name	Scientific Name	March	April	Spring
1	Blue Hawk	*Circus cyaneus*	1	-	**1**
2	Oystercatcher	*Haematopus ostralegus*	-	1	**1**
Total		**Species**	**1**	**1**	**2**
		Birds'	**1**	**1**	**2**

Additionally, bird counts and distribution were recorded during the winter study for species on the following environmental lists: the Red Book of Ukraine, International Union for Conservation of Nature (IUCN), the European Red List, Bonn and Berne Conventions and the Washington Convention on international trade in endangered species of wild fauna and flora threatened of extinction (CITES) (Figure 54).

Figure 54 Distribution of Birds on Environmental Lists Spring 2018

Ukrainian Name / English Name	Scientific Name	Status	ERL		RBU	IUCN		BERN	BONN	CITES
			Cat.	Trend		Cat.	Trend			
Great-Crested Grebe	*Podiceps cristatus*	m, w, n	LC	decreasing		LC	unknown	3		
Grey Heron	*Ardea cinerea*	m, w, n	LC	decreasing		LC	unknown	3		
Mute Swan	*Cygnus olor*	m, w, n	LC	increasing		LC	increasing	3	1.2	

Shelduck	*Tadorna tadorna*	m, w, n	LC	increasing		LC	increasing	2	1.2	
Mallard	*Anas platyrhynchos*	m, w, n	LC	stable		LC	increasing	3	1.2	
Common pochard	*Aythya ferina*	m, w, n	VU	decreasing		VU	decreasing	3	1.2	
Blue Hawk	*Circus cyaneus*	m, w	NT	decreasing	EXOT	LC	decreasing	2	1.2	2
Duck hawk	*Circus aeruginosus*	m, w, n	LC	increasing		LC	increasing	2	1.2	2
Sparrowhawk	*Accipiter nisus*	m, w	LC	stable		LC	stable	2	1.2	2
Buzzard	*Buteo buteo*	m, w, n	LC	stable		LC	stable	2	1.2	2
Common Kestrel	*Falco tinnunculus*	m, w, n	LC	decreasing		LC	decreasing	2	2	2
European Coot	*Fulica atra*	m, w, n	NT	decreasing		LC	increasing	3	2	
Oystercatcher	*Haematopus ostralegus*	m, n	VU	decreasing	Vulner.	NT	decreasing	3		
Ruff	*Philomachus pugnax*	m	LC	decreasing		LC	decreasing	3	1.2	
Common Gull	*Larus ridibundus*	m, w, n	LC	stable		LC	unknown	3		
Caspian Gull	*Larus cachinnans*	m, w, n	LC	increasing		LC	increasing			
Ringed turtledove	*Streptopelia decaocto*	m, w, n	LC	increasing		LC	increasing	3		
Hoopoe	*Upupa epops*	m, n	LC	stable		LC	decreasing	2		
Barn Swallow	*Hirundo rustica*	m, n	LC	decreasing		LC	decreasing	2		
Polityka	*Galerida cristata*	m, w, n	LC	decreasing		LC	decreasing	3		
White Wagtail	*Motacilla alba*	m, w, n	LC	unknown		LC	stable	2		
Common Starling	*Sturnus vulgaris*	m, w, n	LC	decreasing		LC	decreasing	2		
Jay	*Garrulus glandarius*	m, w, n	LC	increasing		LC	stable	2		
Magpie	*Pica pica*	m, w, n	LC	stable		LC	stable	2		
Jackdaw	*Corvus monedula*	m, w, n	LC	stable		LC	stable	2		
Rook	*Corvus frugilegus*	m, w, n	LC	decreasing		LC	decreasing	2		
Hooded Crow	*Corvus cornix*	m, w, n	LC	stable		LC	increasing	2		
Crow	*Corvus corax*	m, w, n	LC	increasing		LC	increasing	3		
Tree Sparrow	*Passer montanus*	m, w, n	LC	unknown		LC	decreasing	3		
Finch	*Fringilla coelebs*	m, w, n	LC	stable		LC	increasing	3		
Goldfinch	*Carduelis carduelis*	m, w, n	LC	stable		LC	increasing	2		

Legend: Status: m - were met during seasonal migrations; **w** - were met in winter; **n** – were met in nesting period.

RBU - Security status of the red data book of Ukraine: **EN** – endangered; **IM**- impressionable; **EXOT** –

exoticak; **UV** – is unvaluable.

IUCN – conservation status the International Union for nature protection: **EN** – endangered; **NT** – morethreatening condition; **VU** –vulnerable; **LC** –least risk.

ERL - conservation status the European red list: **VU** (Vulnerable) susceptible species that may soon be classified as "endangered" if it continues the effect of the factors affecting their condition; the **EN** – (Endangered) endangered species, species under threat of extinction, the preservation of their unlikely, playback is not possible without the implementation of special measures.

BONN - Bonn Convention: Appendix I (1) includes species threatened with extinction; Appendix II (2) includes species whose status is unfavorable, maintain and regulate the use of which requires international agreements, as well as those species whose status could be improved substantially in result of international cooperation, which can be made on the basis of international agreements. The same species may be listed both in Appendix I and Appendix II.

BERN - Bern Convention, or the Convention on the Conservation of wild flora and fauna and natural habitats in Europe, includes Annex II (2) - list of fauna species which is subject to special protection; Annex III (3) - the species to be protected.

CITES - the Washington Convention on international trade in endangered species of wild fauna and flora threatened with extinction: Appendix I includes species "threatened with extinction, trade in which is causing or may cause to their existence adversely affected. Trade in specimens of such species should be particularly strictly regulated with the purpose, not to put further endanger their survival and must only be allowed in exceptional cases"; Annex II (2) includes: "a) all species that are currently not necessarily threatened with extinction but may be at such risk if I specimens of such species is strictly regulated to avoid such use, which is incompatible with their survival; and b) to be subject to regulation in order to the trade in specimens of certain species referred to in subparagraph (a) of this paragraph, can be established effective control".

10.3.6.3.4. Nesting Study 2018

Identification of Nests

In the South of Ukraine, May is generally a period of active egg laying, incubation, and feeding chicks. However, the phenological timing of the nesting period for different species occurs over a longer period than this; as such, the first observations of nesting behavior began during the migratory studies in April when nesting behavior is typical for most species (herons, cormorants, gulls, larks, starlings, etc.).

The ornithological experts assessed a number of factors to identify nesting birds including the presence of nests, juveniles, breeding behavior (mating singing, “withdrawal” from the nest, mating, aggressive behavior, etc.), destroyed nests, dead chicks and eggs. During the study, 55 nests were recorded. These nests were attributed to 25 species of birds (Figure 55).

The ornithological experts note that certain bird species exhibit “hidden behavior” (larks, partridge, quail, owls, wren, flycatchers, wheatears and others) which makes it more difficult to identify nests. As such, the methodology used has limitations and it is likely that the nest identification studies did not capture all nests within the study territory. To account for this, the scientists assigned an error estimation of approximately 30-35%. Taking into account these species, whose nests were likely missed, the ornithological experts estimate that there are in actuality from 80-90 nests within the study area, comprised of at least 30 species of birds.

Figure 55 Nesting Bird Species Identified in 2018

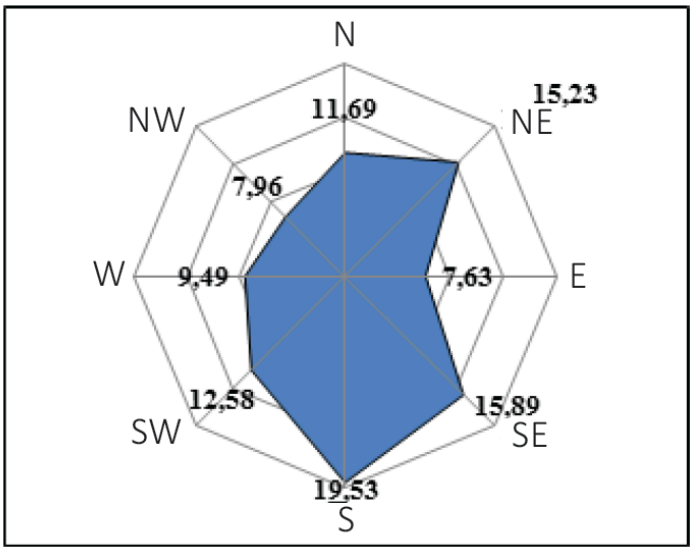
No.	Species	Nests
1	Buzzard (*Buteo Buteo*)	**1**
2	Red-footed Falcon (*Falco vespertinus*)	**1**
3	Common kestrel (*Falco tinnunculus*)	**4**
4	European partridge (*Perdix perdix*)	**1**
5	Ring Dove (*Columba palumbus*)	**2**
6	Turtledove *(Streptopelia turtur)*	**2**
7	Long-eared owl (*Asio otus*)	**1**
8	Scoop (*Otus scops*)	**1**
9	Ordinary Golden bee-eater (*Merops apiaster*)	**15**
10	Hoopoe (*Upupa epops*)	**2**
11	Crested lark (*Galerida cristata*)	**1**
12	Lesser gray shrike (*Lanius minor*)	**1**
13	Jay (*Garrulus glandarius*)	**1**
14	Magpie (*Pica pica*)	**7**
15	Jackdaw (*Corvus monedula*)	**3**
16	Hooded crow (*Corvus cornix*)	**1**
17	Garden warbler (*Sylvia borin*)	**1**
18	Eurasian whitethroat (*Sylvia communis*)	**1**
19	Winchat (*Saxicola rubetra*)	**1**
20	Northern Wheatear (*Oenanthe oenanthe*)	**2**
21	Eastern Nightingale (*Luscinia megarhynchos*)	**1**
22	Blackbird (*Turdus merula*)	**2**
23	Greenfinch (*Chloris chloris*)	**1**
24	Corn Bunting *(*Emberiza calandra*)*	**1**
25	Common Bunting (*Emberiza citrinella*)	**1**

The most common species identified was the Golden bee-eater (*Merops apiaster*) with 15 nests identified. Within the the Corvidae family, the following nests were identified: Magpies (*Pica pica*) – 7 nests, Jackdaws (*Corvus monedula*) – 3 nests, and the Grey Crow (*Corvus cornix*) –1 nest. It should be noted that within the Project area no colonies of rooks (*Corvus frugilegus*) were identified.

Migratory Movements

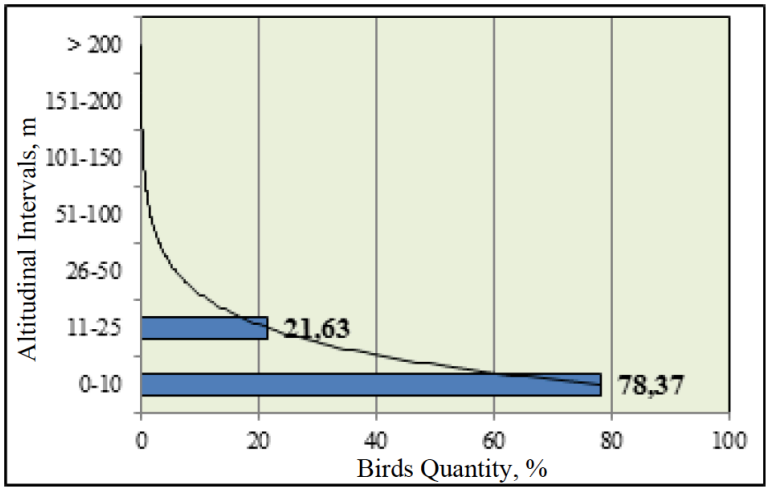
During May, migratory bird movements were recorded primarily in the south-east, north-east, north and south directions (60.23%) (Figure 56). mainly the high intervals of 0-10 m – 595 ind. (83.92% of the total), the remaining birds were observed at altitudes 11-25 m (114 ind, of 16.08%).

Figure 56 Direction of Bird Flights During the 2018 Nesting Period (number in %)



All birds recorded were observed in the safe flight altitude intervals of 0-10 m (710 observations, 78.37%) and 11-25 m (196 observations, 21.63%). No birds were recorded at higher altitudes (Fig. 57) which can likely be attributed to the fact that the majority of birds are on nests at this time of the year. The exponential trend line in Figure demonstrates that the majority of birds remain near the surface heights.

Figure 57 Altitude Characteristics of Bird Movements During the 2018 Nesting Period



Species of Interest

2 species of birds from Red Book of Ukraine were identified – Scoop (*Otus scops*) – 2 birds; and the Roller (*Coracias garrulus*) –11 birds (Figure 58).

Figure 58 Birds Encountered from the Red Book of Ukraine During the 2018 Nesting Period

#	English Name	Scientific Name	Obs. Point 1	Obs. Point 2	Obs. Point 3	Route Count	Total
1	Shriek-Owl	*Otus scops*	-	-	-	2	**2**
2	Roller	*Coracias garrulus*	5	-	6	-	**11**
Total		Species	1	-	1	1	2
		Birds	5	-	6	2	13

During the nesting period, the count and distribution of birds on the following international lists was also recorded: the Red Book of Ukraine, International Union for Conservation of Nature (IUCN), the European Red List, Bonn and Berne Conventions and the Washington Convention on international trade in endangered species of wild fauna and flora threatened of extinction (CITES) (Figure 59).

Figure 59 Distribution of Birds on Environmental Lists During 2018 Nesting Period

Ukrainian Name / English Name	Scientific Name	Status	ERL		RBU	IUCN		Bern	Bonn	CITES
			Category	Trend		Category	Trend			
European Cormorant	*Phalacrocorx carbo*	m, w, n	LC	increasing		LC	increasing	3		
Mute Swan	*Cygnus olor*	m, w, n	LC	increasing		LC	increasing	3	1.2	
Shelduck	*Tadorna tadorna*	m, w, n	LC	increasing		LC	increasing	2	1.2	
Duck hawk	*Circus aeruginosus*	m, w, n	LC	increasing		LC	increasing	2	1.2	2
Buzzard	*Buteo buteo*	m, w, n	LC	stable		LC	stable	2	1.2	2
Кібчик / Falcon	*Falco vespertinus*	m, n	NT	decreasing		NT	decreasing	2	2	2
Common Kestrel	*Falco tinnunculus*	m, w, n	LC	decreasing		LC	decreasing	2	2	2
Куріпка сіра / European Partridge	*Perdix perdix*	m, w, n	LC	decreasing		LC	decreasing	3		
Pheasant	*Phasianus colchicus*	m, w, n	LC	increasing		LC	decreasing	3		
Common Gull	*Larus ridibundus*	m, w, n	LC	stable		LC	unknown	3		
Caspian Gull	*Larus cachinnans*	m, w, n	LC	increasing		LC	increasing			
Ring Dove	*Columba palumbus*	m, w, n	LC	increasing		LC	increasing			
Ringed turtledove	*Streptopelia decaocto*	m, w, n	LC	increasing		LC	increasing	3		
Turtledove	*Streptopelia turtur*	m, n	VU	decreasing		VU	decreasing	3		
Long-Eared Owl	*Asio otus*	m, w, n	LC	unknown		LC	decreasing	2		2
Shriek-Owl	*Otus scops*	m, n	LC	unknown	EXOTDANG	LC	decreasing	2		2
Roller	*Coracias garrulus*	m, n	LC	decreasing		LC	decreasing	2	2	
European bee eater	*Merops apiaster*	m, n	LC	stable		LC	stable	2	2	
Hoopoe	*Upupa epops*	m, n	LC	stable		LC	decreasing	2		

Woodpecker large	*Dendrocopos major*	m, n	LC	increasing		LC	increasing	2		
§	*Hirundo rustica*	m, n	LC	decreasing		LC	decreasing	2		
Polityka	*Galerida cristata*	m, w, n	LC	decreasing		LC	decreasing	3		
Field Lark	*Alauda arvensis*	m, w, n	LC	decreasing		LC	decreasing	3		
Blue-headed wagtail	*Motacilla flava*	m, n	LC	decreasing		LC	decreasing	2		
White Wagtail	*Motacilla alba*	m, w, n	LC	unknown		LC	stable	2		
Red-Backed Shrike	*Lanius collurio*	m, n	LC	stable		LC	decreasing	2		
Lesser Gray Shrike	*Lanius minor*	m, n	LC	stable		LC	decreasing	2		
Golden Oriole	*Oriolus oriolus*	m, n	LC	unknown		LC	stable	2		
Common Starling	*Sturnus vulgaris*	m, w, n	LC	decreasing		LC	decreasing	2		
Jay	*Garrulus glandarius*	m, w, n	LC	increasing		LC	stable	2		
Magpie	*Pica pica*	m, w, n	LC	stable		LC	stable	2		
Jackdaw	*Corvus monedula*	m, w, n	LC	stable		LC	stable	2		
Rook	*Corvus frugilegus*	m, w, n	LC	decreasing		LC	decreasing	2		
Hooded Crow	*Corvus cornix*	m, w, n	LC	stable		LC	increasing	2		
Crow	*Corvus corax*	m, w, n	LC	increasing		LC	increasing	3		
Garden warbler	*Sylvia borin*	m, n	LC	unknown		LC	decreasing	2		
Eurasian Whitethroat	*Sylvia communis*	m, n	LC	stable		LC	increasing	2		
Трав'янка лучна / Whinchat	*Saxicola rubetra*	m, n	LC	decreasing		LC	decreasing	2	2	
оголова / Common Stonechat	*Saxicola torquata*	m, n	LC	decreasing		LC	stable	2	2	
Northern Wheatear	*Oenanthe oenanthe*	m, n	LC	stable		LC	decreasing	2		
West Nightingale	*Luscinia megarhynchos*	m, n	LC	stable		LC	stable	2	2	
Blackbird	*Turdus merula*	m, w, n	LC	increasing		LC	increasing	3	2	
Great Titmouse	*Parus major*	m, w, n	LC	increasing		LC	increasing	2		
Tree Sparrow	*Passer montanus*	m, w, n	LC	unknown		LC	decreasing	3		
Finch	*Fringilla coelebs*	m, w, n	LC	stable		LC	increasing	3		
Greenfinch	*Chloris chloris*	m, w, n	LC	stable		LC	stable	2		

Goldfinch	*Carduelis carduelis*	m, w, n	LC	stable		LC	increasing	2		
Common Bunting	*Emberiza calandra*	m, w, n	LC	stable		LC	decreasing	3		
Yellowhammer	*Emberiza citrinella*	m, w, n	LC	decreasing		LC	decreasing	2		

Legend: Status: m - were met during seasonal migrations; **w** - were met in winter; **n** – were met in nesting period.

RBU - Security status of the red data book of Ukraine: **EN** – endangered; **IM**- impressionable; **EXOT** – exoticak; **UV** – is unvaluable.

IUCN – conservation status the International Union for nature protection: **EN** – endangered; **NT** – morethreatening condition; **VU** –vulnerable; **LC** –least risk.

ERL - conservation status the European red list: **VU** (Vulnerable) susceptible species that may soon be classified as "endangered" if it continues the effect of the factors affecting their condition; the **EN** – (Endangered) endangered species, species under threat of extinction, the preservation of their unlikely, playback is not possible without the implementation of special measures.

BONN - Bonn Convention: Appendix I (1) includes species threatened with extinction; Appendix II (2) includes species whose status is unfavorable, maintain and regulate the use of which requires international agreements, as well as those species whose status could be improved substantially in result of international cooperation, which can be made on the basis of international agreements. The same species may be listed both in Appendix I and Appendix II.

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CITES - the Washington Convention on international trade in endangered species of wild fauna and flora threatened with extinction: Appendix I includes species "threatened with extinction, trade in which is causing or may cause to their existence adversely affected. Trade in specimens of such species should be particularly strictly regulated with the purpose, not to put further endanger their survival and must only be allowed in exceptional cases"; Annex II (2) includes: "a) all species that are currently not necessarily threatened with extinction but may be at such risk if I specimens of such species is strictly regulated to avoid such use, which is incompatible with their survival; and b) to be subject to regulation in order to the trade in specimens of certain species referred to in subparagraph (a) of this paragraph, can be established effective control".

10.3.6.4. Evaluation of Baseline Data

Migration

The results of the migratory studies establish that there are few migratory bird congregations within the Project area. Instead, the dominant part of the birds in transit includes wetland birds that rarely visit the wind farm site; their main flight paths pass above the waters of the Dniester estuary, and, therefore, their flight altitude corridor (200-250 m) will not be interfered by turbines. Migratory concentrations are primarily comprised of near-water birds, and within the Dniester Estuary, migrations take place only within the waters and coastal areas, both at a considerable distance from the Project given that the Project has been sited no less than 1.45 km from the Estuary coast.

Furthermore, the territory of the Project area is represented exclusively by anthropogenic biotopes (agricultural lands, forest belts). Consequently, the development of the Project is not expected to have a material impact on foraging accumulations or migratory foraging movements of birds. The ornithological experts note that a more significant factor and disruptive change for birds is agricultural activity, including annual crop rotations.

The negative influence on migratory movements has been assessed as low.

Collision risk of target species

A detailed discussion of the methodology used to assess collision risk is included in the report "Expert opinion and scientific report on the influence of the construction and operation of the Dniester wind-power station site on natural environments, vegetation, seasonal ornithological complexes and migratory birds, bats."

The mathematical model allows one to estimate the probability of birds collisions in the case of passage through space of the rotor and the number of collisions in the territory of the wind farm within a specified period of time of its operation. The main factors affecting bird mortality are the structural and operational characteristics of the propeller, as well as geometric, flight and behavioral parameters of birds. Numerical calculations were carried out on the basis of the results of the study in the proposed Project area. According to the data obtained, the total number of theoretical bird collisions during one year of operation the wind farm is 3 birds: 0.69 birds attributed to *Buteo buteo*, 0.38 to *Buteo lagopus*, 0.34 to *Circus aeruginosus*, and 0.72 to *Larus ridibundus* (Figure 60).

Figure 60 DWPP Birds at Collision Risk

Species	Season	The time of flight through the rotor (sec)	The probability of collision with the rotor	Quantity of collisions by season	Quantity of collisions for the year

Buteo buteo	Winter Spring Summer Autumn	0.128 0.144 0 0	0.116 0.135 0 0	0.25 0.44 0 0	0.69
Buteo la gopus	Winter Spring Summer Autumn	0.141 0 0 0	0.133 0 0 0	0.38 0 0 0	0.38
Circus aeruginosus	Winter Spring Summer Autumn	0 0.144 0 0	0 0.135 0 0	0 0.34 0 0	0.34
Larus ridibundus	Winter Spring Summer Autumn	0 0.144 0 0	0 0.126 0 0	0 0.72 0 0	0.72

Based on the field observations conducted from Fall 2017-Summer 2018, the vast majority of birds recorded flew at altitudes of up to 50m (dominant heights up to 25m). The birds that were assessed to be in the risk group (flying within the potentially dangerous altitude interval of 50 – 200m) are all stable populations. Taking into account both the field observations and calculation methodology, the collision risk of the Proposed project has been assessed as low, but in some cases may be average.

Breeding species

The ornithological experts concluded that there will not be a significant loss of breeding places for species within the Project area given the low density of nesting birds and small species composition. There will be ample alternative nesting sites for birds to choose given the low density of nesting birds. The ornithological studies also found that the majority of nesting birds within the wind farm are common and widespread in the area.

Noise associated with construction and operating activities may have a negligible negative influence on some nesting birds if the activity is near nesting sites. This is especially true for larks and birds of forest belts (Magpie – *Pica pica*, and Windhover – *Falco tinnunculus*). The effect of this factor is likely to be reduced given the low density of birds and ample alternative nesting locations within the Project area and nearby. Consequently, the influence was assessed as very low.

Protected territories and species of special interest

The possibility of loss of species protected, which is due to the construction of the wind farm was very low, and for near-water birds this threat does not exist. Rare birds (Red Book of Ukraine) are unlikely to be encountered in the territory and were only recorded in very small numbers during the ornithological studies. Additionally, other species of special interest based on the five other international environmental lists assessed are also unlikely to be encountered in the Project area and were only recorded in small numbers during the ornithological studies. The negative influence of this factor is assessed as low.

10.4. Human Geography

10.4.1. Socio-Economic Environment

10.4.1.1. Area of Influence

The primary area of influence is the focus of the impact assessment and it encompasses all project impacts on local resources and receptors. It includes the areas within the boundaries of the local communities surrounding the Project site including Starokozache, Semenivka, Udobne, and Moloha.

The secondary area of influence is a wider, regional level study area and includes larger scale economic and infrastructure impacts. This area comprises the Bilhorod-Dnistrovskiy District and Bilhorod-Dnistrovskiy Port.

The tertiary area of influence considers the wider, national and international scale impacts of the Project.

10.4.1.2. Local Context

The following communities are located within the Project area: Starokozache, Semenivka, Udobne and Moloha. All these villages are suffering an outflow of young people to other parts of Ukraine and abroad in search of jobs and improved quality of life. The special survey on Migration from Ukraine prepared by EBRD confirms a high labor migration rates in the Odesa region.

The entire local population within the Project area is classified as rural given that there is no town located within the Project area.

Agriculture is the mainstay of the local economy of the Project area. Cultivators and agricultural laborers constitute significant proportion among the various forms of occupation of the people in the Project area. The laborers are mostly engaged in the farmlands of large farmers owned by others.

The project area belongs to one of the economically least developed areas of Odesa Region. The key reasons for the lack of development include i) lack of well-developed road, old, post-soviet social communal, educational and health care infrastructure; ii) lack of an educated workforce,

notably a lack of qualified staff in public administration and public enterprises who can work on attracting investment; and iii) non-existence of new technologies caused by general lack of investments in research and local development.

According to the official Bilhorod-Dnistrovsky District Program of Economic and Social Development for 2017[4], energy issues are a major challenge for development and investment in the Bilhorod-Dnistrovsky district development given the districts insufficient power generating capabilities.

10.4.1.3. Local Community Profiles

Starokozache

Starokozache is the center of the Starokozache United Territorial Community which includes the following four villages: Zelenivka, Petrivka, Krutoyarivka and Kozatske. Starokozache is located on the banks of the Alcalá River, 6 km west of the Dniester Estuary and 32 km from the district center. The Odesa - Bilhorod-Dnistrovsky highway passes through the village.

Figure 61 Population of Starokozache Rural Consolidated Community by Village

	Starokozache	Zelenivka	Petrivka	Krutoyarivka	Total
Population	5,407	143	1,195	2,160	**8,905**

Udobne

Udobne is located on the border with Moldova in 5.5 km to the north-west of the Dniester Estuary near the Palanka international custom checkpoint. The village population is 1,947.

In July 2017, the deputies of the Udobne Village Council, after lengthy consultations, decided to join a United Territorial Community with its neighboring villages of Mayaki and Nadlimanskoye.

This settlement boasts large quantities of peach crops and is known as a "peach paradise". Most villagers are engaged in agriculture and private gardening; they grow fruits and vegetables, peach orchards, and vineyards.

Semenivka

The village of Semenivka serves as the Community Center for the villages of Vesele, Honcharivka and Pivdenne.

[4] http://b-dnistrov-rda.odessa.gov.ua/ekonomchnij-rozvitok-rajonu/

Semenivka is located on the right bank of the Dniester estuary, 20 km north-west from the district center. The village population is 645 people. The village has an eight-year school, a library and cultural house.

The Nizhnedneprovskyi National Nature Park was founded in 2008 and is located nearby. Thanks to the unique natural conditions and the preservation of natural landscapes, the territory of the park is characterized by an extremely rich diversity of flora and fauna.

Moloha

Moloha is a village in the Bilhorod-Dnistrovsky district of the Odesa region of Ukraine, located on the banks of the Dniester estuary. Moloha has served as the administrative center for its United Territorial Community since 2017. The Moloha United Territorial Community has an area 205.59 km² and boasts a total population of 15,792 people as of 2017 (8 villages are included within the territorial community). Figure 62 below shows the population of the United Territorial Community by village.

Figure 62 Population of Moloha United Territorial Community by Village

	Moloha	Bykoza	Nove	Sadove	Andriyivka	Suholuzhya	Rozkishne	Vypanse	Total
Population	2,046	432	17	963	1,630	1,127	367	9,210	**15,792**

Educational infrastructure within the community includes 7 preschools (serving the 543 preschool age children in the community), 3 secondary schools (first and 2nd degree), and 4 general education institutions (grades I-III). The 7 secondary and general education schools serve the 1,262 school age children in the community.

The social infrastructure of the community also includes 7 total health care facilities, all providing limited services.

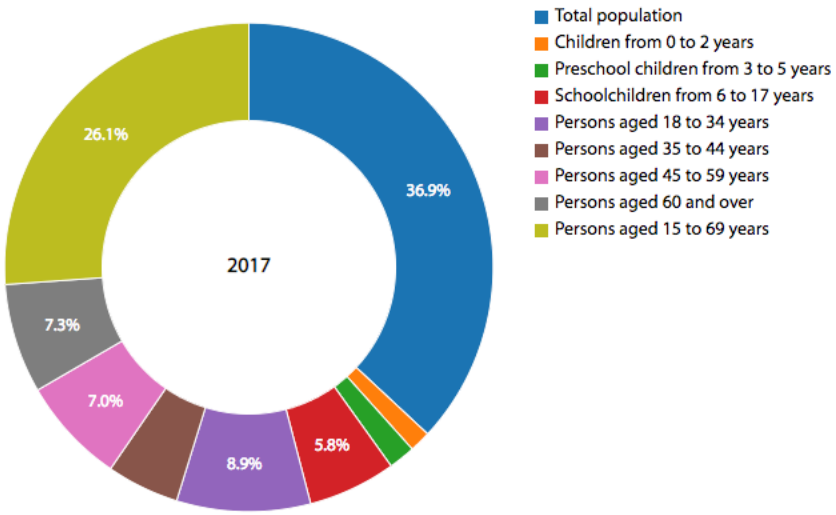
This south region is characterized by a diverse ethnic composition, among which there are Ukrainians, Russians, Moldavians, Gagauz and Bulgarians.

10.4.1.4. Demography

The Bilhorod-Dnistrovskiy district has a population of 60,384 as of 2017. Figure 44 below shows the age distribution of the population.

The majority of the population in the local communities is Ukrainian, Russian, and Moldovan.

Figure 63 Age Distribution of Bilhorod-Dnistrovskiy Population (Source: odesa.opendata.ua)



10.4.1.5. Religion

Within the Bilhorod-Dnistrovskiy district, the main religion is Orthodox Christianity. There are also Catholics, Protestants, and Muslims. This is evidenced by the large number of churches and mosques. Some prominent places of worship include: the Holy Ascension Cathedral, St. Nicholas Church, and other various Greek, Armenian, and Bulgarian churches.

10.4.1.6. Languages

The primary language spoken in the Bilhorod-Dnistrovskiy district is Ukrainian (80.77%), followed by Russian (12.96%). Other languages spoken in the region include Moldavian (5.01%), Hungarian (0.01%), Romanian (0.05%), Bulgarian (0.55%) among others.

10.4.1.7. Housing

Housing in the local communities primarily consists of one- and two-story houses built from compacted dirt or brick. Generally, there are small front lawns separating the houses from the streets. Many houses also have internal courtyards, animal shelters, storage space and garages for agricultural machines and cars. Houses also tend to have gardens (most people have flowers and some grow small plots of vegetables and/or fruits).

10.4.1.8. Infrastructure

The Project site is crossed by the Odessa-Izmail motorway (E 87) a road of local importance, which passes practically across the entire site.

Main access roads to the site and access roads to the turbine plots will be need to be developed to facilitate construction. The development of these roads will occur early on during the construction phase. Development of roads will primarily consist of 10 km of road from Bilhorod-Dnistrovskiy to the area of Monashi village, where route P70 intersects with route M15.

10.4.1.9. Education

The education system in Ukraine is organized into five levels: preschool, secondary, upper secondary and postgraduate education. According to World Bank EdStats data[5], the net enrollment in primary schools is 93% for females and 92% for males while net enrollment in secondary schools is 87% and 86% for females and males, respectively. The literacy rate in Ukraine is 100% and the country has one of the smallest average class sizes in the world with 1 teacher for every 9 students. Ukraine also has one of the highest rates of public spending on education in the world with nearly 6% of GDP spent on education in 2017 (however, between 2013 and 2017, budget financing decreased from 7.2 to 6.0% of GDP and declined by 35% in real terms due to the devaluation of the Hryvnia[6]).

Despite the high spend on education and satisfactory (and in many cases excellent) education metrics compared to other countries globally, there is significant inequality within the Ukrainian education systems. Many schools lack adequate facilities, equipment and textbooks. The inequality is even more pronounced in rural areas and areas of poverty. Indeed, some rural schools even lack indoor restrooms and other basic infrastructure. Aware of the issues across the education system, Ukraine passed the new "Law on Education" in September 2017 which seeks to ensure all Ukrainian's receive equal access to a quality education, a right guaranteed in the Ukrainian Constitution.

Many of the schools in the Bilhorod-Dnistrovskiy area are in poor shape and require significant repairs (windows, roofs, heating systems, school sport facilities, computer classes etc.). The educational system in the District is constrained by the lack of necessary budgets at the local level for repairs and a lack of teachers.

10.4.1.10. Employment and Unemployment

As of 2017, only 5,721 individuals within the district were officially employed (9.4% of the total district population) with another 2,022[7] self-employed (3.3%). Approximately 60% of the population is of working age.

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[5] World Bank EdStats: http://datatopics.worldbank.org/education/country/ukraine

[6] World Bank, "Why Ukraine's Education System Is Not Sustainable": https://www.worldbank.org/en/news/opinion/2018/09/12/why-ukraines-education-system-is-not-sustainable

[7] As of 2016, from odesa.opendata.ua. Link: http://odesa.opendata.ua/en/bilgorod-dnistrovskij-rajon/pokazniki-zajnyatosti-ta-rinku-pratsi

Among the unemployed population (registered at the employment center in Bilhorod-Dnistrovskiy), approximately 68.5% were women (1382) and 29.4% (593) were young people under 35 years old.

10.4.1.11. Health

In Ukraine, the majority of health care (approximately 85%) is state-owned and free of charge, with private practice comprising nearly 15% of the market. It is estimated that no more than 20% of the population of Ukraine can afford treatment in private medical institutions. However, according to the World Health Organization's global data base, up to 3.6% of Ukraine's GDP is spent by the patients themselves for treatment – more than the state.

Generally, the quality of health services provided by public institutions is low. International protocols and standards are not uniformly adhered to and it is estimated that up to 50% of medicines in the pharmaceutical network of Ukraine are pirated.

The average life expectancy in Ukraine is 71.3 years, which is ten years below the average life expectancy for Western Europe. The infant mortality rate in Ukraine is twice as high as the average in Western Europe. According to the World Health Organization (WHO), Ukraine has the second highest mortality rate from cardiovascular diseases in the world and the second highest mortality from cancer and tuberculosis in Europe.

The health care system in the DWPP area experiences the same problems characteristic across Ukraine. Given the rural nature of the Project area, the health care system generally is constrained by a lack of resources.

10.4.1.12. Gender

Women comprise approximately 52% of the population in the Bilhorod-Dnistrovskiy region according to data from the Odessa Regional State Adminsitration. According to the Bilhorod-Dnistrovskiy city employment center, 58% of unemployed people consist of women and youth under the age of 35.

10.4.2. Land Use and Property

The Project site under the scope of this assessment is approximately 11.875 ha (with an additional 5.64 ha used temporarily during construction). The Detailed Regulation Plan specifies that all of the affected land is agricultural land. The land is predominantly arable land, used for growing peaches, wheat, barley, sunflower and rape plant.

The project requires acquisition of land for the following components:

- Up to twenty-six (26) wind turbine generators (WTGs)
- Hardstanding areas

- Internal access roads, passing places on site roads for large scale vehicles and temporary platforms for vehicle parking and maneuvering
- Underground cables for onsite electrical infrastructure
- Control building and substation
- Construction compound

All of the land is expected to be acquired by the end of Q4 2018. All land is still available to users of land, who will continue to use it until construction begins, planned for Q4 2018. The layout of WTGs on private and government owned land is presented in Figure 3 (see Section 6.2.2).

10.4.3. Archaeology and Cultural Heritage

The Bilhorod-Distrovskiy area is rich in culture and historical significance. Bilhorod-Dnistrovskiy was founded in the 4th century B.C and was called Akkerman until 1944. The Bilhorod-Dnistrovskiy fortress (also known as the Akkerman fortress) is one of the most significant historical and cultural monuments in the region and of the 13th and 14th centuries. Furthermore, the fortress is one of the best-preserved fortresses in all of Ukraine. Other significant historical and cultural monuments in the region include the Alexander barracks, the Scythian grave, the Church of the Assumption of the Blessed Virgin Mary and the Church of St. Johann Suceava (see images below).

Highly sensitive to the importance of the cultural heritage of the region the Sponsor's reviewed all available maps and archaeological information when siting the Project, avoiding all known security zones of archaeological objects. One turbine is located just within the boundary of the largest perimeter of an archaeological security zones; no disturbance is expected to occur, but to mitigate the risk UPR will appoint an archaeological monitor who will be present during excavation.

Figure 64 Akkerman Fortress

Figure 65 Scythian Grave

Figure 66 Alexander Barracks

Figure 67 Church of the Assumption of the Blessed Virgin Mary

Figure 68 Church of Ioann Suceava

10.4.4. Transport

10.4.4.1. Project Requirements

Generally, the transport infrastructure required for the project must be capable carrying slow, over-sized vehicles to the site as well as capable of absorbing a large number of aggregate and other material carrying vehicles. In order to determine the feasibility of transporting the main turbine components to the site, GE Energy have undertaken a survey of the available facilities. The GE Transportation Study is used as key source of information for this section and the transport impact assessment sections in this Statement.

10.4.4.2. The Port of Bilhorod-Dnistrovskiy

Turbine components are expected to be transported via the port of Bilhorod-Dnistrovskiy. The port is situated on the western coast of the Dnistrovsky Estuary and is open for navigation all year round. All large items such as cranes and the concrete batch plant as well as construction materials (e.g. cement aggregates) will also be delivered via the port and transported to the site via the route described herein.

10.4.4.3. Road Network and Transportation

The main E-70 road provides an excellent connection route to the village of Bykoza. From the village of Bykoza, the public road connecting to the E72 route in the Moloha/Nove area will be improved and repaired. This improved public route will provide access to Route E72. This route will be used as the main transport connection to the site. The transportation route is shown in blue in Figure 11.

10.4.5. Noise

10.4.5.1. Introduction

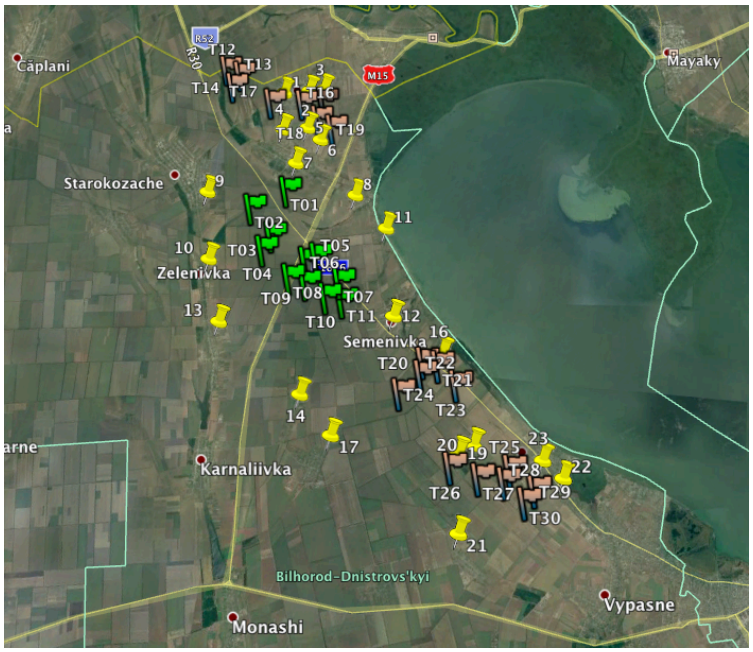
The Project is not located in close proximity to any residences or settlements so no noise impact is expected. However, the closest residence locations in the immediate vicinity of the proposed wind farm are considered potential noise sensitive receptors; the potential impacts need to be assessed at these locations. This section describes the noise sensitive locations and reports a baseline noise survey which establishes the existing noise levels.

10.4.5.2. Noise Sensitive Receptors

The nearest noise sensitive receptors to the wind farm are shown in Figure 48. Figure 49 shows the noise sensitive receptor in relation to the proposed turbine locations. All turbines are located no less than 800 m from noise receptors, and in many cases, at a much greater distance.

Figure 69 DWPP Noise Sensitive Receptor Locations

Figure 70 DWPP Noise Sensitive Locations in relation to Project



10.4.5.3. Baseline Noise Conditions

Additional field studies are currently underway to verify baseline noise conditions. The results will be published as an appendix to this ESIA once available.

10.4.6. Habitats Data

10.4.6.1. Habitats within Project area

According to national Botanical-geographic zoning, the Project is located within the Azov-Black Sea steppe province, the Black Sea steppe province, the European-Asian steppe region (Lavrenko, 1970; Geobotanical zoning of Ukrainian SSR, 1977). The Project area includes only one habitat type, "changed," according to IFC performance Standard 6 "Biodiversity Conservation and sustainable management of living natural resources" (2012).

100% of the Project area is modified habitats comprised of two components: 1) agricultural fields (agricultural lands) and orchards with ruderal vegetation; 2) artificial trees and wood-shrubs (also referred to as "shelterbelts").

Figure 71 Habitat types within the Project area

No.	Type of habitat	Main components	% Total Project Area
1	Changed	Agricultural fields, gardens with ruderal vegetation, trees and shrubs (shelterbelts)	100
2	Natural	Missing	0
3	Critical	Missing	0
4	Areas that are protected by the legislation and the internationally recognized territory	Missing	0

Most of the shelterbelts are composed of mixed species and are in good to satisfactory condition. The average age of trees is 40-60 years. Placement of shelterbelts is shown in Figures 72 and 73 below.

Figure 72 Shelterbelts in the Northern Part of the Project Area

Figure 73 Shelterbelts in the Southern Part of the Project Area

Shelterbelt vegetation plays an important role in the region, protecting agricultural land from wind erosion, helping to retain moisture during the winter, and organizing the agricultural landscape (anthropogenic). While the Project is expected to have a minimal impact on this important vegetation, it is desirable to provide restoration and/or compensatory measures as appropriate in cases where destruction of shelterbelt habitat occurs.

Protected Species in the Project area

There are no protected habitats of ruderal vegetation or shelterbelt (also referred to as "wood-shrub") vegetation in the immediate Project area. There is a very small area of critical steppe habitat located on the slope along the Dniestr Estuary. This critical habitat is located at a distance of more than 2 km from the nearest wind turbines (see Section 10.3.4.3 for discussion of protected species, including flora) and is in poor condition because of grazing by cattle and sheep. Given the already significant pasture load on these steppe habitats, the experts at the Melitopol State Pedagogical University concluded that impact on these habitats would be negligible.

10.4.6.2. Habitats within the DMU (10 km zone) and the Project area

Nearly 60% of the 10 km zone around the Project area is classified as "changed" habitat, in accordance with IFC PS 6, and is comprised of agricultural fields (agricultural lands) with ruderal vegetation, and artificial trees and shrubs (shelterbelts). Natural and critical habitats are confined to the estuary of the Dniester river and a narrow strip of the right Bank of the Dniester estuary.

Natural Habitats

Natural habitats within the 10 km zone around the Project area are confined to a narrow strip on the right bank of the Dniestr Estuary. These natural habitats are represented primarily by wetland vegetation and woody vegetation with a cluster of white willow and white poplar.

Wetland and aquatic vegetation

The main species of marsh plants in the 10 km zone are the common reed (*Phragmites australis*) and Cattail narrow-leaved (*typha angustifolia*). Plant habitats comprised of common reed (*Phragmites australis)* occupy large areas and form impenetrable thickets. These thickets will obstruct general Project visual views by 80-100% when viewed from a height of 3-4 m.

For the most part, aquatic vegetation is absent in the waters of the Dniester estuary. Aquatic vegetation includes unrooted free floating, rooted submerged, rooted with floating leaves, and air-water plants. The region is characterized by a high-level of florocoenotype diversity; within this group there are a considerable number of rare species and plant groups that have protected status.

The most common aquatic vegetation in the area belongs to the *Ceratophylletum demersi* community. The second most common community is *Nymphaea alba*. Plants of this community are found along reed thickets, but also in the form of "islands" of various sizes on open stretches.

The shallow inland waters of the Dnistr Estuary are often stagnant (no flow, lack of oxygen in water during summer). In these stagnant waters, groups of *Hydrocharitetum morsus-ranae* and *Stratiotes aloides* are common.

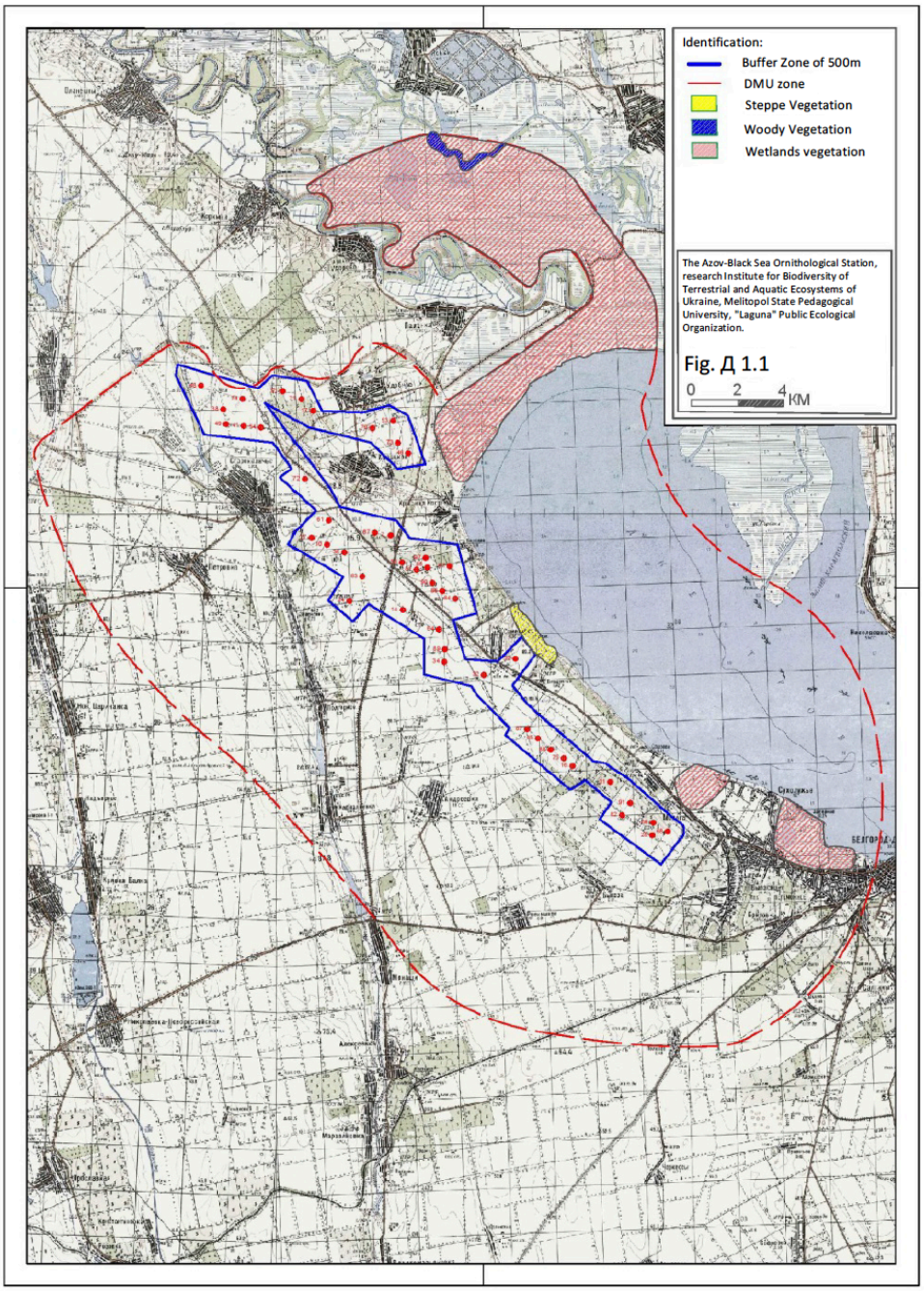
Woody vegetation

Natural woody vegetation is located on the banks of tributaries of the Dniester. This habitat is dominated by groups of *Saliceto-Populetum*. In addition to the dominant habitats of white poplar (*Populus alba*) and white willow (*Salix alba*) found in the Riparian zone of the Dniestr, high thickets of Ash (*Fraxinus excelsior*) and Smooth elm (*Ulmus laevis*) are common. Black mulberry (*Morus nigra*) and Common pear (*Pyrus communis*) are also found.

The underbrush of the Riparian area is composed of Amorphous shrub (*Amorpha fruticosa*), Young ash and Maple seedlings. The bottom layer of the underbrush is composed of blackberries (*Rubus caesius*). There are also forest grapes (*Vitis sylvestris*) and common hops (*Humulus lupulus*).

In areas of coastal sandy deposits, there are groups of *Salicetum triandrae*, dominated by the *Salix triandra* up to 10 m. Riparian forests are one of the few natural habitats that have survived to the present day. This Riparian forest habitat occupies a relatively small area but boasts a high diversity: forests, open grasslands habitats with a different mode of wetting, shrub thickets, small closed depression filled with water, etc.

Figure 24 Habitats within the DMU (10 km zone) and Project Area



Protected Species in the Project area

Steppe species

There is a very small area of critical steppe habitat (shown in yellow in Figure 74) located on the slope along the Dnistr Estuary. This critical habitat is located at a distance of more than 2 km from the nearest wind turbines and is in poor condition because of grazing by cattle and sheep. Given the already significant pasture load on these steppe habitats, the experts at the Melitopol State Pedagogical University concluded that impact on these habitats would be negligible.

Other protected steppe species and species of special interest within the DMU are shown in the tables below. Species according to Annex I of the Directive on natural habitats 92/43/EEC are included in Figure 75 and species according to international environmental lists are shown in Figure 76.

Figure 75 Protected Steppe Species within the DMU (10 km zone) according to Annex I of the Directive on Natural Habitats 92/43/EEC

Type of habitat	Protected habitat specified in Annex I of the Directive on natural habitats 92/43/EEC	Code acc. To Natura 2000 network	Assessment of Habitat		
			Tribute (FV)	Unsatisfactory (U1)	Bad (U2)
Critical (iv)	Ponto-Sarmatian steppes	62C0 *	-	-	+
Natural	Estuaries	1130	+	-	-
Natural	Accumulation of Salix alba and Populus alba	92A0	+	-	-

Figure 76 Steppe Species Found on International Environmental Lists within the DMU (10 km zone)

Taxon name	Species of plants from Annex II of the Directive on natural habitats 9243EEC	RBU / Protected species status	ERL	RL IUCN	BERN	CPF
Bulbocodium versicolor (Ker-Gawl.) Spreng.	-	Vulnerable	-	-	-	+
Stipa capillata L.	-	Unclassified/(UN)	-	-	-	-
Stipa lessingiana Trin. et Rupr.	-	Unclassified/(UN)	-	-	-	-
Amygdalus nana L.	-	-	-	-	-	+
Potentilla astracanica Jacq.	-	-	-	-	-	+
Asparagus verticillatus L.	-	-	-	-	-	+

***Legend**: RBU – the Red book of Ukraine (2009); ERL – European red list; IUCN – Red list of the International Union for conservation of nature; Bern – Bern Convention; CPF – a list of plant species that are not listed in the Red book of Ukraine, but are rare or under threat of extinction on the territory of Odessa oblast*

In addition to the critical steppe habitats, three plants from the Green Data Book of Ukraine (2009) are located within the DMU (Figure

Figure 77 Steppe Plants from the Green Data Book of Ukraine (2009) within the DMU

Formation	Category and groups status	Association
Formation of the feather grass of Lessing (*Stipeta lessengianae*)	3/typical	1. (*Stipetum* (*lessingianae*) *festucosum* (*valesiacae*)); 2. (Stipetum (lessingianae) agropyrosum (pectinatae))
Formation of the fibrous Mat grass (*Stipeta capillatae*)	4/typical	1. (*Stipetum* (*capillatae*) *festucosum* (*valesiacae*))

Wetland and Aquatic Vegetation

In the wetland habitat within the DMU three species of vascular plants from international environmental lists were encountered (Figure 78). 5 species of wetland plants from the Green Data Book of Ukraine were also encountered (Figure 79).

Figure 78 Species Encountered from Environmental Lists in Saline Grassland Habitats within the DMU

Taxon name	Species of plants from Annex II of the Directive on natural habitats 92/43/EEC	RBU / Protected species status	ERL	RL IUCN	BERN	CPF
Salvinia natans - L.) All.	-	Unclassified/(UN)	-	+	+	+
Trapa natans L.	-	Unclassified/(UN)	-	-	+	+
Nymphoides peltata (S. G. Gmel.) O. Kuntze	-	Vulnerable	-	-	-	+

***Legend**: RBU – the Red book of Ukraine (2009); ERL – European red list; IUCN – Red list of the International Union for conservation of nature; Bern – Bern Convention; CPF – a list of plant species that are not listed in the Red book of Ukraine, but are rare or under threat of extinction on the territory of Odessa oblast*

Figure 79 Wetland plants encountered from Green Data Book of Ukraine (2009) in DMU

Formation	Category and Group Status	Association
Formation of water chestnut floating (*Trapeta natanis*)	3/ typical	1. (*Trapetum natanti purum*); 2. (*Trapetum (natantis) ceratophyllosum (demersi)*
Formation of jugs yellow (*Nuphareta luteae*)	3/ typical	1. (*Nupharetum (luteae) salviniosum (natantis*).
Formation of Salvinia floating (*Salvinieta natantis*)	3/ typical	1. (*Salvinietum (natantis) ceratophyllosum (demersi*); 2. (*Salvinietum natantis purum*); 3. (*Salvinietum (natantis) lemnosum (trisulcae)*.
Formation of floating heart (*Nymphoideta peltatae*)	Rare	1. (*Nymphoidetum (peltatae) ceratophyllosum (demersi)*; 2. (*Nymphoidetum (peltatae) hydrocharitosum (morsus-ranae*).
Formation of white lilies *(Nymphaeeta albae*)	Rare	1. (*Nymphaeetum (albae)salviniosum (natantis)* .

Woody vegetation

The only woody vegetation habitat that was encountered from an international environmental list was the accumulation of Salix alba and Populus alba which are protected habitats according to Annex I of the Directive on natural habitats 92/43/EEC (Figure 80).

Figure 80 Protected Species and Communities of Woody Vegetation Encountered from Environmental Lists in DMU

Protected habitat species in Annex I of the Directive on natural habitats 92/43/EEC	Species of plants from Annex II of the Directive on natural habitats 92/43/EEC	RBU	ERL	RL IUCN	BERN	CPF
Accumulation of *Salix alba* and *Populus alba (92A0)*	missing	missing	missing	missing	missing	missing

11. Assessment of Impact

11.1. Introduction

The following sections detail the environmental and social impact assessment of the proposed Dnistrovskiy wind farm.

The approach to the environmental and social assessment has been informed by:

- The requirements of the international investment banks, namely the requirements of the European Bank for Reconstruction and Development (EBRD) and International Finance Corporation (IFC);
- Ukrainian regulatory requirements, in particular the Law on Environmental Impact Assessment (Off. Journal of RS, No. 135/2004, 36/2010) as well as issue specific regulatory requirements such as those associated with noise emissions;
- The requirements of European Commissions, namely EC Directive 97/11;
- Guidance applicable to the project, including Guidelines on the Environmental Impact
- The nature of the project design;
- The environmental and socio-economic background of the proposed project area;
- The expertise of the ESIA team in undertaking similar projects.
- The scope of assessment as set forth in the ESIA Scoping Study, submitted to the EBRD, and the National EIA submitted to the Ukrainian regulatory authorities.

The applicable environmental and socio-economic requirements are discussed in more detail in Section 4.

11.2. Construction

The following sections provide an assessment of the potential impacts of the project activities during the construction phase. A summary of the impacts, management and mitigation measures is presented in Section 13.

11.2.1. Ecology and Nature Conservation

11.2.1.1. Approach

The impact assessment below has been conducted without considering any mitigation measures (other than the 1.45 m buffer between the coast of the Dnister Estuary and 1.7 m buffer between the Estuary). The assessment of the ecological receptors is based on the studies conducted by the experts at the Melitopol State Pedagogical University.

11.2.1.2. Designated Sites

Dnistr Delta Important Bird Area / Ramser Convention Site

Aware of the significance of the Dnistr Delta IBA and Ramser Convention Site, the Sponsor's revised the layout of the initially proposed project so that the turbines are located no closer than 1.3 km to the Estuary, as recommended by the ornithological experts at the Melitopol State Pedagogical University. In order to ensure best practice, the proposed turbines placements are even more conservative than the expert recommendations and are located no closer than 1.45 km to the coast (floodable lands) of the Estuary and no closer than 1.7 km to the Estuary.

The distance from the proposed wind turbine locations to the Dnistr Delta Important Bird Area and Ramser Convention Site means that there will be no loss or disturbance to protected habitats during the construction.

11.2.1.3. Habitats

The Project area is comprised entirely of modified and "changed" habitat due to the intense anthropogenic-influence and agricultural use.

Agricultural Land

A total of approximately 11.875 ha agricultural land will be lost for the lifetime of the Project due to the footprint of the wind turbines, access roads and other infrastructure. There will be direct loss of this habitat, although this habitat has been assessed as being of negligible conservation importance. This impact is not significant.

Natural habitats

There are no natural habitats within the Project area. All natural habitats, and the habitats of the most ecological significance, are located outside of the buffer zone of 1.45 km to the Dnistr Estuary coast (1.7 km buffer to the Estuary). The habitat of highest ecological value near the Project area is a very small critical steppe habitat, is located more than 2 km from the Project and will not be affected by construction. Moreover, it should be noted that these steppe habitats are in poor condition because of grazing by cattle and sheep. Given the buffer between the Project an natural habitats there will be no impact from construction.

11.2.1.4. Ground Mammals and Reptiles

The Ukrainian EIA process concluded that the Project site was chosen successfully given that the location and operation of wind turbines will not significantly affect the ground mammals or reptiles in the region. There are no endangered reptiles located within the Project area. The only endangered ground mammal likely to be encountered in the Project area based on desktop studies

is the Steppe bush mouse, however this species was not encountered or recorded during the detailed studies conducted by experts from the Melitopol State Pedagogical University. Consequently, there is expected to be no impact from construction.

11.2.1.5. Bats

The construction of the Proposed project is not expected to have any major impact on bats and has been assessed as low. There is no anticipated impact on bat migration given that there are no fixed flight paths in the Project area. Furthermore, the construction activities are not expected to have any impact on roosting or foraging bats given that only a small number of bats are located in the Project area at they are well dispersed with no major areas of accumulation. Additionally, the Project is located > 1.45 km from the coastal strip of the Dnistr Estuary; this is significantly more conservative than the 700 meter buffer from the Dnistr Estuary which was recommended as the safe distance for to mitigate any impact on bats feeding in the coastal strip.

11.2.1.6. Birds

The construction of the Proposed project is not expected to have any major impacts on birds and has been assessed as low. There is no anticipated impact on bird migration. Furthermore, there will not be any significant loss of breeding area for the species that remain at the end of the migration to nest within and around the Dnistr Estuary and Project territory. There is a low density of nesting birds and minor species composition within the Project area. Consequently, any loss of breeding habitat will be patchy, leaving most of the Project area free for nesting.

11.2.2. Landscape and Visual

11.2.2.1. Methodology

The methodology of the landscape and visual assessment has been developed to ensure that it considers relevant sensitive receptors and the likelihood of significant landscape and visual impacts, including cumulative effects. The assessment has also been conducted in accordance with the Scottish Natural Heritage's "Visual Representation of Wind Farms" guidance (2017).

A number of photographic panoramas and accompanying photomontages are being prepared in support of the following assessment and will be published as an Appendix to this ESIA no later than December 2018.

11.2.2.2. Scope

The following section is based:

- A site visit conducted by UPR;

- Searches conducted by UPR on the site baseline, its surrounding and the potential impacts of the proposed Project; and
- Detailed assessment of the significant landscape and visual impacts arising as a result of the construction, operation and decommissioning of the proposed Project.

11.2.2.3. Spatial Scope

During the initial stages of the assessment the spatial scope was defined at a distance of 40km radius from the turbine location. A radius up to 30 km for Zone of Theoretical Visibility ("ZTV") calculations is deemed to be suitable for turbines of between 131m and 150m in height according to the Scottish Natural Heritage's "Visual Representation of Wind Farms" Guidance (2017). Based on this distance a computer generated ZTV was calculated for the scheme using GIS software. This provided an indication of the potential visibility of the hub height (131m) and blade tip height (199.5m) and enabled the spatial scope of the assessment to be refined.

The theoretical spatial scope calculated during the desk study was tested and refined during the site visit to identify which areas and receptors would be potentially subject to effects. The site visit is important given that the ZTV calculations do not take into account landscape features like buildings or vegetation; these elements have the potential to substantially reduce the degree of exposure to views of the wind farm.

11.2.2.4. Perception of Wind Turbines

Figure 81 Wind Turbine Perception Distances

Distance from viewer to turbine	Perception
Up to 2kms	Likely to be a prominent feature
2-5km	Relatively prominent
5-15km	Only prominent in clear visibility – seen as part of the wider landscape
15-30km	Only seen in very clear visibility – a minor element in the landscape

11.2.2.5. Landscape Effects during Construction (short term)

During the construction phase, it is anticipated that construction activities will result in adverse changes to localized area of land cover given that pockets of tree and shrub vegetation will be judiciously cleared to form new site access points and internal access roads connection the turbines. Vegetation will also be cleared for the installation of the concrete batch facility and the excavation for the underground cabling works and turbine foundations. Consequently, the site will experience minor adverse effects during this period.

11.2.2.6. Landscape Effects on Landscape Character

The proposed development will result in considerable change in the landscape character of the site during construction due to the increased urbanization of the landscape associated with construction activities (i.e. movement of cranes). While the existing landscape is rural, it is nearly 100% anthropogenic, not natural. Therefore, the project will become a supplemental features of the landscape character and the residual impact is assessed as low adverse.

11.2.2.7. Landscape Effects on Land Use

It is anticipated that construction activity may lead to a slight increase in vehicular traffic, particularly on internal access roads and adjacent roads and lanes. An increase in traffic would result in adverse change in the land use of the site given the agricultural nature of the landscape. However, these effects will be isolated and contained. By implementing proper management plans the majority of the impacts may be avoided. As such, the effects on the landscape use are assessed as minor adverse.

11.2.2.8. Landscape Effects on Designated Sites

The eastern border of the proposed development is adjacent to the Dnistr Estuary and Dnistr Delta IBA; however the proposed development is contained at a distance of a minimum of 1.45 km from the designated landscape. Even though the project will not result in direct physical effects on this area, the impacts of the Project on this setting is still considered.

Given vegetation cover, it is not expected that the designated sites will be directly affected by the presence of construction activity. Therefore, impacts are assessed as low.

11.2.3. Traffic and Transport

11.2.3.1. Introduction

The greatest potential for traffic and transport impact is likely to occur during the construction phase. The construction phase will involve a large number of transport movements involving slow, long and potential wide-load vehicles carrying the turbine components. The transport route covered by this assessment, as described in Section 10.4.4 will start at the port of Bilhorod-Dnistrovsky and travel along the main E-70 road and the improved public road connecting to the E72 route in the Moloha/Nove area.

Further, a large number of vehicle numbers will be required to deliver aggregates to the site for the creation of temporary and permanent gravel roads and to create appropriate foundations for the wind turbines. The creation of appropriate foundations will also require transport to the site of metal reinforcements. The wind turbine components and the aggregate and reinforcement transfers represent the bulk of the transport requirements for the site during construction. At

present it is not known the extent of the foundations for the wind turbines and therefore the volume of fill materials and transport movements for the fill materials. Similarly, it is not known at present to what extent ground excavation will need to be undertaken for the foundations and the extent of transport off side of excavated materials. There will also be other incidental transport requirements which may lead to short term impacts such as the transport of large cranes to and from the site for construction, and the transport of modular structures such as cabins and sanitary requirements to support on site staff office/domestic requirements. Note that there will be no on-site accommodation blocks.

Therefore, associated with the transport route, there are potential impacts that require management and mitigation associated with the harbor, the main and local road networks and within the project area itself.

11.2.3.2. Harbor Impacts

We do not expect that the presence of mobile cranes will disrupt normal operations and the presence of laydown/storage areas will ensure that there is minimal disruption to the normal activities of the harbor. At present, it is unlikely that the harbor will require dredging to reach the necessary water depth for the delivery vessels/barges, but it remains a possibility. If dredging becomes necessary, the harbor impacts will be carefully reassessed. With appropriate management of the harbor activities, we do not predict that there will be a significant negative impact on the harbor operations, therefore we have classified the residual impact as negligible.

11.2.3.3. Impacts on the Main Road Network

The impacts on the main road network are likely to minimal. For the most part, the trucks will travel slowly and at night. Build up and congestion on the main road network is therefore unlikely. With appropriate implementation of management systems, the residual impact will remain low but could rise to moderate in some instances if management plans are not followed.

11.2.3.4. Impacts on Local Roads

The impacts on local roads is expected to be minimal to low beneficial. The local road going from Bykoza to Moloha will be upgraded and improved providing villagers with easier travel conditions. Transport will take place outside peak hours whenever viable, and for the most part, will occur at night. With appropriate implementation of management systems, the residual impact will remain low but could rise to moderate in some instances if management plans are not followed.

11.2.3.5. Impacts within the Project Area

Impacts within the project area will mainly be associated with prevention of access to agricultural plots. The project site is comprised of small agricultural plots intersected by dirt roads. During the construction stage in particular, there may be a moderate impact if access to plots is made difficult by construction vehicles and machinery. It is unlikely that disruption can be entirely prevented, however the development of appropriate passing places and effective management to void blocking of internal access roads will reduce the potential impact. The residual impact is likely to be low overall but may rise to moderate in some instances. UPR will maintain an ongoing and transparent dialogue with the local communities to ensure that information about construction plans and timing are known and to ensure understanding and sensitivity of the locals' requirements. In cases where construction causes disruption, compensation should be undertaken as appropriate.

11.2.3.6. Conclusions

We do not expect any negative impacts on the harbor operations; should dredging become necessary, impacts will be reassessed as appropriate. It is not anticipated that the traffic generated by the construction phase will have a significant impact on main or local roads given that peak traffic hours will be avoided and trucks will travel, for the most part, slowly during night. Overall, the level of disruption is not expected to be significant as long as it is appropriately managed; consequently, the expected residual impact is assessed as low, potentially rising to moderate if appropriate management plans are not implemented or followed.

11.2.4. Noise

11.2.4.1. Construction Activities

A frequently cited international benchmark for construction noise levels is the British Standard BS5228 (British Standard, 2009). This guidance indicates for long-term and large-scale construction projects, noise from daytime construction is not significant if it is below 55 dBA Leq. For smaller projects, construction noise is assessed as not significant if below 65 dBA Leq.

The existing baseline daytime ambient noise levels are above 45 dBA near the Project area; consequently, the construction activities at 55 dBA Leq are unlikely to be audible at the nearest noise sensitive locations.

11.2.4.2. Construction Traffic

The foundations that will support each of the turbines will be constructed in steel reinforced concrete. Each of the foundations is calculated to require about 700m3 of concrete. This is a significant quantity of concrete and it would be impractical to transport ready mixed concrete from Bilhorod-Dnistrovskiy or beyond to the Project site (due to the transportation time and the number of vehicles that would be required). The concrete will therefore be prepared on site using

a concrete batching plant. This prefabricated plant will be provided and operated by the civil contractor who will be executing the foundation construction. Such civil contractor will be chosen in December 2018.

The concrete batch plant will be the focal point for the delivery of aggregates and cement as well as the movement of mixer trucks from the batch plant to the turbine bases. The prepared concrete will be transported to turbine foundations using rotating mixer trucks. Each of these trucks has an approximate capacity of 8 to 9 m3. This means that it will take about approximately one hundred loads to complete each foundation. The trucks will use the internal roads to reach the turbine foundations.

Properties within a few meters of a road with increased traffic flows may also be affected by an increase in ground borne vibration, particularly from heavy vehicles when there are irregularities in the road surface.

11.2.5. Socio-Economic Impacts

The following section describes the socio-economic impacts associated with the project construction activities, which have been grouped under the following headings:

- Impacts to land use
- Employment and procurement opportunities
- Impacts on livelihoods
- Impacts on community health, safety and security
- Impacts on infrastructure

The significance of socio-economic impacts was determined based on a consideration of their direction (positive, negative, mixed or neutral), magnitude (negligible, low, moderate, high), geographic extent (individual, local, regional, national, trans-boundary) and duration (short-term, medium-term, long-term).

11.2.5.1. Impacts to Land Use

Agriculture is the dominant land use in the Bilhorod-Dnistrovskiy District and the immediate Project area is characterized by rain-fed arable land, grape plantations, and intermittent field-protective forest belts. The total area of agricultural land in the District is 132,740 ha including: 118,474 ha arable land; 4,373 ha hayfields; and 313 ha pastures. The total amount of land which will be occupied during construction is approx. 11.875 ha, most of which is agricultural land.

Construction is expected to last 18-24 months, however, an average plot of land needed for the construction of the WTGs or OHL towers will only be unavailable for farming for a period of 2 to 3 months. This means that either one season's crops or no crops will be affected (depending on the season in which construction is carried out on a particular plot).

The total land which will be unavailable for a short period during construction is only a small portion of agricultural land in the area. This impact is assessed as low adverse.

11.2.5.2. Employment and Procurement Opportunities

Direct employment

The workforce needed during the construction phase of the Project will be sourced locally and internationally, through third party construction firms.

Approximately 10-20 construction workers will be required during construction.

Indirect employment

The creation of indirect employment opportunities is associated with:

- the project's supply chain (goods and services)
- spending of project employees in local communities

Turbine components will be imported and delivered to the site via the port of Bilhorod-Dnistrovskiy. It is highly likely that materials needed for civil works (i.e. cement, clay), as well as the materials needed for infrastructure improvements (i.e. for the upgrading of internal access roads) will be procured locally. These materials will be procured by the selected construction company.

Employment related expectations among the local population

The development and implementation of projects in underdeveloped areas can sometimes lead to increased expectations among the local population in relation to employment opportunities. During the ESIA scoping phase it was concluded that there is some increased expectation in the local communities that the Project will result in widespread employment opportunities.

This impact has been assessed as low adverse.

11.2.5.3. Impacts on Livelihoods

In relation to UPRs land acquisition, involuntary resettlement (possibly leading to economic displacement) may occur during construction for the following categories of people:

- People who are using the land plots which have been or will be acquired for the project, but are not owners of the land, and whose crops might be affected by construction.

- People who are using the land plots which will be crossed during the transport and installation of WTGs or other land

UPR will compensate all lost crops and damages in accordance with Ukrainian Law. In addition, the implementation of the Traffic Management Plan and reinstatement of all affected land should assist in managing impacts on livelihoods. This impact is assessed as low to moderate adverse, as it is challenging to predict the number of people who will be affected at the time of publication.

11.2.5.4. Impacts on Community Health, Safety and Security

Impacts and mitigation measures associated with community health, safety and security, as well as occupational health and safety are addressed throughout other sections of the document, while this section focuses on impacts associated with the influx of labor and the increase in traffic and heavy vehicles.

The introduction of temporary construction employment opportunities is sometimes associated with an increase in vulnerability and susceptibility of local communities to various social pathologies, such as increased crime, alcoholism, etc. The project is relatively small and an estimated 80 individuals will be employed from local communities as unskilled labor or as drivers, security personnel, etc. The presence of workers will inevitably cause some disturbances in the Project area, however these are expected to be minor and as a result, the impact on local communities in relation to social pathologies is assessed as low adverse. Occasional incidents could however lead to tensions between local communities and UPR.

Transport and increased traffic can lead to more possibilities for accidents for the local population as well as to a reduced quality of life.

11.2.5.5. Impacts on Infrastructure

The construction of the Project will require the use of roads and internal access roads through agricultural fields. Section 10.4.4 explains the road requirements for the transport of construction materials and equipment. Two impacts on roads are foreseen and are described below.

The upgrading and widening of internal access roads prior to construction will benefit local farmers as it will lead to improved access to agricultural plots. The impact has been assessed as low beneficial. On the other hand, damages to road surfaces during transport of heavy machinery, leading to damages to motor vehicles, road accidents and the increase in costs for local government, are also possible. UPR is planning to make necessary preparations of roads for heavy transport before construction and therefore this impact has been assessed as low adverse. However, if roads used during construction are not restored, this could lead to tensions between UPR and the local communities.

The Project is unlikely to place any additional demands on local infrastructure during construction, as utility infrastructure connections are not available on the Project site. Water will

be provided from tanks or possibly a groundwater well, electricity will be provided through a generator and sanitary containers will be installed on the site.

11.2.6. Health, Safety and Public Nuisance

The construction of a wind farm and associated power lines, like all large industrial and infrastructure construction projects, carries with it several key health and safety risks to the workers employed on the project as well as members of the public who access the site. Key issues for consideration associated with the proposed project are as follows:

- working at height and in confined spaces;
- working with large scale structures and plant;
- traffic;
- issues associated with unauthorized access and vandalism;
- ground excavation hazards;
- potential for electrocution;
- use of hazardous substances

Of the issues described above, three are particularly associated with injury and death in relation to the proposed construction project, they are:

- Falls from height
- Electrocution
- Traffic

11.2.7. Other Construction Impacts

11.2.7.1. Land and Groundwater Quality

The construction of the wind power plant, including transmission lines, substations and other structures is not expected to have an impact on geological or geomorphological aspects. Contamination of soils with lubricants at wind power substations is unlikely, given that oil-filled equipment has oil drains.

However, as a result of accident, construction activities have the potential to release pollutants to the ground (topsoil, subsoil and natural strata) and groundwater. Potential sources of pollution include:

- accidental release of fuels, oils, chemicals, hazardous materials, etc., to the ground, especially in the construction lay-down area, during delivery, storage, handling and use, for example, re-fueling, maintenance activities, etc. with subsequent leaching to groundwater;

- accidental release of liquid wastes during storage, handling and removal, with subsequent leaching to groundwater;
- accidental discharge of sanitary wastewater to ground and groundwater from the workers domestic facilities; and
- discharge of pollutants in water used for plant, equipment and vehicle washing to ground and subsequent leaching to the groundwater.

Measures will be employed to reduce the risk posed by the potential sources of pollutants listed above. All possible steps will be taken to prevent materials being imported onto the site which are already polluted.

11.2.7.2. Surface Water and Effluent

During the construction activities, there will be no pre-planned direct discharges to surface water or effluent systems. No pathways have been identified where releases to effluent systems could be made. However, construction activities have the potential to pollute surface waters through accidents from the escape of:

- Silty and contaminated water from de-watering of excavations;
- Silty and contaminated water from exposed ground, earth stockpiles, and muddy roads;
- Silty water from vehicle/plant washing areas;
- Leakage or accidental spillage of fuels, oils, chemicals etc., especially on the construction lay-down area;
- Washing down concrete mixing equipment; and
- Sanitary wastewater from the workers domestic facilities.

Areas of ground become exposed and disturbed during construction. This increases the potential for soil erosion and could potentially result in an increase in the sediment load of waters leaving the construction site. The site is relatively level and therefore the potential for water flowing across the site to cause significant soil erosion is low. To prevent impacts from runoff during land preparation and construction the following measures are foreseen: (a) excavations' face will be kept minimal to avoid the exposure of exposed surfaces to natural conditions, (b) surface runoff collection will be implemented through temporary drainage grooves and sedimentation ponds to avoid their direct discharge to the natural receptor, this is particularly important during wet seasons.

According to the engineering-geological surveys of the designing area (carried out by the field division of DESNO, LLC in January-February 2018) provision should be made for the regulation of the runoff of surface water and to pay special attention to the installation of the sewage and water supply system in order to prevent the manifestation of subsidenced properties.

Appropriate measures will be employed at the construction site to reduce the risk of potentially polluting materials leakage. In particular, polluting materials such as oils, fuels and chemicals will be stored in dedicated storage areas, complete with spillage protection and working procedures, which ensure that these materials are handled correctly. Further, any hazardous materials will be stored in areas with secondary containment.

11.2.7.3. Archaeology and Cultural Heritage

It is not expected that the construction phase of the Project will have an impact on archaeology or cultural heritage. All known archaeological and cultural heritage sites and areas were reviewed and taken into consideration when siting the wind turbines.

While unlikely, it is possible that the construction phase could have an impact on cultural heritage; chiefly, through the encounter of a newly discovered archaeological artifact unearthed during construction. In order to minimize the impact of the Project on archaeological objects, UPR will strictly adhere to the requirements and provisions of Ukrainian legislation (in particular, part one of Article 37 of the Law of Ukraine "On the protection of the cultural heritage"). UPR will also have

11.2.7.4. Water Supply

The only significant use of water during construction will be the cement batch plant. This unit will be provided with its own, dedicated water supply. The water has to be of good quality and will be provided from tanks or possibly a groundwater well.

11.2.7.5. Air Emissions

Construction activities have the potential to affect air quality mainly due to the dust created during the completion of ground works and construction. In addition, construction plant and vehicles can affect air quality as a result of exhaust emissions.

Re-suspension of dust through activities on the site or the wind can cause a nuisance and affect human health and vegetation. Favorable conditions for dust generation are dry weather combined with high winds. Continual or severe concerns are most likely near to dust sources, usually within 100 meters. The perception of nuisance is subjective and highly variable, although crop cover with dust may lead to a reduction in crop yields.

There are a wide range of dust control measures that are commonly used on construction sites. The measures should be incorporated into a Construction Environmental Management Plan (EMP) and will include:

- water-spraying of roads, surfaces prior to being worked, and material stockpiles to minimise dust raising, as required;

- sheeting vehicles carrying dusty materials to prevent materials being blown from the vehicles whilst travelling;
- enforcing speed limits for vehicles on unmade surfaces to minimise dust entrainment and dispersion; and
- employing suitable measures to ensure that vehicles leaving the site do not entrain dust onto public roads.

In the event that the aforementioned measures are implemented, the impact of air emissions will be **negligible**, potentially limited short term dust and/or diesel and oil fume. We expect no health effects as a result of the emissions.

11.3. Operational Impacts

11.3.1. Introduction to Operational Impacts

The key topics assessed in detail for the operational phase of the project are:

- Ecology and Nature Conservation
- Landscape and Visual
- Noise Impact
- Socio-Economic Impacts
- Health, Safety and Public Nuisance

Other topics which do not represent significant potential issues and which are addressed in less detail are:

- Electric and Magnetic Fields (EMF)
- Electromagnetic Interference
- Traffic and Transport
- Land and Groundwater Quality
- Surface Water and Effluent

The following sections provide an assessment of the potential impacts of the project activities during the operational phase. A summary of the impacts, management and mitigation measures is presented in Section 13. The Monitoring Program with all impacts is presented in Section 12.

11.3.2. Ecology and Nature Conservation

11.3.2.1. Habitats Assessment

Designated Sites

It has been agreed that there will be a >1.45 km buffer between the wind farm and the Dnistr Estuary which is part of the Dnistr Delta IBA and an important fish habitat. An assessment of potential impacts to birds (some of which are qualifying species of the Dnistr Delta IBA) has been undertaken in Section 11.3.2.3.

Habitats

During operation of the wind farm, maintenance of the turbines and associated infrastructure will be undertaken, but this will be along existing internal access roads and within compound areas. No impacts to semi-natural habitats are anticipated during the operational phase.

Species (other than bats and birds)

During operation of the wind farm, maintenance of the turbines and associated infrastructure will be undertaken, but this will be along existing internal access roads and within compound areas.

No impacts to mammals or reptiles are anticipated during the operational phase.

11.3.2.2. Bats

Collision Risk

In summary, operational impacts to bats from wind turbines come from four key factors:

- Collision with moving turbine blades or barotrauma caused by changes in air pressure close to the blades;
- Disorientation of bats in flight through ultrasound emission by wind turbines and potential for interference with social interactions (Rodrigues et al, 2008);
- Disturbance to, or severance of, local commuting routes (i.e. barrier effects).

No other effects on bats are predicted. Day-time maintenance activities are likely to make use of established internal access roads only and will not require any additional land-take. Maintenance would be unlikely to cause any observable effects on the local bat population and are not considered further.

11.3.2.3. Birds

Disturbance and Habitat Loss

No impact on bird migrations is expected. No significant loss of breeding habit is expected given the low density of nesting birds. Any loss of habitat will be patchy, leaving ample area within the Project area available for nesting sites.

The number of protected species that were encountered in the Project area was extremely low and the impact on them is assessed as low. The other species that were encountered were wetland birds that were recorded outside of the Project area within the waters of the Estuary and surrounding area. Given that there is a buffer of > 1.45 km from the Project to the Dniestr Estuary coast (and >1.7 km to the Estuary waters) the operation of the Project is not expected to have an impact on the birds within the IBA habitat or the birds migrating above the Estuary and its coast.

Collision (mortality)

Based on the studies conducted in fall 2017, the collision risk has been assessed as low to average. Given the low number of birds present at the Project site in the winter, the negative impacts and collision risk are predicted to be very low. Furthermore, it was also concluded during the spring 2018 and nesting (summer) 2018 studies that the risk of collision was very low.

11.3.3. Landscape and Visual

11.3.3.1. Introduction

This section addresses the nature and significance of the perceived alterations in landscape character and visual amenity that would result from the scheme during the operation of the wind farm. The prominence of the development proposals will be dependent upon a combination of land use and topographic factors relative to the position of the visual receptor and their sensitivity. The sensitivity of visual receptors is an important issue in the assessment of the significance of an impact. This sensitivity is based on the type of receptor, as well as the special nature of the view. For example, residential properties are considered to have a high sensitivity.

11.3.3.2. Landscape Effects during Operation

Effects on Vegetation and Land Cover

The site comprises large agricultural fields with open, undefined boundaries and therefore the proposals will not result in the loss of any significant landscape features or vegetation of particular value for its contribution to the wider landscape. It is anticipated that upon completion of construction the internal access roads and the footprint of the turbines as well as the electricity pylons will occupy a limited area of the overall site extents, this combined with the restoration of construction areas will in the main return the site to its current land cover condition. Therefore it is considered that the effects on vegetation and land cover throughout the operational phase are expected to be **no change** as land cover re-establishes.

Effects on Landscape Character

The placement and operation of the wind farm in the landscape may result in a negative change to the landscape character of the site and its immediate surroundings. This is due to the

introduction of tall industrial structures in the agricultural setting and predominantly low and open landscape. It should be noted that the existing site and surrounding area contains a number of other tall elements such as a line of electricity pylons and telephone poles.

Furthermore, the turbines would introduce additional modern and dominant elements to the landscape which would contrast with the character of the rural landscape elements. Therefore the turbines would become a supplemental feature and characteristic of the landscape within the local area. As a result, the changes to the site would predominantly cause a minor to moderate adverse impact on the landscape character on commencement of operation.

Effects on Land Use

The Project would introduce 26 wind turbine generators which will require the permanent use of approximately 11.875 ha of land (repurposed for energy use). It is expected that there will be continuation of current agricultural land over the rest of the site during operation. It is considered that, overall, there will be no detrimental change to the land use of the site. Access tracks and other associated infrastructure are also not expected to have an impact. Consequently, negative effects on the land use throughout the operational phases is expected to be negligible to low adverse.

Effects on Designated Areas

The site is located near the Dnistr Delta IBA and Dnistr Estuary Ramsar site; however the proposed development will be contained at a distance of a minimum of 1.45 km from the designated landscape. Though the proposals will not result in direct physical effects on this designated area, the proposed site must be considered as a contributor to the setting of the landscape protection area.

The landscape character of the protected area is strongly defined by the tranquility and scenic quality of the area. These qualities are considered essential to the attraction the area has to tourists, seasonal visitors and residents. However due to the variation in topography, the predominance of dense woody vegetation in the Riparian habitat near the Estuary coast, and given the relative remoteness and restricted accessibility of the designated area in relation to the wider landscape, only a limited number of turbines would be visible, or partially visible from a limited number of locations of the Dnistr Delta and Estuary areas. As such the landscape effects on the designated site are likely to be low adverse to no change during the operation phase of the development.

11.3.3.3. Potential Visual Impacts

Visual impacts will result from the operational phase, including construction plant operations and traffic movements, facility installation and operational phases.

The prominence of the development proposals will be dependent upon a combination of land use, land cover and topographic factors relative to the position of the visual receptor and their sensitivity.

The sensitivity of visual receptors is an important issue in the assessment of the significance of an impact. This sensitivity is based on the type of receptor, as well as the special nature of the view. For example, residential properties are considered to have a high sensitivity.

Additional factors to consider in the classification of sensitivity of visual receptors include:

- The period of exposure to view;
- The degree of exposure to view;
- The function of receptor, and
- The nature of the view.

The visual impacts that will potentially be generated by the Project as viewed from a series of key viewpoints are being assessed. Corresponding viewpoint montages are being prepared and will be published as an appendix to this ESIA no later than December 2018.

11.3.3.4. Shadow Flicker

Shadow flicker is caused where the light from the sun passes through the blades of a moving turbine. It may become a problem for those people who live near, or have a specific orientation to, the wind farm.

It is considered that shadow flicker will not be a significant issue for the site given that the turbines are not located in close proximity to any residences.

UPR utilized simulation software to identify zones of potential shadow flicker when siting the Project. The distance of the Project from the nearest residential property is greater than 800 m.

11.3.4. Noise Impact

11.3.4.1. Approach

In order to assess the noise impacts from the operation of the wind farm, noise levels from the operation of the wind farm have been calculated and compared with the permitted noise levels described in Section 7.2.2.

11.3.4.2. Noise Calculations

Noise simulations have been carried out according to the international standard of ISO 9613-2 Acoustics – Attenuation of sound during propagation outdoors. According to ISO 9613-2 the source noise level according to 8m/s in 10m height is specified.

The calculations are based on three years of wind measurements from a 100 m met mast located 40 km to the South-East of the Project Site. The on-site data has been long term correlated. Twenty-six (26) locations using General Electric GE 137, 3.83 MW turbines were considered with a common hub height of 131.4 m.

11.3.4.3. Noise Impact Assessment

Noise contour maps for the GE137-3.8 turbine (106 dBA) are shown below. The noise map demonstrated that noise levels are within the limits set for residential areas by the IFC in its Environmental, Health, and Safety Guidelines for Wind Energy (2007) of 55 dBA (daytime) and 45 dBA (nighttime) (see discussion of IFC noise guidelines in Section 7.2.2).

Figure 82 Noise Map of the Proposed Turbine Layout, GE137-3.8 Turbine

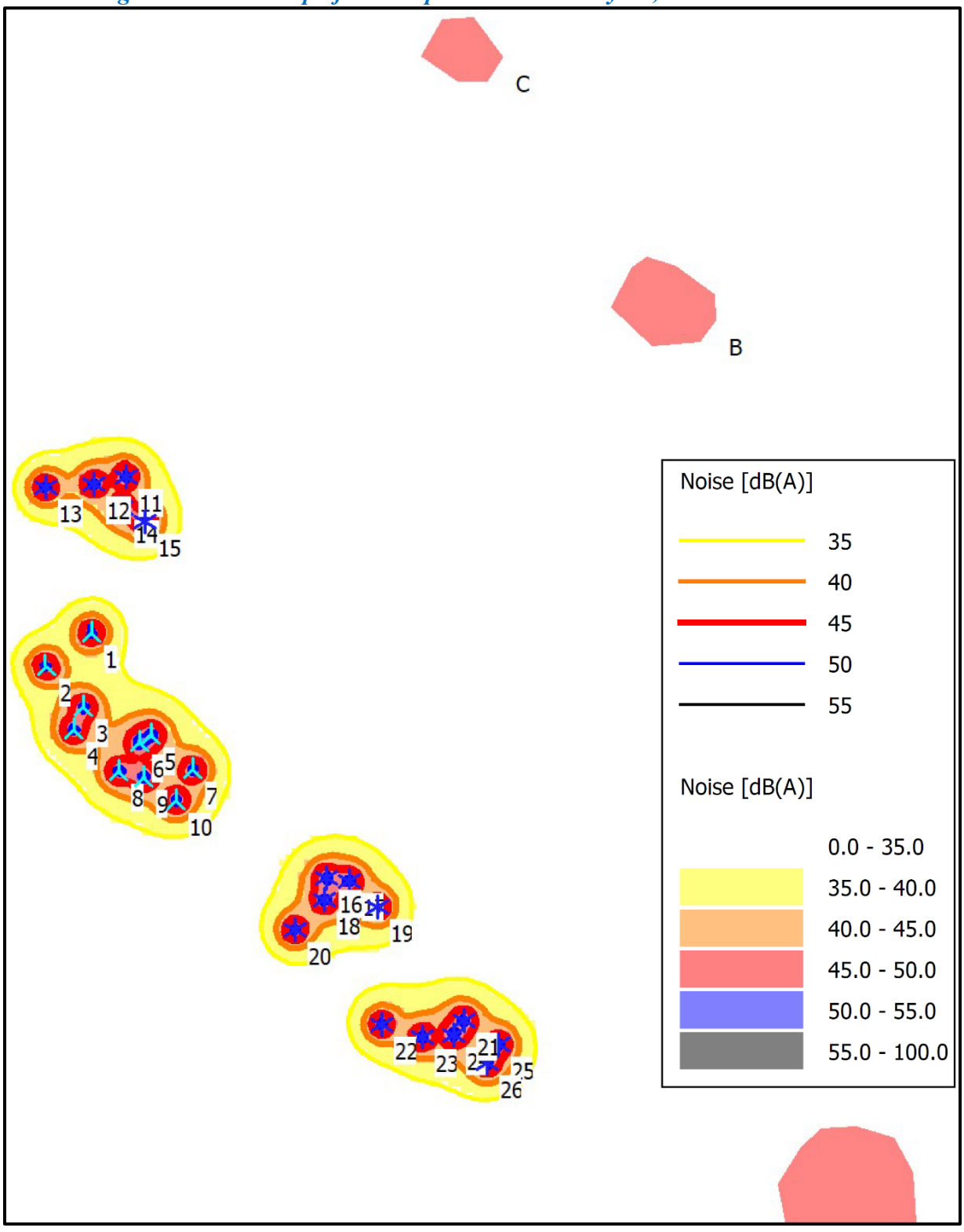
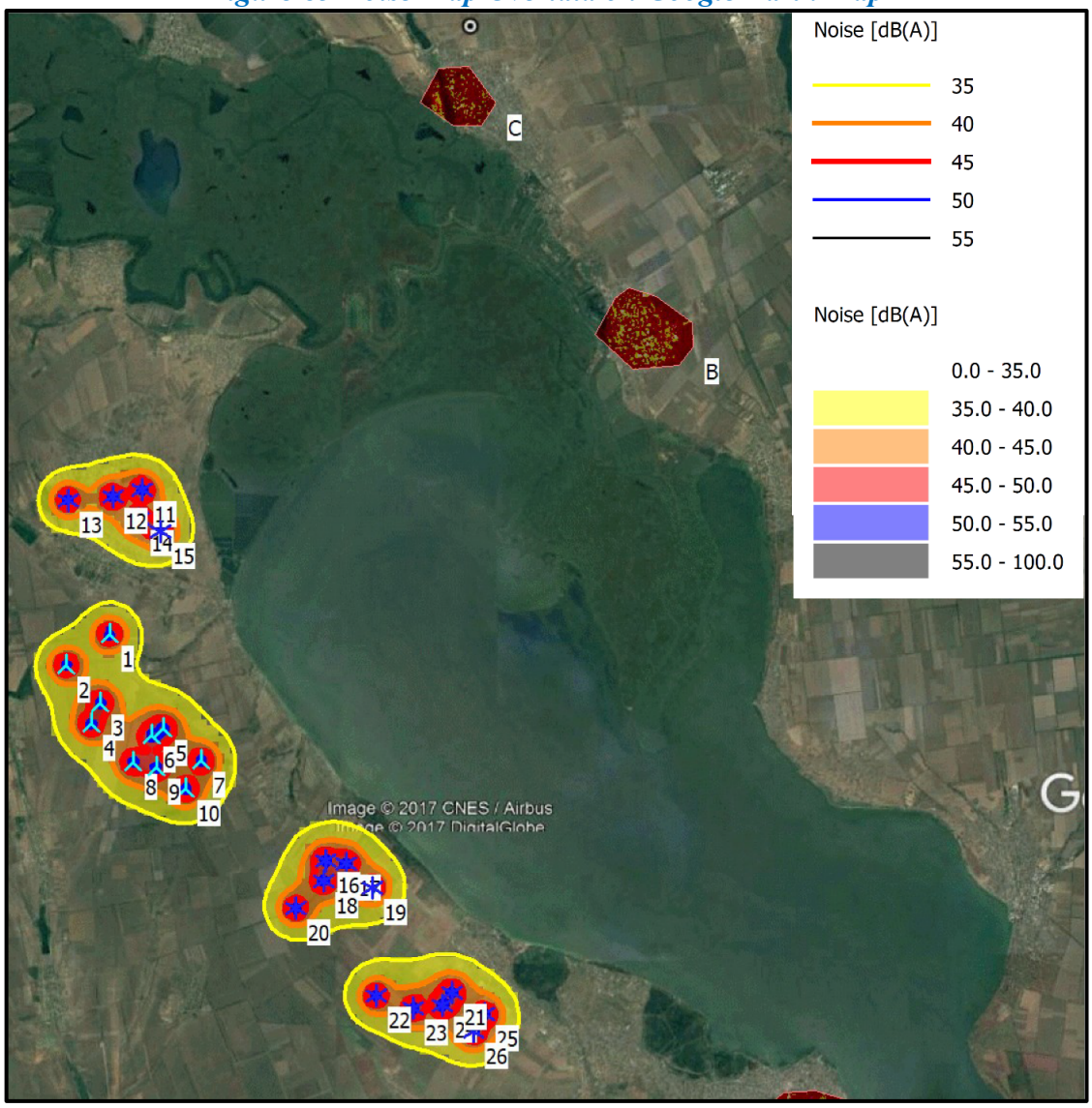


Figure 83 Noise Map Overlaid on Google Earth Map



11.3.5. Social-Economic Impacts

The following section describes the socio-economic impacts associated with the operation of the Dnistrovskiy Wind Power Project, grouped under the following headings:

- Impacts to land use
- Employment and procurement opportunities
- Impacts on livelihoods
- Revenue generation for the local government / community
- Impacts on infrastructure

Impacts and mitigation measures associated with health, safety and public nuisance are addressed in Sections 11.3.6 and 12.2.7.

The significance of socio-economic impacts was determined based on a consideration of their direction (positive, negative, mixed or neutral), magnitude (negligible, low, moderate, high), geographic extent (individual, local, regional, national, trans-boundary) and duration (short-term, medium-term, long-term).

11.3.5.1. Impacts to Land Use

Approximately 5.64 ha of land previously occupied for construction will become available for agriculture again. Only approximately 11.875 ha will remain unavailable furing the operation of the wind farm and will be rezoned as energy land. Compensation for privately owned lost land is provided via servitude agreements. This impact has been assessed as low adverse.

A part of the land used permanently for the WTGs may be subject to some use restrictions for the safe operations of the wind farm. It is expected that this will impact a very small amount of land and the impact is assessed as low adverse.

11.3.5.2. Employment and Procurement Opportunities

Direct employment

The life of the project is expected to be at least at least 25 years and during that time a small workforce will be needed. UPR estimate that up to 20 individuals (a few local and international, but mostly national) will be employed during operations. This will give long term stability to the full time employees and will have a significant effect on their lives. However, within the local communities and even more at the national level, this number is very low and the impact has been assessed as low beneficial.

Indirect employment

Indirect employment may occur as a result of increased spending of those employed by UPR, however since this number is so low, this is also assessed as a negligible positive impact. The procurement of local goods and services is also likely to be minimal and have a negligible effect on local economies.

11.3.5.3. Impacts on Livelihoods

During the operational phase, involuntary resettlement, possibly leading to economic displacement may occur for persons who are using the land plots which may be crossed during repairs of WTGs, whose crops may be affected. UPR will compensate all lost crops and damages

in accordance with the Ukrainian Law "On " and the principles set out in the Livelihood Restoration Framework. Therefore, this impact is assessed as being **low adverse.**

11.3.5.4. Revenue Generation for the Local Government / Community

The Bilgorod-Dnistrovskiy District and local communities are expected to experience an increase in revenues as a result of the Project through land-lease payments and taxes. This benefit is assessed as moderate beneficial.

The benefits described above will be felt by residents in the Bilhorod-Dnistrovskiy district, and particularly, those located within the settlements where the turbines are installed. At the same time, if the benefits are not felt by the other affected communities, tension may be created between some communities and the Project. Aware of this fact, UPR supports local communities through its Corporate Social Responsibility Program and is careful to understand and manage expectations of all local and regional stakeholders. Overall, the expected residual impact is low potentially rising to moderate if appropriate support is not implemented. This is addressed in further detail in UPR's Environmental and Social Action Plan and Stakeholder Engagement Plan & Grievance Mechanism which are both part of this ESIA Disclosure Package.

Additionally, the region may experience an increase in tourism as a result of the wind farm. It is difficult to assess whether the wind farm alone will provide enough of a stimulus to trigger tourism in the area, thus contributing to local economic development, and therefore the impact has been assessed as low beneficial, with potential to grow to moderate beneficial.

UPR's presence in the Bilgorod-Dnistrovskiy district is attracting foreign and domestic investments in the municipality and wider area, as well as fostering local economic development. This has resulted in greater presence and visibility of Bilgorod-Dnistrovskiy and has put the municipality in touch with potential investors. This impact is assessed as low beneficial with potential to grow to moderate.

11.3.5.5. Impacts on Infrastructure

UPR will have to carry out regular maintenance of upgraded and widened internal access roads needed to access WTGs for repairs and maintenance. This in turn will have a low beneficial impact on local farmers' access to their plots of land.

11.3.6. Health, Safety and Public Nuisance

This section details the direct potential health and safety impacts associated with the operation of the wind farm. Issues such as health impacts associated with electromagnetic waves are dealt with in Section 11.3.7. The operational activities of a wind farm and associated power lines carries with it several key health and safety risks to the workers employed on the project as well

as members of the public. Key issues for consideration associated with the proposed project are as follows:

- working at height;
- potential for electrocution;
- frosting and ice shed;
- blade shear or breakage;
- turbine collapse;
- lightning strike and fire;
- issues associated unauthorized access and vandalism.

The issues above may be grouped into those which may primarily carry a physical risk to workers, those which carry a physical risk to members of the public but also possibly workers and those which may impact other stakeholders.

11.3.6.1. Worker Health and Safety

Of the issues described above, two are particularly associated with injury and death in relation to the proposed workers during the operational phases of the project, they are:

- working at height; and
- potential for electrocution.

11.3.6.2. Public Health and Safety

Issues which may impact on public health and safety, but which also may impact worker health and safety are associated with:

- frosting and ice shed;
- blade shear or breakage;
- turbine collapse;
- lightning strike and fire; and
- issues associated unauthorized access and vandalism.

Frosting and Ice Shed

The risk of frosting/ice build-up leading to ice throw and potential injury is considered to be low for the following reasons:

- Based on climatological data, risk of ice build-up will be relatively short term.
- The turbines will be equipped with sensors as part of their design to detected imbalances on the turbine blades, which among other causes, will indicate ice build-up leading to shut down of the turbines and therefore prevent ice throw.

- During cold periods, it is highly unlikely that the agricultural fields will be occupied.
- The residential dwelling is approximately 0.8 km from the nearest turbine, and ice throw over that distance is highly unlikely.
- Workers attending the site during cold conditions will be aware of potential hazards associated with ice build-up on the turbine structures and in the event of a potential risk, should not undertake any tasks associated with the turbine structures.

Based on the above information we have determined that the potential risk of ice throw from ice build-up on the turbine blades leading to injury or damage is considered to be negligible.

A further risk associated with ice build-up is falling ice directly from turbine structures. There is a potential for injury or death caused by falling ice as from all large-scale structures where snow/ice have built up. If the local population are aware of this potential hazard, the risk of accident should also be negligible.

Blade Shear or Breakage

Blade shear or breakage is a relatively rare occurrence and injury as a result of blade shear or breakage is rarer still. As with ice shed, it is unlikely that persons will be in the vicinity of the wind farm during conditions which may lead to blade shear/breakage and the distance from the nearest residential property will minimize any risk. Based on the above information we have determined that the potential risk of blade shear or breakage leading to injury or property damage is **negligible.**

Turbine Collapse

Occurrences of turbine collapse are extremely rare. As with ice shed and blade shear or breakage, it is unlikely that persons will be in the vicinity of the wind farm during conditions which may lead to turbine collapse and the distance from the nearest residential property will eliminate any risk. Based on the above information we have determined that the potential risk of turbine collapse leading to injury or property damage is negligible.

Lightning Strike and Fire

Due to the nature of the structure lightning strike is an inevitability. However, damage caused to turbines is Lightning damage, particularly to wind turbines, is often attributed to design issues associated with inadequate direct-strike protection, insufficient earthing (grounding) and/or other insufficient protection. In such cases breakup of the turbine structure could potentially result in injury or damage to property. However, it is expected that the proposed design will be state of the art and incorporate all possible modern methods to eliminate damage caused by lightning strike. Further, for the reasons listed above, it is unlikely that persons or property will be impacted in an event where damage is caused to the turbine by lightning strike. Based on the above information we have determined that the potential risk of lightning strike leading to damage to the turbine structure and causing injury or property damage is negligible.

Fire associated with wind turbine structures is extremely rare, the few public reports of such occurrences may be classified as 'freak events' and compared to other power generation structures the risks associated with wind power are extremely small. Due to the nature of the design, there is a very small amount of readily combustible materials associated with wind turbine structures. We have found no incidents where turbine fires have led to injury or property damage. Therefore, the risk of turbine collapse leading to injury or property damage is **negligible**. Fire may also be associated with the transformer station, and previous reported incidents are more dramatic than those associated with wind turbine structures. However, the transformer will be located away from persons and public property and will be designed with a fire protection system. Therefore, the risk of a transformer fire leading to injury or property damage is negligible.

Unauthorized Access and Vandalism

Unauthorized access and vandalism are a problem with all remotely managed technical equipment. The turbines will be designed to as to prevent unauthorized access, but there will be no enclosing fencing around the turbine array. The transformer station and management compound will be fenced and locked so as to prevent access. Further, there will be an onsite security presence in order to deter any would be unauthorized access and/or vandalism. Experience dictates that no matter what security is in place, determined persons will gain access to hazardous areas. However, information indicates that appropriate measures to prevent access will be in place in accordance with industry standards. Issues associated with unauthorized access and vandalism also pose a risk to the operational work force. We expect that appropriate management systems will be in place to allow for risk assessment where wind farm plant and structures have been accessed and/or vandalized, and where necessary work routines are altered to eliminate risk to the work force. That appropriate design requirements will be in place and management systems will be implemented, we determine the risk of injury as negligible.

11.3.7. Other Potential Operational Impacts

11.3.7.1. Electric and Magnetic Fields (EMF)

Introduction

Alternative current generates electrical and magnetic fields, collectively known as an 'electromagnetic field' (EMF). Electric fields are produced by voltage and increase in strength as the voltage increases. Magnetic fields result from the flow of electric current and increase in strength as the current increases. Electricity transport lines are the best known sources of electromagnetic fields, but any electrical equipment is capable of generating an electromagnetic field. Sources associated with the proposed project are the wind turbines and the transformers.

Potential Health Effects

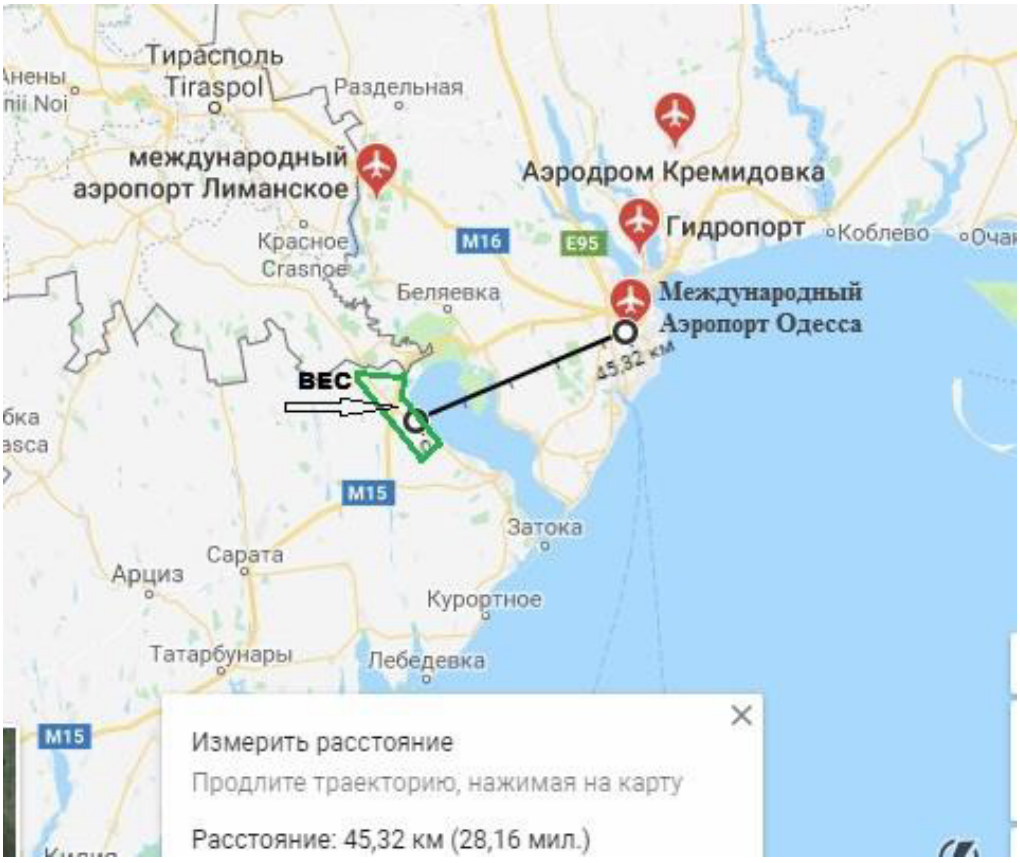
There has been considerable research over the last 30 years associated with the potential impacts on human health associated with EMF. A detailed review and discussion of the scientific literature associated with this area of research is outside of the scope of this project. However, the IFC health and safety guidance for overhead power lines (IFC, 2007c) states the following in regards to the available scientific information:

Although there is public and scientific concern over the potential health effects associated with exposure to EMF (not only high voltage power lines and substations, but also from everyday household uses of electricity), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern.

11.3.7.2. Aviation

The nearest major airport is located more than 45 km away from the Project. The Project is not located within the radius of the airport's impact. See Figure 84 for the locations of the nearest airports.

Figure 84 Location of the nearest airports



11.3.7.3. Electromagnetic Interference

Aviation Radar and Radio Communications

Wind farms may have an impact on aviation radar and radio communication systems when the wind farm is situated particularly close to an airport. However, the Dnistrovskiy Wind Power Project is located 45 km from the nearest airport. Due to the distance between the wind farm and the nearest potential receptors of disruption, it is thought that there will be no impact on aviation radar and radio communication systems.

Television and Telecommunication Systems

For any interference that occurs and is shown to be as a result of the wind farm, appropriate measures will be implemented (such as installation of an additional television mast). There may be some short-term impacts to television and or telecommunication systems as a result of the wind farm, however it is unlikely there will be any long term impact. In the long term we expect no negative impact associated with this issue.

11.3.7.4. Traffic and Transport

The main traffic and transport impacts associated with the project will be during the construction phase. The operational phase will typically be characterized by a low presence of workers on site, with occasional maintenance involving use of access cranes (not heavy lifting cranes). Access to the site of heavy vehicles should be along the routes established during construction for heavy vehicles. Management measures to prevent disruption to traffic and rail transport should be amended for the operational phase and adopted. It is likely that small vehicles could access the site from the east without any disruption as long as they are in relatively low numbers. During the operational phase it is expect that there will be no disruption of access to the agricultural plots. As long as appropriate established routes are used and management measures are implemented, the residual impact during the operational phase of the project is therefore deemed to be **negligible impact.**

11.3.7.5. Land and Groundwater Quality

During the operational activities, there will be no pre-planned direct discharges to ground. However, as a result of accident, operational activities have the potential to release pollutants to the ground (topsoil, subsoil and natural strata) and groundwater. Potential sources of pollution include:

- accidental release of fuels, oils, chemicals, hazardous materials, etc., to the ground, especially associated with maintenance, chemicals storage areas and the transformer area with subsequent leaching to groundwater;

- accidental discharge of sanitary wastewater to ground and groundwater from the domestic waste water management system.

Measures will be employed to reduce the risk posed by the potential sources of pollutants listed above. All possible steps will be taken to prevent materials being imported onto the site which are already polluted.

Potentially polluting materials, such as fuels, oils, chemicals and associated liquid waste materials, etc. will be stored in dedicated, segregated storage areas, with spillage protection and appropriate environmental security measures to prevent accidental release to ground during storage. In addition, appropriate working procedures will be adopted to minimize the risk of accidental release during delivery to and removal from the storage areas.

11.3.7.6. Surface Water and Effluent

During the operation activities, there will be no pre-planned direct discharges to surface water or off-site effluent treatment systems. Further, it is unlikely that there will be a pathway between operational areas (e.g. transformer compound) that store hazardous materials and any surface water or effluent system. Therefore, potential releases are likely to be limited to accidental releases as a result of maintenance activities during site operations. In the event of any release, we expect that appropriate containment and clean up measures will be in place. Further, it is expected that the potential volumes that may be released are relatively small. Therefore, it is unlikely that there will be any releases that may find their way into surface water during the operational phase of the project.

In the event that the aforementioned description of the proposed site operations is accurate and that appropriate containment and clean up measures are implemented, there should be **no impact** to surface water and effluent systems.

11.4. Closure and Decommissioning Impacts

11.4.1. Introduction to Closure and Decommissioning Impacts

For the purpose of this assessment, no issues have been assessed in significant detail. The potential for impact during decommissioning is similar to those of construction activities. The key issues are potentially:

- Noise
- Traffic and Transport
- Socio-Economic Impacts
- Health, Safety and Public Nuisance

Other decommissioning impacts are likely to be as follows and which have addressed in this section of the report are:

- Ecology and Nature Conservation
- Landscape and Visual Impact

The following sections provide an assessment of the potential impacts of the project activities during the closure and decommissioning phase of the project. A summary of the impacts, management and mitigation measures is presented in Section 13.

11.4.2. Noise

Decommissioning Activities

Decommissioning activities are expected to generate similar noise levels to the construction activities, and similar noise significance levels would apply.

The majority of plant expected to be used for decommissioning would be of sufficiently low noise levels not to significantly affect the nearby noise sensitive receptors.

Some adverse noise impacts may be expected if the concrete foundations for the turbines are broken out and removed, with impacts being potentially greater at locations closer than 1500m.

Decommissioning Traffic

Similarly, like with construction activities, there would be a number of vehicle movements associated with the decommissioning of each turbine, and dependent on the routes that the vehicles take to get to the site, there may be increases in noise arising from increased traffic.

11.4.3. Traffic and Transport

Traffic and transport impacts during the decommissioning phase are likely to be very similar to the construction phase. As with the construction phase, appropriate management and mitigation measures should be implemented to prevent disruption or nuisance. If appropriate management and mitigation measures are implemented as detailed in the construction (Section D2.3), then the residual impact should be low, rising to moderate if appropriate management and mitigation measures are not implemented.

11.4.4. Socio-Economic Impacts

Generally speaking the socio economic impacts from decommissioning activities will be similar to those during the construction phase, apart from the considerably reduced impact on land use. In summary, impacts to land use, impacts on livelihoods and employment and procurement opportunities, include the following:

- The total amount of land which will be permanently lost to agriculture is approx. 18 ha. This impact is assessed as negligible**.**
- Increase in land available for agricultural use and no more use restrictions on land. Upon dismantling of WTGs, another 12 ha (out of 30 ha occupied during operations) will become available for agricultural use. At the same time, use restrictions will cease to exist on 67 ha. This impact is assessed as low beneficial.
- The dismantling of WTGs, disposal of materials and reinstatement of land will generate some direct and indirect employment opportunities. A part of those opportunities will be available for local people. This impact is assessed as low beneficial.
- During decommissioning, involuntary resettlement, possibly leading to economic displacement may occur for persons who are using the land plots which may be crossed during dismantling and transport of WTGs and site clearance, whose crops may be affected. This impact is assessed as low adverse.

11.4.5. Health and Safety

In general, the health and safety risks to workers and the community from decommissioning activities will be similar to those during the construction phase, as outlined above.

The project will be designed to reduce potential risks during its decommissioning. This is typically done by ensuring that a design risk register is kept and maintained through the design process, allowing potential risks that can arise during decommissioning to be identified and addressed in the design process. For example, the use of hazardous materials in construction that could lead to health and safety risks during decommissioning will be avoided wherever possible.

Upon closure of the site, inspections will be undertaken to ensure that contamination of the ground has not taken place during the operational phase, and that measures put in place during the design and construction phases have been successful in protection ground, surface water and groundwater at the site.

It will be important that documentation is maintained during the operational phase that shows that any incidents or accidents have been managed and cleaned up to ensure that no significant contamination has been caused that could lead to health and safety risks during decommissioning.

11.4.6. Other Closure and Decommissioning Impacts

11.4.6.1. Ecology and Nature Conservation

The primary effect from decommissioning will be through temporary disturbance to the site from heavy plant and vehicle movement. Works during the decommissioning phase would involve activities similar to those used during the construction phase; therefore these effects would be

similar to and no greater than those that may occur during the construction of the wind farm as described in this chapter.

11.4.6.2. Landscape and Visual

It should be noted that the turbines have a limited operational life span (i.e. 25 years). Following this period of operation it would be necessary to decommission and remove the out-of-service wind turbines. Impacts of decommissioning are anticipated to be of a similar magnitude and severity as those experienced during construction (see Section 11).

Following the decommissioning of the turbines, impacts would be generated by the effects of changes in the land management of the site. This would include slight and very short-term impacts generated by reinstatement proposals undertaken as part of the land restoration scheme. Upon completion of the decommissioning and restoration process, impacts on the landscape character of the area would be insignificant resulting in no change to moderate beneficial.

11.5. Cumulative Impacts

It is important to consider the potential cumulative impact of the Dnistrovskiy Wind Power Project with other windfarms that may be developed in the area. Organizations like the IFC provide guidance on how to complete a Cumulative Impact Assessment (or CIA) and this guidance has been used to develop this CIA. The main challenges when undertaking the CIA are uncertainty regarding the likelihood that other wind projects will be constructed and limited data available on projects under development.

The CIA is risk-based and assesses the impact on 'valued' environmental and social components. Consequently, speculative assumptions relating to potential or possible projects must not be interpreted by project stakeholders as true or inevitable. For the Dnistrovskiy Wind Power Project the valued components are considered to be:

- Impact on birds and bats;
- Landscape and visual impact;
- Employment and community revenues.

The second point for consideration is the geographic and temporal boundary of the CIA. The general area has wind characteristics that make it suitable for wind power. There are already other wind power projects under development in the region and given these favorable characteristics of the region, there may be additional projects developed in the future. For this CIA, the boundary has been set at 30km from the Project. A time horizon of 5 years has been used given that it is extremely challenging, if not impossible, to predict and consider development activities beyond this time frame.

At the beginning of November 2018, based on all available information, there were three wind farms under development within a 30 km radius of the Project. Approximate locations are shown below. These wind farms are in different stages of development.

Figure 85 Prospective Projects within 30 km of DWPP

An overview of the prospective wind farm developments is provided in Figure 86 below.

Figure 86 Characteristics of Prospective Projects within 30 km of DWPP

Wind Project	# of Turbines	Distance from DWPP boundary	Stage of development	Expected start of construction
Caplani 19.2 MW	5	15 km to NW	Not yet permitted	Unknown
Ovid Wind (30 MW) and Ovid Wind 2 (51 MW)	9 and 15	21 km to SE	• Ovid Wind (30 MW) is under construction	• Ovid Wind - Under construction

			• Ovid Wind 2 is not yet under construction, no valid EIA	• Ovid Wind 2 - Construction assessed as unlikely
Ovidiopol Energie 120 MW		30 km to NE	Stale project, not yet under construction, connection agreement ends Q4 2018 and no valid EIA	Construction assessed as highly unlikely

11.5.1. Cumulative impact on birds and bats

A Cumulative Impact Assessment on birds and bats is being prepared and will be published as an annex to this ESIA no later than December 2018.

11.5.2. Cumulative impact on landscape and visual impact

11.5.2.1. Landscape

The introduction of the Dnistrovskiy Wind Power Project on its own has been assessed to have a minor to moderate adverse effect on the landscape character. The turbines are likely to become a supplemental anthropogenic feature and characteristic of the landscape within the local area including the villages of Starokozache, Semenivka, Udobne and Moloha. If all prospective projects were to be constructed (which is considered highly unlikely), turbines would become a dominant and key characteristic of the region, which would represent a significant cumulative change to the character of the landscape.

11.5.2.2. Visual

The visual impact of the Dnistrovskiy Wind Power Project has been assessed moderate to substantial in respect to a small number of residential properties at the edges of Starokozache, Semenivka, Udobne and Moloha villages. It has also been assessed to have a minor to moderate effect on road users and farmers in the area. A cumulative visual effect is likely to be expected if all of the projects are constructed. Views however would be distant except in the immediate vicinity of each project given the significant distance between all prospective projects.

11.5.3. Cumulative impact of construction

Cumulative effects may arise where heavy vehicles and transport construction equipment take place at the same time. However, this is unlikely given that the likelihood of construction of Ovid 2 and Ovidiopol Energie 120 have been assessed as unlikely to highly unlikely; furthermore, Caplani is not yet permitted so it is not expected that construction timelines will overlap. Ovid Wind, which is currently under construction, does not have any transport routes in common with the Project.

11.5.4. Socio-economic impacts

The Project is being developed in the Bilgorod-Dnistrovskiy district of Ukraine which is one of the least developed area of the Odessa region. While the introduction of the Project alone may not represent a significant large-scale socio-economic effect, the cumulative effect of all developments is likely to represent a positive and noticeable change in respect to local economy, infrastructure, and tourism opportunities in the local communities.

12. Management and Mitigation

12.1. Introduction

The following sections outline the management and mitigation requirements associated the potential and actual impacts identified throughout the project phases. Section 13 summarizes the management and mitigation measures described below. The impact once management and mitigation measures are applied is termed the 'residual impact'.

The management and mitigation measures identified should be detailed in appropriate plans, applicable to the phase of the project. This is standard practice for all major projects. For example, in terms of 'environment' the appropriate plans would be as follows:

- Construction – Construction Environmental Management Plan (CEMP)
- Operations – Operational Environmental Management Plan (OEMP)
- Closure and Decommissioning – Decommissioning Environmental Management Plan (DEMP)

The plans should remain up to date and accurate based on the activities to be undertaken at the project site. The plans should encompass all of the issues described in the following sections, as well as any other requirements required by the local regulatory authorities. The plans should include detail of how management and mitigation shall be undertaken for each issue and should be approved by the appropriate regulatory parties and any other pertinent stakeholders, such as investment banks.

The implementation of the plans should be through a robust Integrated Management System (IMS), incorporating the requirements of environmental, health and safety, as well as any other requirements of the business and its stakeholders, including issues associated with members of the public. In terms of the requirements detailed in this Statement as well as other requirements delineated by the IFI's and/or commercial banks, the management system can be called an 'Environmental and Social Management System (ESMS)'. Organizational Capacity is addressed within the ESMS. The ESMS establishes specific roles, responsibilities, and authority to individuals tasked with implementing the ESMS.

12.2. Management and Mitigation during Construction

12.2.1. Introduction

The following sections provide a brief overview of the management and mitigation measures required during construction, based on the findings of the impact assessment. The impacts

associated with the construction of the project are generally the most wide spread and severe of the whole of the project lifecycle.

12.2.2. Ecology and Nature Conservation

12.2.2.1. Habitat Management and Mitigation

All turbines are offset at least 1.45 – 1.7 km from the Dnistr Delta IBA and Dnistr Estuary Ramsar site. The impact assessment has been undertaken with consideration of this buffer.

A Construction Environmental Management Plan (CEMP) will be prepared and will include a precautionary method of working (PMW) in relation to birds, bats, mammals and reptile species.

The PMW will include judicious, staged clearance of vegetation from the Project area as required. This method of working, and the presence of people and machinery, is likely to encourage mammals and reptiles to move away from the working area.

12.2.2.2. Bats

In order to minimize the effects of construction, work between dusk and dawn will be limited during the most bat active season (April through October). Artificial lighting, when required, will be restricted to the necessary areas of current construction work. Lighting should be directed towards the works areas, with hoods fitted to lights to prevent light spill outside this area. Temporary lighting will not be installed along access roads through the site.

12.2.2.3. Birds

The ornithological experts concluded that the proposed wind farm will not have any adverse impacts on qualifying bird populations of Dnistr Delta IBA or Dnistr Estuary Ramsar site. Additionally, construction is not expected to cause any significant loss of breeding habitat given the low density of nesting birds and availability of alternative nesting sites.

12.2.3. Landscape and Visual

12.2.3.1. Overview

Mitigation measures for wind farm developments are relatively limited and those that are appropriate have been included as an integral part of the scheme. It is recognized that there is limited potential to relocate the infrastructure or screen these large-scale structures. Therefore there is no separate assessment of residual effects. However there is potential to include integrated mitigation measures that would protect, and potentially enhance, the landscape

features and character and also maximize the screening capability of the landscape, thereby minimizing visual impacts.

12.2.3.2. Specific Measures

In relation to landscape and visual impacts, the broad aims and objectives of mitigation measures for the proposals during construction should include, but are not be limited to:

- Judicious vegetation clearance to ensure only limited vegetation is cleared to facilitate construction access and operations;
- Where construction access is required in the vicinity of existing vegetation, suitable protection to existing tree canopies and root zones should be provided with protective fencing and ground protection surfacing, which should be removed immediately upon completion of construction works;
- Bespoke mitigation planting at strategic sites both within and outside the development area to create thickets of trees and shrub that are in keeping with the landscape character and perform targeted screening of potential visual impacts anticipated to be experienced by the surrounding residences exposed to the development.

12.2.4. Traffic and Transport

Transport of construction materials and equipment will involve both public roads and site roads on the wind farm site. In order to optimize and improve traffic safety, a Transport Management Plan will be developed and implemented to include two separate sections: one section on public road traffic, and one for on-site traffic. Although UPR does not have responsibility for transport before the handover point, UPR shall assume responsibility for the effective management of transport at all stages of the project. Therefore, the Transport Management Plan shall be owned by UPR. The plan may be a sub-section of the project Environmental Plan,or may be standalone.

UPR's Transport Management Plan for the Dnistrovskiy Wind Power Plant will establish:

For traffic on public roads: methods to reduce the number of trips, suitable routes to follow to/from the project area agreed with the local governments of the localities crossed by transport routes, agreements with the local governments regarding transport delivery, transport scheduling, and public warning.

For site traffic: the traffic routes between the work fronts and the site logistics facilities/ supply areas, travel speed limits, necessary practices in avoiding excessive dust emissions and the fouling of public roads.

In order to minimize traffic and transport impacts, the following mitigation measures should be considered:

- Restricting delivery hours to reduce noise nuisance and congestion;

- Heavy construction traffic will be subject to the traffic management plan.

Management and mitigation measures should also be incorporated in to the Environmental Management Plan once transport requirements and suitable options have been established.

12.2.5. Noise

Overall, noise from construction activities would be managed to minimize the impacts on the noise sensitive receptors. Noise control measures would include:

- The use of Best Practicable Means during construction works,
- Ensuring that all staff and operatives are briefed on the requirement to minimize nuisance from site activities,
- Establishment of agreed site working hours for "normal" construction activities,
- Programming works such that the requirement for working outside of normal working hours is minimized,
- Use of attenuation measures such as silencers/enclosures where appropriate,
- Plant and machinery will be well maintained,
- Plant and machinery will be tuned off when not in use,
- Establishment of agreed criteria whilst undertaking significantly noisy or vibration-causing operations near to sensitive locations.

Construction traffic will follow pre-determined routes to access the site to minimize impacts, and where possible, routes will be selected to avoid areas of habitation.

12.2.6. Socio-Economic

12.2.6.1. Impacts to Land Use

During construction the project will cause a temporary reduction in land available for agriculture. Whilst the actual impact will only be short term, there are certain measures which will be implemented to mitigate it, as well as prevent any impacts to livelihoods. These measures include:

- Minimize the amount of land occupied during construction;
- Position WTGs near edges of land plots to optimize land use;
- Upon the completion of construction activities, fully reinstate the land not permanently occupied;
- Compensation for privately owned land already executed.
- Difficulties in accessing land as a result of increased traffic and internal access road upgrades managed by the implementation of following measures:
    - Develop and implement a traffic management plan;

  - Provide timely information to users of land of when access to their land might be more difficult (e.g. scheduled internal access road upgrades);
- Establish and implement a community grievance mechanism.

Even if these measures are fully implemented, it is possible that individuals will still occasionally experience difficulties in accessing land, however this is not expected to have a further impact on livelihoods.

12.2.6.2. Employment and Procurement Opportunities

The project will create some direct employment opportunities, however a significant proportion of the opportunities will be for semi-skilled and skilled labor, which are expected to be largely national and international staff and thus this impact may not be significant for local communities. In any case, the engagement of all non-employee workers will follow international best practice, with the main measures comprising the following:

- Put in place transparent and fair recruitment procedures
- Ensure that all non-employee workers are engaged in line with both national legislation and applicable international (ILO) standards and recommendations
- Provide a grievance mechanism for workers
- Implement a training program for the local workforce to enable them to take advantage of the opportunity

To foster the creation of indirect employment opportunities, the Project will procure goods and services locally whenever possible.

Anticipated construction activities may create employment related expectations among the local population, which are unrealistic. If this is not managed appropriately, it could lead to worsened relationships between UPR and the local population, once these expectations do not materialize. The following measure will be implemented to manage the impact:

- Continue to provide timely and transparent information regarding employment opportunities related to the Project.

12.2.6.3. Impacts on Livelihoods

Economic displacement of persons whose crops may be affected by construction and generally any loss of livelihoods as a result of loss of land available for agriculture will be mitigated by undertaking the following measures:

- Minimize the amount of land occupied / disrupted during construction
- Provide timely information to users of land of when construction is planned to begin and how
- lost crops and damages will be compensated

- Compensate all users of land for lost crops and any other damages at full replacement value, in accordance with the Ukrainian Law and IFI policies
- Fully reinstate the land after disruption
- Establish and implement a grievance mechanism.
- These measures will ensure that land loss is minimized, however, approx. 30 ha of land will continue to be unavailable for agriculture even after construction.
- To prevent any livelihood losses as a result of transport and increased traffic, the following measures will be implemented:
- Provide timely information to people/households located along selected transport route that there will be increased transport activity in their area and the possible impacts as well as foreseen mitigation measures.
- Compensate any business losses full replacement value, in accordance with the Ukrainian Law and IFI policies
- If compensation alone is not sufficient to restore livelihoods, implement livelihood restoration measures in accordance with IFI policies
- Establish and implement a grievance mechanism

12.2.6.4. Community Health, Safety and Security

The influx of workers into the Project area causing disturbances for the local population, will be minimized by the implementation of the following measures:

- Encourage contractors to hire local workforce, i.e. give preference to suitably qualified and experienced applicants from the local communities.
- Enforce workers code of conduct
- Cooperate and coordinate with local health and safety facilities

The possibility of occasional incidents still exists. Such incidents could lead to tensions between the community and UPR and therefore will be prevented to the greatest extent possible.

Increase in traffic (bringing equipment and materials to the site and employee travel) could lead to more accidents in the local communities and reduced quality of life. These impacts will be managed with the implementation of the following measures:

- Provide timely information to people/households located along selected transport route and consult on mitigation measures
- Develop and implement a traffic management plan
- Workers code of conduct (guidance on safe driving)
- Cooperate and coordinate with local health and safety – security facilities

Any accidents involving local community members will have serious effects on the individual or his/her household and could lead to tensions between the community and UPR, which is why they will be prevented to the greatest extent possible.

12.2.6.5. Impacts on Infrastructure

Transport of heavy machinery could lead to damages of road surfaces, further causing accidents, vehicle damages, etc. The following measures will be undertaken to mitigate these impacts:

- Preparation of roads for heavy transport before construction
- Restoration of roads to at least pre-construction level

If roads used during construction are not fully restored, this could lead to tensions between UPR and the local communities and therefore this impact will be prevented to the greatest extent possible.

12.2.7. Health, Safety and Public Nuisance

In general, construction will be organized in consultation with the local community to ensure that community health and safety risks are minimized. Key issues for consideration will be:

- Routing of traffic to avoid settlements where possible;
- Prevention of nuisance from noise and vibration by timing of certain activities;
- Security and prevention of unauthorized access, particularly during tower erection and blade lifting operations.

12.2.7.1. Working at Height and Fall Prevention

Work at height may be performed during the erection of towers and fitting of blades. This will be subject to specific health and safety risk assessments by the contractors responsible for these operations. Particular regard will be had for, but not be limited to, the following (as set out in the IFC guidelines):

- Prior to undertaking work, test structure for integrity;
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers;
- Establishment of criteria for use of 100 percent fall protection (typically when working over 2 m above the working surface but sometimes extended to 7 m, depending on the activity). The fall-protection system should be appropriate for the tower structure and movements to be undertaken including ascent, descent, and moving from point to point;
- Install fixtures on tower components to facilitate the use of fall protection systems;
- Provide workers with an adequate work-positioning device system. Connectors on positioning systems must be compatible with the tower components to which they are attached;
- Ensure that hoisting equipment is properly rated and maintained and that hoist operators are properly trained;

- Safety belts should be of not less than 15.8 mm (5/8 inch) two in one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident;
- When operating power tools at height, workers should use a second (backup) safety strap;
- Signs and other obstructions should be removed from poles or structures prior to undertaking work;
- An approved tool bag should be used for raising or lowering tools or materials to workers on elevated structures; and
- Avoid conducting tower installation or maintenance work during poor weather conditions and especially where there is a risk of lightning strikes.

Trenches and drainage chambers may be in place on site. Drainage chambers (e.g. manholes and catch pits) will require visual inspection from ground level. Pits or chambers will not be left exposed overnight. Any trenches that have to be left open overnight will have a suitable barrier placed around them to prevent access and/or falls from height. All site operatives and site visitors will be briefed about such hazards during the induction. Suitable means will be taken to prevent the risk of trench wall collapse (e.g. battering back or appropriate trench support systems).

12.2.7.2. Delivery and Removal of Materials

Deliveries and collections should be planned and that adequate storage areas for material and equipment are allocated. Waste removal, e.g. excavated soil, should be planned and sufficient temporary storage provided.

12.2.7.3. Lifting Operations

Lifting the tower into place, and fitting the blades and nacelle, are specialist operations that will be subject to specific health and safety risk assessments by the contractors responsible for these operations. Particular regard will be had for, but not be limited to, the following:

- Access of lifting equipment to site;
- Fencing off a security area;
- Control of access to operational areas;
- Wind speed and direction;
- Weather conditions and risk of severe weather.

12.2.7.4. Use and Maintenance of Plant and Equipment

Construction plant and equipment used on the project will be inspected by the contractor for condition and suitability and be subject to verification of maintenance certificates or records, statutory or otherwise, prior to being put to use. All equipment will carry a suitable and valid examination certificate.

12.2.7.5. Ground Excavation

Normal good practice for preventing or minimizing risk from ground excavations will be followed, including but not limited to:

- All operatives should wear appropriate PPE;
- Suitable welfare facilities are to be provided;
- Staff should adopt good hygiene, no eating and smoking on site;
- Contractors should consider providing antiseptic wipes etc.;
- Contractors should adopt a suitable emergency action plan in the event of site accident; and
- Suitable first aid arrangements should be provided.

It is not currently thought that the ground at the project site is likely to be contaminated, but in the event that unusual ground conditions, odors or other signs of contamination are observed, a further risk assessment will be carried out to ensure that the risk to human health and the environment from such contamination is minimized.

Measures will also be taken to minimize the risk from working in confined spaces, such as trenches and pits, such as:

- Slope dewatering;
- Side wall support;
- Gradient adjustments;
- Providing safe means of access and egress;
- Avoiding prolonged use of combustion equipment and ensuring proper ventilation.

12.2.7.6. Traffic Management

A traffic management system will be set up, to ensure separation of construction workers from traffic related risks, including moving machinery. Heavy plant and vehicles will be provided with audible and visible reversing alarms. All vehicle movements must follow the designated routes and be accompanied by a banksman. An appropriate site speed limit will be enforced. Private vehicles will park in a designated area. Delivery and collection vehicles will follow the set route. All such vehicles will sign in and out of site. Individuals will wear high visibility clothing and must comply with the site traffic management system and use segregated walkways.

12.2.7.7. Storage of Plant and Materials

Plant and equipment will be stored in designated areas when not in use. Appropriate security will be provided.

12.2.7.8. Working near Live Electrical Equipment

Specific safety rules will be set up to be followed when working near live electrical equipment. A specific permit to work system will be in place for such work.

12.2.7.9. Slips, Trips, and Falls

These will be avoided where possible through good housekeeping, spill prevention and clean-up, avoiding uncontrolled use of ropes and cords, proper storage of construction materials and the use of slip resistant footwear.

12.2.7.10. Manual Handling and Over Exertion

Manual handling risks will be identified through the risk assessment process undertaken at site. Suitable control measures shall be identified and detailed within contractor risk assessments and method statements to reduce the risk to individuals, including:

- Training personnel to recognize weight limits and use of two person lifts or mechanical assists;
- Planning of work layout to avoid manual lifting of heavy loads;
- Posture improvement; and
- Taking regular breaks and rotate heavy lifting jobs.

12.2.7.11. Use of Hazardous Substances

The use of hazardous substances will be in compliance with various EU Directives, including 80/1107/EEC on protection or workers from the risks related to exposure to chemical, physical and biological agents at work, and Directive 1907/2006 on the registration, evaluation, authorization and restriction of chemicals (REACH). Appropriate health and safety assessments will be undertaken, including handling, storage, transfer and use. A register and site inventory of hazardous materials will be kept.

12.2.7.12. Nuisance from Noise and Vibration and Dust

Noise and vibration may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. To minimize potential impact as far as possible, the following measures will be taken:

- Construction activities will be planned in consultation with the local communities, so that the noisiest activities are planned during the day;
- Noise barriers and source attenuation measures such as silencers will be used where appropriate;

- Heavy plant will be routed to the construction site avoiding areas of habitation where possible;
- All plant and machinery will be tuned off when not in use;
- Where noise exposure is anticipated, hearing protection equipment will be provided and worn by all personnel.

Airborne dust can be generated by the operation of heavy plant and machinery, excavation and the exposure of bare soil to wind. This can cause a risk to construction workers and the local community, although the distance to the nearest community receptors makes this unlikely. The following control measures are typical of construction activities:

- Minimizing dust form material storage and transfer using dust suppression, enclosures and covers;
- Spraying roadways to minimize vehicle generated dust;
- Managing emissions form mobile sources by ensuring vehicles comply with national
- emissions standards;
- Avoiding open waste burning.

12.2.7.13. Being Struck by Objects

Measures will be in place to prevent workers being struck by objects or particles ejected from the use of machine tools. These will include:

- Designated waste drop zones and/or a waste chute;
- Using machine guards;
- Keeping traffic ways clear to avoid machining over obstacles;
- Use of temporary fall protection;
- Use of appropriate PPE including eye protection, face shields and hard hats.

12.2.7.14. Fire

Emergency contact numbers will be made available in the site plan. This will include the fire and rescue service and the environmental regulator. A 24-hour spill response contract will also be in place.

12.2.7.15. Unauthorized Public Access and Vandalism

Appropriate site security will be provided, including but not limited to:

- Fencing of the construction area, with gates and warning signs on access roads;
- Control of access roads to the turbines and associated equipment;
- Fencing off maintenance and equipment storage areas;
- 24-hour security personnel with CCTV to prevent unauthorized entry to the site;

- Display of contact details for emergency response services and police in the security station, for use in the event of unauthorized entry.

12.2.8. Management and Mitigation of Other Construction Impacts

12.2.8.1. Ground and Water

The site is relatively level and therefore the potential for water flowing across the site to cause significant soil erosion is low. To prevent impacts from runoff during land preparation and construction the following measures are foreseen: (a) excavations' face will be kept minimal to avoid the exposure of exposed surfaces to natural conditions, (b) surface runoff collection will be implemented through temporary drainage grooves and sedimentation ponds to avoid their direct discharge to the natural receptor, this is particularly important during wet seasons.

The largest user or water will be the concrete batch plant. The water supply must be of good quality and will either be provided from tanks or possibly a groundwater well. Appropriate measures will be employed at the construction site to reduce the risk of potentially polluting materials leakage. In particular, polluting materials such as oils, fuels and chemicals will be stored in dedicated storage areas, complete with spillage protection and working procedures, which ensure that these materials are handled correctly.

Domestic type wastewater will be collected at site and will be removed from site for treatment at an appropriate treatment facility. The site will not be connected to the local waste water collection system nor to any surface water and there will be no waste water treatment on site.

12.2.8.2. Archaeology and Cultural Heritage

UPR will appoint an archaeological monitor who will be in charge of archaeological monitoring and present during excavation.

12.2.8.3. Air Emissions

In general the key requirements are:

- Minimization of dust arising at the site through preventing exposure and drying out of soil where ever possible.
- Minimize emissions from generators and vehicles engines through appropriate maintenance, suitable levels of operation in accordance with national requirements and prevention of black smoke emissions.
- Point source emissions from the concrete batch plant will be expected to comply with EU standards.

12.3. Management and Mitigation during Operations

12.3.1. Introduction

The following sections provide a brief overview of the management and mitigation measures required during the operational phase of the project, based on the findings of the impact assessment. The impacts associated with the operational phase of the project are generally not as widespread as during construction but are where the impacts associated with specific receptors identified in the impact assessment may be most severe if appropriate management and mitigation measures are not implemented, particularly during the earlier stages of the project, during design and construction.

12.3.2. Ecology and Nature Conservation

12.3.2.1. Habitat Management and Mitigation

There will be no further impacts on habitats once the wind farm has been constructed therefore no mitigation is proposed.

12.3.2.2. Bats

There were not any well-established flight paths identified through the wind farm, and moreover, no major accumulations of bats during the day or hibernation periods were observed. Therefore, it has been decided that mitigation to discourage bats from passing through the site is not required.

12.3.2.3. Birds

Collision risk is assessed as low. Post-construction monitoring is proposed to monitor and mitigate collision risk with turbine blades. If necessary, target turbine shutdown during certain weather conditions, if deemed necessary, may be recommended.

12.3.3. Landscape and Visual

In relation to landscape and visual impacts, the broad aims and objectives of mitigation measures for the proposals during operation phase should include, but are not be limited to:

- To offset significant adverse impacts associated with views from sensitive areas such as the village settlements within the surrounding area (i.e. Starokozache, Semenivka, Udobne, and Moloha).

- An advanced mitigation planting program should be provided. Proposed replacement planting to replace areas removed during construction and decommissioning phases to facilitate machine access should also be included, all planting should comprise native plant species to reflect the local landscape character.
- All mitigation and replacement planting should be suitably protected, maintained and monitored during medium term establishment for a minimum of 5 years upon completion of the proposed development.

12.3.4. Noise Impact

The predicted noise levels are below the permitted values, and no particular noise mitigation measures are required other than those which are inherent in the design. It is expected that an appropriate maintenance program will be implemented to ensure correct functioning of the wind turbines and associated structures, in line with manufacturers' requirements, in order to ensure smooth running and minimization of noise.

12.3.5. Socio-Economic Impacts

12.3.5.1. Impacts to Land Use

Approximately 11.875 ha of land will continue to be occupied after construction. All measures previously listed for the construction phase will be implemented to minimize land occupation to the greatest possible extent.

Minor use restrictions will be applied on agricultural land in the vicinity of WTGs. The imposition of use restrictions is not expected to have a significant impact on users of affected land. However, to reduce the chances of any further impacts on livelihoods, these use restrictions will be confined only to areas needed for the safe operation of wind farms and easy access for repairs and maintenance.

12.3.5.2. Employment and Procurement Opportunities

Construction-related Employment

As for construction related employment, the contracting of any individuals for the operation of the wind farm will follow principles of international best practice. UPR will require all contractors to abide by Ukrainian law, including the Ukrainian Law "On Labour Protection," and international best standards.

Management of Contractors

UPR holds itself responsible for managing its contractors' (including any subcontractors') environmental and social performance. Management of all contractors and subcontractors shall

be conducted in accordance with the IFC's Good Practice Note: Managing Contractors' Environmental and Social Performance (October 2017). Management of contractors is addressed in UPR's Environmental and Social Management Systems document.

Indirect Employment

To foster the creation of indirect employment opportunities, the Project will continue to procure goods and services locally whenever possible. Supply chain management is addressed in the Environmental and Social Management Systems document.

12.3.5.3. Impacts on Livelihoods

Economic displacement of persons whose crops may be affected by repairs and generally any loss of livelihoods as a result of loss of land available for agriculture will be mitigated by undertaking the following measures:

- Minimize the amount of land occupied / disrupted during repairs
- Compensate all users of land for lost crops and any other damages at full replacement value,
- in accordance with the Ukrainian Law and IFI policies
- Fully reinstate the land after disruption
- Implement a grievance mechanism

12.3.5.4. Revenue Generation for the Local Government / Community

It will be important to ensure that all payments to local communities are made in a timely and transparent manner. Possible tensions between the project and local communities, or even local community not directly benefiting from the Project, may arise if appropriate management measures are not implemented properly.

12.3.5.5. Impacts on Infrastructure

The operation of the wind farm is expected to contribute to the improved access to agricultural plots and for that to happen, regular maintenance of internal access roads will be carried out.

12.3.6. Health, Safety and Public Nuisance

Health, Safety and Public Nuisance is covered by the Ukraine "Act on Labour Protection (safety and health)" of 14 October 1992, as last amended by Act No. 229-IV of 21 November 2002.

In addition, IFC has published a set of EHS Guidelines on typical industrial risks, as well as a specific guideline on health and safety risks associated with wind farms (IFC, 2007b). These are discussed further below.

12.3.6.1. Worker Health and Safety

Specific risks associated with workers at wind farms, as outlined in the IFC guideline, include working at height. This is relevant during construction and maintenance activities. Risk prevention measures included in the guideline are listed below and will be followed for onsite personnel wherever appropriate:

- Prior to undertaking work, test structure for integrity;
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers;
- Establishment of criteria for use of 100 percent fall protection (typically when working over 2 m above the working surface but sometimes extended to 7 m, depending on the activity). The fall-protection system should be appropriate for the tower structure and movements to be undertaken including ascent, descent, and moving from point to point;
- Install fixtures on tower components to facilitate the use of fall protection systems;
- Provide workers with an adequate work-positioning device system. Connectors on positioning systems must be compatible with the tower components to which they are attached;
- Ensure that hoisting equipment is properly rated and maintained and that hoist operators are properly trained;
- Safety belts should be of not less than 15.8 mm (5/8 inch) two in one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident;
- When operating power tools at height, workers should use a second (backup) safety strap;
- Signs and other obstructions should be removed from poles or structures prior to undertaking
- work;
- An approved tool bag should be used for raising or lowering tools or materials to workers on elevated structures; and
- Avoid conducting tower installation or maintenance work during poor weather conditions and especially where there is a risk of lightning strikes.
- In addition to these general occupational health and safety issues and risk prevention techniques, there are specific issues associated with wind farms, than can have an impact on occupational and public safety. The key issues are discussed in the following sections.

12.3.6.2. Blade Shear or Breakage

Wind turbines can suffer from wind shear, i.e. different wind speeds at the bottom and top of the blades. This can lead to bend of the shaft, and it is more likely to arise in onshore installations

than offshore due to the larger potential wind gradient. The design of the blades has been selected to be suitable for the prevailing climate and wind speed at the Dnistrovskiy Wind Power Project.

Blade breakage can potentially be caused by poor maintenance, or by very unusual wind conditions, e.g. hurricanes, tornadoes, or by lightning strike. This can lead to blades hitting the tower and being scattered. There will be a robust and comprehensive preventative maintenance programme to ensure that collapse does not occur through wear of critical parts such as gearboxes.

In the event of breakage, the blades could potentially be scattered some distance (up to 500m in some cases). The surrounding land use is arable, with very little human occupancy. The risk to human safety from blade scattering after breakage is therefore deemed to be very low, due to its very unlikely occurrence, and the absence of receptors.

In the very unlikely event that breakage occurs, UPR will ensure that debris is thoroughly removed and disposed of, proper replacement or removal and restoration is undertaken, with the appropriate level of compensation to any land or livestock owner adversely affected.

There is a very slight residual risk of injury to any employees on site at the time of collapse. Training will be provided to enable the indicators of wind shear or potential breakage, such as unusual noises from the tower, nacelle or blades, and evacuation would proceed immediately in these circumstances.

12.3.6.3. Turbine Collapse

Turbine collapse can happen in exceptional circumstances, due to brake failure, caused by extreme wind conditions or malfunctions of key controlling systems such as the gearbox, leading to uncontrolled blade rotation and the removal of the air brakes on the blade tips. Collapse can be prevented through proper design and maintenance. The design selected is suitable for the prevailing climate, wind speed and terrain at the Dnistrovskiy Wind Power Project. In addition, there will be a robust and comprehensive preventative maintenance program to ensure that collapse does not occur through wear of critical parts such as gearboxes.

In the event of collapse, it is expected from previous incidents that the majority of the tower and associated structures will fall in the area immediately adjacent to the turbine. The blades could potentially be scattered further. The surrounding land use is arable, with very little human occupancy. The risk to human safety from collapse is therefore deemed to be very low.

In the very unlikely event that collapse occurs, the operator will ensure that debris is thoroughly removed and disposed of, proper replacement or removal and restoration is undertaken, with the appropriate level of compensation to any land or livestock owner adversely affected.

There is a very slight residual risk of injury to any employees on site at the time of collapse. Training will be provided to enable the indicators of potential collapse, such as unusual noises

from the tower, nacelle or blades, and evacuation would proceed immediately in these circumstances.

12.3.6.4. Lightning Strike and Fire

There is a risk of damage to blades and electrical equipment by lightning strikes, which can also lead to setting fire to the hydraulic oil, the switchgear and transformer present in the nacelle. Fires caused in this way can be hard to detect, as there is no long-term human occupancy at the turbine, and they are very hard to fight due to the height of the nacelle above the ground.
The use of fire-resistant components in construction, where possible, and preventative maintenance to ensure the robust connection of the lighting protection (earthing) system, electrical systems and the correct operation of rotating parts in the nacelle that can cause temperature increases or sparks if poorly maintained, will help to prevent nacelle fires.
The provision of automatic fire detection systems linked to automatic shutdown systems will allow them to be dealt with in the shortest possible time by disconnection from the power supply systems. If this does not prevent the fire, automatic fire fighting is also provided.

Training of staff undertaking preventative maintenance using items such as welding equipment, will be robust to ensure that this type of introduced hazard does not lead to outbreaks of fires.
The area surrounding the turbines will be designated as “no smoking” and signage provided accordingly.

An emergency plan will also be maintained and updated to inform training of personnel. It will include a fire prevention plan, incorporating (but not limited to):

- Staff training;
- Inspection and maintenance (particularly of oil condition in the transformers in the turbine and
- substation);
- Testing and maintenance of fire control systems; and
- Communication and co-operation with fire services.

In the unlikely event of a nacelle fire, best practice is usually to allow burnout, and for firefighting services to establish a safety zone to ensure secondary fires in the area surrounding the turbine is prevented.

12.3.6.5. Unauthorized Public Access and Vandalism

Security will be provided to the site at various levels, as recommended by the IFC (IFC, 2007a), including (but not limited to):

- Locking of each individual turbine tower access door;
- Operating a permit to work system to prevent unauthorized access;
- Gates and warning signs on access roads;

- Control of access roads to the turbines and associated equipment;
- Fencing off maintenance and equipment storage areas; and
- Dissemination of information on safety zones and the hazards posed by the turbines in the local community.

12.3.6.6. Aviation

There is a general risk to aviation from the wing turbines, due to their height. Whilst the wind farm is not located within the radius of the effects of airports, UPR will undertake to install suitable anti-collision lighting systems on the towers, in consultation with the air regulatory traffic authorities before installation, in accordance with air traffic safety regulations. Additionally, a number of consultations are to be held with the Ukrainian air traffic service "Ukraerorukh" and "State Aviation Service." These companies will receive the coordinates, altitudes above sea level, and the surface of each turbine for approval.

12.3.6.7. Electromagnetic Interference

Electromagnetic interference can potentially be caused by wind turbines, through near-field effects, diffraction and scattering. These can impact on aviation radar systems and telecommunication systems.

The site is more than 45km from the nearest airport, so it is not expected that there will be any significant impact on their radar system. However, the project will be developed in consultation with the aviation authorities, and any suitable and appropriate measures will be incorporate as recommended.

12.3.7. Management and Mitigation of Other Operational Impacts

12.3.7.1. Traffic and Transport

The Transport Management Plan will address management of the operation phase. Traffic on access routes to the site should be reduced during the Operational Phase, small vehicles can be used to mitigate distruption During the operational phase it is expect that there will be no disruption of access to the agricultural plots or any compaction of ground caused by vehicles. Heavy vehicles should only access the via dedicated heavy transport route, most likely the route established during the construction phase.

12.3.7.2. Materials and Plant Management

The management and mitigation requirements for preventing and/or minimizing releases to the environment during operations are generally the same as for construction. During operations is it necessary to ensure the following:

- Correct storage and handling of hazardous materials and prevention from release to ground/groundwater, surface water and sewage networks;
- Ensure the implementation of an appropriate maintenance regime to minimize emissions to the environment both direct (e.g. maintenance of hazardous materials containment) and indirect (e.g. maintenance to maximize resource efficiency).

12.4. Management and Mitigation during Closure and Decommissioning

12.4.1. Introduction

In general management and mitigation during closure and decommissioning will follow the same requirements as during construction. Since closure and decommissioning will take place in excess of 25 years' time, it is not possible at present to identify with accuracy all closure and decommissioning requirements. Therefore, before any closure and decommissioning activities are undertaken, a formal assessment of the requirements should be undertaken, based on the design at the point of closure and decommissioning and potential issues which may arise at that time and will require management and mitigations. The potential issues and associated management and mitigation measures should be encompassed in a Closure and Decommissioning Plan, approved by the appropriate regulatory parties and any other pertinent stakeholders, such as investment banks.

The following sections provide a brief overview of the management and mitigation measures required during closure and decommissioning.

12.4.2. Noise

Overall, noise from decommissioning activities would be managed to minimize the impacts on the noise sensitive receptors. Noise control measures would include:

- The use of Best Practicable Means during decommissioning works,
- Ensuring that all staff and operatives are briefed on the requirement to minimize nuisance from site activities,
- Establishment of agreed site working hours for "normal" decommissioning activities,
- Programming works such that the requirement for working outside of normal working hours is minimized,
- Use of attenuation measures such as silencers/enclosures where appropriate;
- Plant and machinery will be well maintained
- Plant and machinery will be tuned off when not in use
- Establishment of agreed criteria whilst undertaking significantly noisy or vibration-causing operations near to sensitive locations;

Decommissioning traffic will follow pre-determined routes to access the site to minimize impacts, and where possible, routes will be selected to avoid areas of habitation.

12.4.3. Traffic and Transport

Management of traffic and transport during decommissioning involves essentially the same requirements as during the construction phase. Transport of equipment to and from site and decommissioned materials from the site will involve both public roads and roads on the wind farm site. UPR should assume responsibility for the effective management of transport at all stages of the project.

In order to minimize traffic and transport impacts, the following mitigation measures should be considered:

- Restricting traffic movements to reduce noise nuisance and congestion;
- Heavy plant traffic will be subject to the traffic management plan.

12.4.4. Habitats and Species

Prior to decommissioning of the site, the site will need to be re-surveyed to establish ecological baseline and determine whether specific methods of working are required with relation to habitats and species.

With careful programming and precautionary working practices, decommissioning should be possible with no significant effects on habitats or protected species. Any specific mitigation measures would be determined according to site conditions at the time and would be designed to minimize the effects on receptors.

12.4.5. Socio-Economic Impacts

The mitigation measures which will be implemented during decommissioning largely correspond with those undertaken during construction.

With regards to impacts to land use, it will be important to clear all materials and equipment upon dismantling of WTGs and fully reinstate the land for agricultural use.

12.4.6. Health and Safety

Health and Safety management and mitigation during decommissioning is essentially identical to that of construction.

12.4.7. Management and Mitigation of Other Decommissioning Impacts

12.4.7.1. Landscape and Visual Impact

In relation to the maintenance and mitigation of landscape and visual impacts during closure and decommissioning it is anticipated that the processes will be similar to those undertaken during construction therefore the broad aims and objectives of mitigation measures should include:

- Judicious vegetation clearance to ensure only limited vegetation is cleared to facilitate construction access and operations during decommissioning;
- Where machinery access is required in the vicinity of existing vegetation, suitable protection to existing tree canopies and root zones should be provided with protective fencing and ground protection surfacing, which should be removed immediately upon completion of works; and
- Land cover particularly topsoil areas should be stripped and stored during the decommissioning operations and subsequently reinstated (cultivated and graded) and returned to a condition suitable for agricultural use upon completion.

12.5. Monitoring Program

12.5.1. Ecology and Nature Conservation

Permanent Monitoring

The wind farm will be equipped with continuous monitoring equipment for monitoring bird and bat movements through and around the wind farm site in accordance with Ukrainian law.

Post-Construction Bird Surveys

The latest U.K. guidance (Natural England, 2010) on monitoring onshore wind farms both pre- and post-construction, recommends the survey methodology used for the additional bird surveys. It is recommended that post-construction monitoring will follow this methodology to allow direct comparisons of bird abundance and flight activity within the survey area, pre- and post-construction. This will involve 36 hours of vantage point surveys at each of the 6 vantage points during both the breeding and winter seasons, plus 9 breeding bird surveys between late March and July. In line with U.K. guidance, this monitoring is proposed for years 1, 2, 3, 5, 10 and 15.

It is proposed that post-construction monitoring should also include corpse searches for the first three years after construction. These corpse searches allow the actual bird mortalities for the wind farm to be established, allowing the operator to put in place further mitigating measures in the unlikely event that the wind farm is shown to have a significant mortality impact on any species of concern. The proposed methodology will be agreed with the local planning authority prior to construction.

Post-Construction Bat Surveys

A post-construction monitoring program will be implemented for a period of at least two years after construction of the wind farm (recording bat activity automatically by appropriate devices, e.g. batbox or Anabat).

Searches for possible collision casualties will also be undertaken. A search will be made for fatalities within 50m of each WTG. Transects will be walked through the area around each WTG once or twice a week during the bat active season.

The purpose of this monitoring is to:

- verify the assumptions made within the impact assessment and to determine significant deviations from predicted impacts;
- test the effectiveness of mitigation measures (e.g. alternation of the operational parameters to reduce bat fatalities); and,
  identify possible critical wind turbines and, if necessary, define further operational parameters to reduce bat fatalities.

12.5.2. Noise

We are not proposing monitoring to be undertaken during the construction phase of the project nor are we proposing any post construction (i.e. operational phase) monitoring. Evidence indicates that the noise levels will fall well within the prescribed limits during operations and appropriate controls will be in place during construction. In the event that noise appears to be causing a nuisance during operation, amendments to the construction management program will be implemented. In the event that, during operation, the wind farm appears to be causing nuisance, a post construction monitoring program will be devised and agreed with the appropriate regulatory authorities.

12.5.3. Traffic and Transport

It is not deemed to be necessary to undertake any specific monitoring associated with the traffic and transport. However, we expect that the transport management procedures will include an audit process to ensure that the construction traffic is adopting the appropriate transport routes.

12.5.4. Socio-Economic

Complaints and grievances submitted through the Project grievance mechanism should be regularly monitored. Feedback received from various Project stakeholders will alert UPR of any problems or issues that need to be dealt with, whether on an individual or community level. For example, frequent grievances regarding levels of traffic related noise at certain times of day or reoccurring difficulties in accessing land with agricultural machines and equipment may indicate that the Transport / Traffic Management Plan needs to be re-adjusted.

Grievance management itself needs to be monitored to ensure that all received complaints are addressed as described in the Project ESAP and SEP. All of this also pertains to workers' grievances.

Another key activity that requires monitoring is the reinstatement of land upon completion of construction activities, and later after decommissioning. Proper reinstatement is key to ensuring that people can continue to farm their land and expect the same quality of crops, so that their livelihoods do not suffer. The same applies to restoration of roads. This needs to be monitored at the end of constriction, to ensure that all roads have been reinstated to at least pre-construction level. The same applies during operations, concerning road repairs and maintenance.

Similarly, the execution of compensation payments for lost crops and damages must be monitored to ensure that it is being paid in a timely manner, so as to prevent any loss of livelihoods. If businesses are affected by increased traffic, their losses must be compensated and this too must be monitored to ensure livelihoods are improved or at least restored to the previous level.

Finally, the implementation of the Corporate Social Responsibility Program should be regularly monitored to ensure that it is achieving its goals and if there is a need to update possible areas of support, revise the application procedure, include more people in the decision making process, etc.

12.5.5. Landscape and Visual Impact

Further to a program of advanced mitigation and enhancement, (including replacement tree and shrub vegetation) all areas should be suitably protected, maintained in line with good horticultural practice and monitored for a minimum of 5 years upon completion of the proposed development.

The following aspects should be considered during post-construction monitoring:

- The monitoring of the planting areas will ensure that the planting is suitably maintained ensuring it achieves the performance and function as intended such as the screening of views from sensitive areas and replacing lost vegetation through preconstruction site clearance activities.
- Monitoring should be undertaken at least annually for the duration of the 5 year period upon completion of the planting operations. The monitoring visit should be undertaken by a landscape architect or a suitably qualified horticulturalist.
- During monitoring, plant stock should be inspected to assess the plant establishment and identify rates of plant losses. Plant failures should be recorded, and species replaced within the first available planting season, generally between November and February.

12.5.6. Health, Safety and Public Nuisance

We are not proposing any specific monitoring associated with Health, Safety and Public Nuisance. However, we expect that the management systems implemented for construction and operation will incorporate the following:

- Appropriate communications processes to receive communications from internal and external stakeholders
- Implementation of a non-conformance and corrective action process to record issues reported by internal and external stakeholders
- Audits to review the Health and Safety Performance during all phases of the project and encompassing work undertaken by all workers associated with the project, particularly those that are involved with site work.
- Transport management procedures will include an audit process to ensure that the construction traffic is adopting the appropriate transport routes and that health, safety and public nuisance issues are not being caused.
- Senior management review of the health and safety performance and improvements where necessary to ensure international level best practice.

Implementation of the management arrangements will be a requirement of any IFI and is part of the Environmental and Social Action Plan (ESAP).

12.5.7. Surface Water, Effluent and Land and Ground Quality

We are not proposing any specific monitoring associated with surface water, effluent and land and ground quality. However, we expect that the management systems implemented for construction and operation will incorporate the following:

- Appropriate training for all personnel involved in the handling of hazardous materials.
- Appropriate communications processes to receive communications from internal and external stakeholders, including that associated with reporting releases of hazardous materials to the environment.
- Implementation of a non-conformance and corrective action process to record issues reported by internal and external stakeholders.
- Audits to review the environmental performance during all phases of the project and encompassing storage, containment and use of all hazardous substances so as to prevent emissions to the environment.
- Senior management review of the environmental performance and improvements where necessary to ensure international level best practice.
- An accidental spillage procedure will be drafted and put in place prior to construction beginning.

Implementation of the management arrangements will be a requirement of any IFI and is part of the Environmental and Social Action Plan (ESAP).

12.5.8. Appendices

12.5.8.1. Corporate Social Responsibility Program

UPR seeks to have a positive impact in the local communities where it operates through its CSR programs. UPR works in cooperation with local leaders and stakeholders to meet each community's unique needs. Specifically, UPR plans to invest up to EUR 1,000 per MW of installed capacity for each year of the Project's operations through the CSR program. In addition to direct contributions to community budgets through land lease payments, this will also typically include direct investments in specific programs in each community's infrastructure. Direct investments may focus on specific themes like youth empowerment or initiatives that better the lives of the elderly.

The cornerstone of the UPR CSR program is cooperation with local communities to enhance local economic and cultural development. In choosing which projects to fund, UPR will take into account the minutes from public discussions and meetings with local communities and stakeholders, the feasibility of the proposed activity, the sustainability of the action, the number of beneficiaries, and the compliance with UPRs CSR program and its goals. The system of support to local communities will be continually improved and revised to suit local needs and respond to feedback received from the communities.

UPR has to date formed partnerships at a national level with the Caritas Foundation.

13. Summary of Impacts and Control Measures

The following Sections provide a summary of the impact assessment detailed in Section 11, the Management and Mitigation measures described in Section 12 and the 'Residual Impact' once the Management and Mitigation Measures have been applied.

The residual impact is summarized as a simple graduate scale from positive benefits down to negative impacts as follows:

Substantial Beneficial
Moderate Beneficial
Minor Beneficial
Negligible Beneficial
No Change
Negligible Adverse
Minor Adverse
Moderate Adverse
Significant Adverse

Where the summary of the impact is variable, such as where the impact is variable over a number of individual receptors, this can be expressed as a band of potential impacts. For example, a visual impact may be dependent on the position/location of individual receptors. In such a case, the impact may include:

No change
Negligible Adverse
Minor Adverse
Moderate Adverse

Rather than list each of the potential impact levels, the residual impact will be expressed as 'No Change – Moderate Adverse', where the impacts include those presented in the text (in this case 'No Change – Moderate Adverse) and those in between on the impact scale (in this case 'Negligible Adverse and Minor Adverse').

The following summaries are divided in to the three phases of the project; Construction; Operations; and, Closure and Decommissioning.

13.1. Summary of Construction Phase Impacts and Control Measures

13.1.1. Ecology and Nature Conservation

ECOLOGY & NATURE CONSERVATION: HABITATS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Loss of arable farmland habitat and marginal habitats such as grassland and scrub	Habitat management and enhancement	Loss of farmland habitat	**Minor Adverse**
Disturbance to mammal and reptiles	Clearance of working areas prior to construction	None	**Minor Adverse**
ECOLOGY & NATURE CONSERVATION: BIRDS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Disturbance to breeding birds during vegetation clearance	Time vegetation clearance to avoid the breeding season	Breeding birds will not be disturbed	**No Impact – Negligible Adverse**
Loss of breeding bird habitat	None proposed. No significant loss of breeding habitat expected given low density of nesting birds and ample available nesting sites.	None.	**Minor Adverse**
ECOLOGY & NATURE CONSERVATION: BATS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Noise, vibration and light disturbance to roosting, commuting and foraging bats	Minimize construction work between dusk and dawn. Restrict artificial lighting to required areas only.	Some noise, vibration and light disturbance to roosting, commuting and foraging bats is inevitable, but implementation of appropriate measures should have no appreciable effect.	**Minor Adverse**

13.1.2. Landscape and Visual Impact

LANDSCAPE AND VISUAL IMPACT			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Impact on land cover to form the new access points and tracks between turbines, underground cables, construction compound and storage facilities	Judicious vegetation clearance to ensure only limited vegetation is cleared to facilitate construction access and operations	No significant impact expected	**Minor Adverse**
Impact on landscape character due to the increased urbanization of the landscape associated with construction	Bespoke mitigation planting at strategic sites both within and outside the development area to create areas of vegetation consistent with landscape character	The turbines would progressively introduce modern dominant elements which would contrast with the character of the rural landscape and ultimately become the dominant feature of landscape; underground cables will have minimal visual impact	**Minor Adverse**
Impact due to change in land use including an increase in movement of construction vehicles, plant and equipment	Full reinstatement of working areas to agricultural use	These effects will have a limited degree of exposure on the wider area and as such, the effects on the landscape resources are expected to be minor	**Minor Adverse**
Visual / landscape character impact on adjacent sites (Dnistr Estuary / IBA)	Bespoke mitigation planting at strategic sites both within and outside the development area to create areas of vegetation consistent with landscape character	The proposed development will be contained at a distance of a minimum of 1.3 km from the designated area and will not result in direct physical effects on these areas	**Minor Adverse**
Visual impacts on views from villages Properties on the edge of villages will have views of wind turbines in the development area	Bespoke mitigation planting at strategic sites both within and outside the development area to create areas of vegetation and perform targeted screening of potential visual impacts	Residual impact varies according to receptor location; Most significant visual impact experienced by receptors on edge of village settlements toward development	**Varied Adverse: Negligible Adverse – Moderate Adverse** **(dependent on settlement location and orientation)**

LANDSCAPE AND VISUAL IMPACT			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Visual impacts on views from vehicle travelers	Bespoke mitigation planting at strategic sites both within and outside the development area to create areas of vegetation and perform targeted screening of potential visual impacts	Views from the main E-87 Odessa-Izmail motoerway would be limited to vehicle travelers traveling towards the development. Views would be fleeting due to speed of travel and vegetation alongside the road. Views from village roads would be restricted to a limited number of road sections and direction of vehicle travelers. Views from small tracks between villages within close proximity of the development would be most severely affected; however these are infrequently used.	**Minor – Moderate Adverse**
Visual impact on views from people in work, including receptors at varying distances from the scheme, ranging from immediate to in excess of 15 km Impacts associated with short term construction activities such as turbine processes	No specific mitigation measures	Views of the site would vary, from direct views of the temporary construction activities and direct views of the assembled turbines. In many areas views are disrupted by intervening vegetation and few vantage points are available due to the low lying and level landform.	**Minor - Moderate Adverse**

LANDSCAPE AND VISUAL IMPACT			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Visual Impact on views from users of Dnistr Estuary and Dnistr Delta IBA Impacts associated with construction activity such as crane and plant machinery movement and turbine installation. Potential views of a very limited number of turbines from the Dnistr sites, these views would in all likelihood comprise only the upper sections of a limited number of turbines	No specific mitigation measures	Where views are available the wind farm development would form a small proportion of the view and, from these areas, the scale and composition of the view are not likely to be affected due to intervening vegetation and topography.	**No Change - Minor Adverse**

13.1.3. Noise

NOISE AND VIBRATION			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Noise from construction of wind turbines – No significant impact expected.	Use Best Practicable Means during construction to prevent/manage noise emissions. For example, undertaking piling during day light hours only.	No significant impact expected.	**Negligible Adverse - Minor Adverse**
Noise from construction traffic - Potential for minor adverse noise and vibration impacts.	Define access routes to the site with the smallest number of properties in proximity to it.	Unlikely to be noise/vibration increases at residential properties in proximity to the chosen access routes, given distance between residences and access routes	**Minor Adverse**

13.1.4. Socio-Economic Impacts

IMPACTS TO LAND			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Reduction in land available for agriculture The total amount of land which will be occupied during construction is approximately 17.51, of which approx. 5.64 ha will be occupied temporarily.	Minimize the amount of land occupied during construction Position WTGs near edges of land plots to optimize land use. Upon the completion of construction activities, fully reinstate the land not permanently occupied	Approximately 11.87 ha of land will remain unavailable for agriculture after construction. Possibility of impacts on livelihoods discussed in separate section below.	**Minor Adverse**
Difficulties in accessing land as a result of increased traffic and internal access road upgrades	Develop and implement a traffic management plan Provide timely information to users of land of when access to their land might be more difficult (e.g. scheduled internal access road upgrades) Establish and implement a community grievance mechanism	Individuals may still occasionally experience difficulties in accessing land.	**No impact - Negligible Adverse**
EMPLOYMENT AND PROCUREMENT OPPORTUNITIES			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Creation of direct employment opportunities Approximately 10-20 local people will be employed during construction	Put in place transparent and fair recruitment procedures Ensure that all non-employee workers are engaged in line with both national legislation and applicable international (ILO) standards and recommendations Provide a grievance mechanism for workers	Possibility of impacts on livelihoods discussed in separate section below.	**Moderate Beneficial**

	Implement a training program for the local workforce		
EMPLOYMENT AND PROCUREMENT OPPORTUNITIES			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Creation of indirect employment opportunities associated with the Project's supply chain and spending of project employees in local communities.	Procure goods and services locally wherever possible	Possibility of impacts on livelihoods discussed in separate section below.	**Minor Beneficial**
Creation of employment related expectations among the local population	Continue to provide timely and transparent information regarding employment opportunities related to the Project	Individuals may still have unrealistic employment expectations from the Project.	**No impact - Negligible Adverse**
IMPACTS OF LIVELIHOODS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Economic displacement may occur during construction for the following categories of people: a) Persons who are using the land plots which have been or will be acquired for the project, but who are not owners of land, and whose crops may be affected by construction. b) Persons who are using the land plots which will be crossed during the transport and installation of WTGs in their future locations or other land which may be disrupted during construction, whose crops may be affected.	Minimize the amount of land occupied / disrupted during construction Provide timely information to users of land of when construction is planned and how lost crops and damages will be compensated Compensate all users of land for lost crops and any other damages at full replacement value, in accordance with the Ukrainian Law and IFI policies Fully reinstate the land after disruption Establish and implement a grievance mechanism	Proposed mitigation should be enough to at least restore livelihoods, if not improve them.	**No impact**
Loss of livelihoods as a result of loss of land available for agriculture	Minimize the amount of land occupied during construction Upon the completion of construction activities, fully	Proposed mitigation should be enough to at least restore livelihoods, if not improve them.	**No impact**

	reinstate the land not permanently occupied		

IMPACTS OF LIVELIHOODS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Increased incomes for farmers who signed servitude agreements with UPR	No mitigation needed.	Possibility of further impacts on livelihoods discussed below.	**Minor Beneficial**
Local economies will be improved as a result of employment and increased incomes for farmers.	No mitigation needed.	None.	**Minor Beneficial**
Loss of livelihoods as a result of transport and increased traffic Negligible with potential to rise to low adverse if any businesses along transport routes are identified.	Provide timely information to people/households located along selected transport route about the transport plan and possible impacts as well as foreseen mitigation measures. Compensate any business losses full replacement value, in accordance with the Ukrainian legislation and IFI policies If compensation alone is not sufficient to restore livelihoods, implement livelihood restoration measures in accordance with IFI policies Grievance mechanism has been established	Proposed mitigation should be enough to at least restore livelihoods, if not improve them.	**No impact**
Increased value of land in the Project area (negligible)	No mitigation necessary	None.	**No impact**

COMMUNITY HEALTH, SAFETY AND SECURITY			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Influx of workers into the Project area, further impacting on community health, safety and security (law and order issues, social pathologies)	Encourage contractors to hire local workforce, i.e. give preference to suitably qualified and experienced applicants from the local communities. Enforce workers code of conduct Cooperate and coordinate with local health and safety facilities	The possibility of occasional incidents still exists. Such incidents could lead to tensions between the community and UPR. However, the UPR development and local team has regional and international experiences in solving these issues.	**Minor Adverse - Moderate Adverse**
Increase in traffic (bringing equipment and materials to the site and employee travel) could lead to more accidents in the local communities and reduced quality of life.	Provide timely information to people/households located along selected transport route and consult on mitigation measures Develop and implement a traffic management plan Workers code of conduct (guidance on safe driving) Cooperate and coordinate with local health and safety – security facilities	Accidents involving local community members will have serious effects on the individual or his/her household and could lead to tensions between the community and UPR	**Minor Adverse - Moderate Adverse**

IMPACTS ON INFRASTRUCTURE			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Improved access to agricultural plots as a result of upgrading and widening of internal access roads prior to construction	No mitigation needed.	None.	**Minor Beneficial**
Damages to road surfaces during transport of heavy machinery	Preparation of roads for heavy transport before construction Restoration of roads to at least pre-construction level	If roads used during construction are not restored, this could lead to tensions between UPR and the local communities.	**Minor Adverse - Moderate Adverse**

13.1.5. Health, Safety, and Public Nuisance

HEALTH, SAFETY AND PUBLIC NUISANCE			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Industrial accidents associated with the construction of the wind farm. Potential for serious injury or death, particularly associated with falls from height and electrocution.	Implementation of an appropriate health and safety management system for all personnel on site.	Small scale accidents and slight injuries are inevitable on a large construction site. However, implementation of appropriate management systems should ensure that the risk of serious accident is very small.	**No Change - Minor Adverse**
Accidents associated with construction traffic, both on and off site associated with both workers and members of the public.	Accidents associated with construction traffic are not acceptable and all efforts should be made to prevent them. This will include implementation of traffic management plan. This includes ensuring vehicles are driven within speed limits and with care on public roads, as well as on site.	The traffic management measures should be robust enough to prevent accident.	**No Change**
Risks to the public and also workers associated with unauthorized site access. Risk of injury to those entering the site unauthorised and also risks to workers as a result of the unauthorised access.	Implementation of appropriate signage and site security.	Implementation of appropriate management systems will prevent impacts.	**No Change**

13.1.6. Emissions to Ground and Water

GROUND AND WATER			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Accidental release of fuels, oils, chemicals, hazardous materials, etc., to the ground, groundwater and/or surface water.	Appropriate procedures and protocols to be established and monitored for materials delivery and handling	Potential for accidental release during delivery of materials to the site will be minimized	**No Change**
Deliberate or accidental discharge of sanitary wastewater to ground, groundwater and/or surface water.	Sanitary waste will not be discharged to the ground deliberately. Measures to be in place to prevent accidental releases including locating waste water management systems away from open water and assurance that appropriate containment both primary and secondary is in place.	None	**No Change**
Discharge of pollutants in water used for plant, equipment and vehicle washing to ground	Washing activities will take place on areas with appropriate containment and procedures and protocols will be established and monitored to ensure that the preventative measures are efficient	Potential for accidental release of pollutants to the ground during washing activities will be minimized	**No Change**
Increase of sediment load in natural aquatic receptors resulted from direct runoff disposal	Minimization of excavations face during construction Temporary drainage grooves and sedimentation ponds for surface runoff collection	None	**No Change**

13.1.7. Archaeology and Cultural Heritage

CULTURAL HERITAGE			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Disturbance to archaeological zone of importance; one turbine is located just within the boundary of the largest perimeter of an archaeological security zone	No disturbance is expected to occur, but an archaeological monitor will be appointed and present during excavation	None expected.	**No Change**
Possible chance finds There are no known archaeological or cultural heritage objects within the project area (however one turbine is located within the largest archaeological security perimeter, see above), however the archaeological features in the area have not been investigated fully and chance finds during construction are possible. There is a potential for archaeological or cultural finds within the project area. Findings will increase knowledge of cultural heritage, but unnecessary damage would be a negative impact.	An archaeological monitor will be appointed and present during excavation. In case of chance finds, all works will be immediately halted and the archaeological monitor, together with other relevant cultural heritage experts, will issue necessary measures, in accordance with Ukrainian Law.	If chance finds are encountered - potential for slowing down construction or changes in the project footprint. Any findings will increase knowledge of archaeological and cultural heritage.	**Minor Beneficial - No Change**

13.1.8. Air Emissions

CULTURAL HERITAGE			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Dust emissions during construction and ground works	Development of procedures for: a) water spraying roads and dusty materials stockpiles b) sheeting vehicles carrying dusty materials on leaving the site to prevent materials being blown from the vehicles c) speed limits on unmade surfaces on site to limit dust	Dust propagation will be limited to construction area and will not influence local community. Workers should still be supplied with dust masks especially in dry days.	**Minor Adverse**
Emissions from generators and vehicles	Assurance that all engines operate to national standards and are fully maintained, particularly to prevent the release of black smoke.	Minor emissions from engines.	**Minor Adverse**

13.2. Summary of Operational Phase Impacts and Mitigation Measures

13.2.1. Ecology and Nature Conservation

ECOLOGY & NATURE CONSERVATION: HABITATS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
There will be no further impacts on the habitats once the wind farm has been constructed	N/A	N/A	**No Change**
ECOLOGY & NATURE CONSERVATION: BIRDS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Collision risk of birds with wind turbines	No mitigation is proposed	The baseline data and associated research has concluded that the proposed turbines are not expected to have a significant collision impact on bird populations	**Minor Adverse**
Disturbance/displacement/barrier effect of birds from wind farm	No mitigation is proposed	No clear flight lines were recorded through the wind farm. Therefore, the proposed wind farm is not thought to present a barrier area for birds.	**Negligible Adverse - Minor Adverse**
ECOLOGY & NATURE CONSERVATION: BATS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Collision risk with turbine blades	Post-construction monitoring Targeted turbine shutdown during certain weather conditions, if advisable or necessary.	Reduced collision risk	**Negligible Adverse**

13.2.2. Landscape and Visual Impact

LANDSCAPE AND VISUAL IMPACT			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Effects on Vegetation and Land Cover The site comprises large agricultural fields with open, undefined boundaries and therefore the proposals will not result in the loss of any significant landscape features or vegetation of particular value for its contribution to the wider landscape.	Mitigation planting program. All planting should comprise native plant species to reflect the local landscape character. Turbines should be a color which is unobtrusive to blend with the colors of the surrounding landscape sky and logos and other images should be avoided	During operation phases, internal access roads, the footprint of the turbines and electricity pylons will occupy a limited area of the overall site extents, this combined with the restoration of construction areas will in the main return the site to its current land cover condition.	**No Change**
Effects on Landscape Character The operation of the wind farm would result in a negative change to the landscape character of the site and its immediate surroundings due to the introduction of the tall industrial structures in the rural and predominantly low lying, open landscape.	Mitigation planting program. All planting should comprise native plant species to reflect the local landscape character. Turbines should be a color which is unobtrusive to blend with the colors of the surrounding landscape sky and logos and other images should be avoided	The turbines would introduce modern elements which would contrast with the character of the rural landscape and become a supplemental feature of the landscape.	**Minor Adverse – Moderate Adverse**
Effects on Land Use The scheme would introduce new tall vertical, manmade elements and associated infrastructure into an existing rural landscape resulting in alteration to the current agricultural land use.	Areas affected by construction activities to be fully reinstated and reverted back to agricultural land use.	It is anticipated that there will be continuation of agricultural land use over the rest of the site during operation and thus no detrimental change to the land use of the site.	**No Change - Minor Adverse**

LANDSCAPE AND VISUAL IMPACT			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Visual Impacts on views from villages and hamlets Operational phase would see the introduction of large-scale features that, from certain locations, would occupy a large proportion of the view from residential properties. Properties on the edge of villages will have views of wind turbines in the development area and potential views of the electricity pylons depending on orientation and location of receptor within a given settlement.	Bespoke mitigation planting at strategic sites and perform targeted screening of potential visual impacts Turbines should be a color which is unobtrusive to blend with the colors of the surrounding landscape sky and logos and other images should be avoided	Residual Impact varies according to receptor location and perception Most significant visual impact experienced by receptors on edge of village settlements toward development.	**Minor Adverse – Moderate Adverse** **(dependent on settlement location, orientation and perception)**
Visual Impacts on views from vehicle travelers Including numerous locations throughout the study area often associated with locations between villages and settlements from varying hierarchy of roads/ lanes and tracks in the area.	Bespoke mitigation planting at strategic sites and perform targeted screening of potential visual impacts Turbines should be a color which is unobtrusive to blend with the colors of the surrounding landscape / sky and logos and other images should be avoided	Views from main E-87 Odessa-Izmail motorway would be limited to vehicles travelling towards the development. Views would be fleeting due to speed of travel and vegetation alongside the road and within the intermediate landscape. Views from village link roads would be restricted to a limited number of road sections and direction of vehicle travelers. Views from tracks between villages and farmland within close proximity of the development would be most severely affected;	**Minor Adverse - Moderate Adverse**

		however these are infrequently used.	

LANDSCAPE AND VISUAL IMPACT			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Visual impact on views associated with people who are working	The proposed turbines should be a color which is unobtrusive in the landscape / sky and logos and other images should be avoided	Impact on views would vary according to distance of the worker from site and their work activity.	**Minor Adverse - Moderate Adverse**
Visual Impact on views from users of Dnistr Estuary / IBA sites Potential views of turbines from the Dnistr sites would in all likelihood comprise only the upper sections of a limited number of turbines dependent on viewer's position within the area.	The proposed turbines should be a color which is unobtrusive in the landscape / sky and logos and other images should be avoided	Where views are available the wind farm development would form a small proportion of the view and, from these areas, the scale and composition of the view are not likely to be affected due to intervening vegetation and topography.	**No Change - Negligible Adverse**

13.2.3. Traffic and Transport

TRAFFIC AND TRANSPORT			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Increased heavy vehicles traffic both locally and regionally.	Use of designated managed traffic routes only. Heavy construction traffic will be subject to a traffic management plan, as necessary.	None expected.	**Negligible Adverse**

13.2.4. Noise Impact

NOISE AND VIBRATION			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Operation of wind farm will increase noise levels, but levels will be within permitted levels.	None required as within permitted levels.	Increase in noise levels will not be significant.	**Negligible Adverse**

13.2.5. Socio-Economic Impacts

IMPACTS TO LAND			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Reduction in land available for agriculture The total amount of land which will continue to be occupied after construction and during operations is approximately 11.87 ha out of 17.51 impacted by the Project.	Landowners compensated through servitude agreements.	Approx. 11.87 ha of land will remain permanently unavailable for agriculture.	**Negligible Adverse**
Minor use-restrictions may be imposed on some agricultural land	Use-restrictions will be confined only to areas needed for the safe operation of the Project and for repairs and maintenance	None.	**Negligible Adverse**
EMPLOYMENT AND PROCUREMENT OPPORTUNITIES			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Creation of direct employment opportunities A small number of individuals will be contracted by UPR during the operational phase of the project	Put in place transparent and fair recruitment procedures	None.	**Negligible Beneficial**

EMPLOYMENT AND PROCUREMENT OPPORTUNITIES			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Creation of indirect employment opportunities associated with the Project's supply chain and spending of Project employees in local communities.	Procure goods and services locally whenever possible.	None.	**Negligible Beneficial**
IMPACTS ON LIVELIHOODS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Economic displacement Persons who are using the land plots which will be crossed during repairs of WTGs may be economically displaced if their crops are affected.	Minimize the amount of land occupied / disrupted during repairs Compensate all users of land for lost crops and any other damages at full replacement value, in accordance with the Ukrainian Law and IFI policies Fully reinstate the land after disruption Grievance mechanism implemented	Proposed mitigation should be sufficient to restore livelihoods, if not improve them.	**No Impact – Negligible Beneficial**
Increased incomes for farmers who regained full access to land (temporarily occupied by UPR for construction).	No mitigation needed.	None.	**Minor Beneficial**
REVENUE GENERATION FOR THE LOCAL GOVERNMENT / COMMUNITY			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Increased revenue for Bilgorod-Dnistrovskiy District and local communities	Ensure all payments are made in a timely and transparent manner; manage expectations appropriately	Possible tensions between the Project and other local communities not directly benefiting from Project	**Minor Adverse - Moderate Adverse**

REVENUE GENERATION FOR THE LOCAL GOVERNMENT / COMMUNITY			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Enhanced tourism opportunities for local communities	Support tourism-related initiatives when feasible through UPR CSR Program	Local economic development	**Moderate Beneficial - Minor Beneficial**
Increased foreign and domestic investment in Bilgorod-Dnistrovskiy District and wider area as	Continued support for investment in the Project area	Local economic development	**Moderate Beneficial - Minor Beneficial**
IMPACTS ON INFRASTRUCTURE			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Improved access to agricultural plots resulting from regular maintenance of internal access roads needed for repair and maintenance of WTGs	Regular maintenance of internal access roads	None.	**Minor Beneficial**

13.2.6. Health, Safety and Public Nuisance

HEALTH, SAFETY AND PUBLIC NUISANCE			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Industrial accidents associated with operation of the wind farm may occur. Potential for serious injury or death, especially associated with falls from height or electrocution.	Health and safety management system will be implemented for all personnel working on the Project	Health and safety management system shall ensure that the risk of a serious accident is very small	**No Change – Minor Adverse**

HEALTH, SAFETY AND PUBLIC NUISANCE			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Accidents may occur associated with traffic, both on and off-site, involving both workers and/or members of the general public	Accidents associated with traffic are not acceptable and all efforts to prevent them will be made including the implementation of a traffic management plan which will establish speed limits on public roads and on-site.	The traffic management measures should be robust enough to prevent accidents.	**No Change**
Unauthorized site access poses risks to both the public and workers.	Appropriate signage will be posted and site security shall be implemented	Implementation of appropriate management systems will mitigate impacts.	**No Change**

13.2.7. Electric and Magnetic

ELECTRIC AND MAGNETIC FIELDS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
There is a perception among the public that electric and magnetic fields could pose health risks. Evidence suggests this is only true at very high exposure levels.	Public residences are not in close proximity to the location of the electric and magnetic sources, consequently risk is negligible.	None.	**No Change**

13.2.8. Electromagnetic Interference

ELECTROMAGNETIC INTERFERENCE			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Potential disruption of aviation radar and radio systems	Wind farm situated away from main airport and flight paths and all required aviation approvals obtained	None.	**No Change**

13.2.9. Traffic and Transport

TRAFFIC AND TRANSPORT			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Increased heavy vehicle traffic might lead to congestion and damage roadways, both locally and nationally	Delivery hours will be restricted to avoid heavy truck movement at nighttime and to reduce noise nuisance Deliveries will be scheduled with consideration for peak traffic times to reduce congestion Traffic management plan will govern heavy construction traffic, as necessary	No disruptions are expected.	**Negligible Adverse**

13.2.10. Ground and Water

GROUND AND WATER			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Accidental release of fuels, oils, chemicals, hazardous materials, etc. to the ground, groundwater table and/or surface water	Establish and implement appropriate procedures and protocols for materials delivery and handling Monitor the aforementioned protocols	Potential for accidental release during delivery of materials to the site will be minimized	**No Change**
Deliberate or accidental discharge of sanitary wastewater to ground, groundwater and/or surface water	Sanitary waste will not be discharged deliberately to the ground. Measures will be implemented to prevent accidental release and waste water management systems will be located away from open water and properly contained	None.	**No Change**
Groundwater depletion may occur if a borehole is used to provide water for operations	If borehole used, water use will be minimized or water transported to site instead by tanker	Existing groundwater reserves exploitation rate is sufficient for water requirements; alternatively water will be transported to site by tanker	**No Change**

13.3. Summary of Decommissioning Phase Impacts and Control Measures

13.3.1. Noise

NOISE AND VIBRATION			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Noise nuisance from decommissioning of wind turbines and removing foundations may occur	Use best practicable means	No change.	**Negligible Adverse – Minor Adverse**
Traffic from decommissioning activities may cause minor adverse noise and vibration impacts	Access routes to site were selected to minimize the number of properties in close proximity	Given the absence of residential properties in close proximity to the selected access routes, noise and vibration increases are not expected to occur or will be negligible given the distance	**No Change - Minor adverse**

13.3.2. Traffic and Transport

NOISE AND VIBRATION			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Increased heavy vehicle traffic, both locally and nationally	Traffic management system shall be implemented to avoid causing congestion Delivery hours restricted during nighttime and to reduce noise and nuisance Deliveries scheduled with consideration for peak traffic periods	Traffic could potentially lead to congestion and cause local complaints due to noise/vibration. Based on the transportation study conducted, there is not expected to be a significant impact.	**Negligible Adverse – Minor Adverse**

13.3.3. Socio-Economic Impacts

LAND USE AND LAND ACQUISITION			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Reduction in land available for agriculture A total of approximately 11.87 ha of agricultural land will be permanently used during the life cycle of the Project	All materials and equipment will be cleared Upon complete decommissioning, land shall be fully reinstated	None.	**Negligible Adverse – Minor Adverse**
Increased land available for agricultural use and use-restrictions on land removed Approximately 11.87 ha will become available for agricultural use once the Project is decommissioned and the turbines are dismantled; use restrictions will be removed once the turbines are removed.	All materials and equipment will be cleared Upon complete decommissioning, land shall be fully reinstated	None.	**Minor Beneficial**
EMPLOYMENT AND PROCUREMENT OPPORTUNITIES			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Dismantling of turbines, disposal of materials and reinstatement of land will generate a small number of direct and indirect employment opportunities for local people	Put in place transparent and fair recruitment procedure. Abide by national legislation and applicable international standards Provide a grievance mechanism for workers Implement a training program for the local workforce	None.	**Minor Beneficial**

IMPACTS ON LIVELIHOODS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
<u>Economic displacement</u> Dismantling and transporting turbines for site clearance may require crossing land plots and affect some crops; people using these plots may be economically displaced	Minimize the amount of land occupied / disrupted during construction Provide timely information to users of land of when construction is planned and how lost crops and damages will be compensated Compensate all users of land for lost crops and any other damages at full replacement value, in accordance with the Ukrainian Law and IFI policies Fully reinstate the land after disruption Establish and implement a grievance mechanism	Mitigation measures should sufficiently restore	**Minor Beneficial**
<u>Restoration of land ownership</u> Landowners and/or territorial communities will have possibility to regain full ownership and control of land after decommissioning of turbines (approximately 11.87 ha)	Provision to be included in land leases between UPR and territorial communities.	None.	**Minor Beneficial**

13.3.4. Health, Safety and Public Nuisance

HEALTH, SAFETY AND PUBLIC NUISANCE			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
It is possible that industrial accidents could occur with the decommissioning of the wind farm, including the potential for serious injury or death including from falls from height or electrocution.	An appropriate health and safety management system will be established and implemented for all personnel associated with the Project	Implementation of appropriate management systems should ensure that the risk of a serious accident is very small	**No Change – Minor Adverse**
Accidents associated with decommissioning traffic, both on and off-site, involving both workers and/or members of the public	Accidents associated with decommissioning traffic are not acceptable and all efforts will be made to prevent them.	Traffic management system should be adequate to prevent accidents.	**No Change**
Risk of injury if site is accessed without authorization by the public and/or workers.	Appropriate signage will be posted and site security implemented	Implementation of appropriate manage systems will prevent impacts	**No Change**

13.3.5. Ecology and Nature Conservation

ECOLOGY AND NATURE CONSERVATION: HABITATS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Habitat Loss due to decommissioning activities, same as construction	Resurvey site and implement habitat management and enhancement, same as construction	None.	**No Change – Minor Adverse**

ECOLOGY AND NATURE CONSERVATION: HABITATS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Disturbance to wildlife	Resurvey site, clear work areas prior to decommissioning activities, same as construction	None.	**No Change – Minor Adverse**
ECOLOGY AND NATURE CONSERVATION: BIRDS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Disturbance to breeding birds during deconstruction	Time any vegetation clearance to avoid the breeding season	Breeding birds within the work area will not be disturbed	**No Change – Negligible Adverse**
Displacement of birds during deconstruction	No mitigation proposed	Some birds may be displaced during decommissioning activities however, abundant alternative habitat is available	**Negligible Adverse – Minor Adverse**
ECOLOGY AND NATURE CONSERVATION: BATS			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Noise, vibrations and light disturbances associated with decommissioning may cause disturbance to roosting, commuting and foraging bats	Decommissioning work shall be minimized between dusk and dawn. Use of artificial lighting will be used judiciously in required areas only.	Potential short-term disturbance to bats	**Negligible Adverse**

13.3.6. Landscape and Visual Impact

LANDSCAPE AND VISUAL IMPACT			
Impact	Proposed Control Measure	Residual Impact	Residual Impact Rating
Impacts from the decommissioning of the wind farm are expected to be similar to those experienced during construction.	Resurvey site, clear work areas prior to decommissioning activities, same as construction	None.	**No Change – Minor Adverse**

14. Appendix

24.04.2019

ASSESSMENT OF THE VISUAL IMPACT OF THE PLANNED DNISTROVSKA WIND POWER PLANT

KYIV-ODESA 2019

CONTEXT

LIST OF SYMBOLS, UNITS, ABBREVIATIONS AND TERMS

DTM	–	Digital Terrain Model
GIS	–	Geographic Information System
JTC	–	Joined Territorial Community
MW	–	Megawatt
VEM	–	Visual Envelope Map
VIA	–	Visual Impact Assessment
VP	–	View Point
WPP	–	Wind Power Plant
WT	–	Wind Turbine
ZTV	–	Zone of theoretical visibility
ZVI	–	Zone of Visual Influence

FIGURES

TABLES

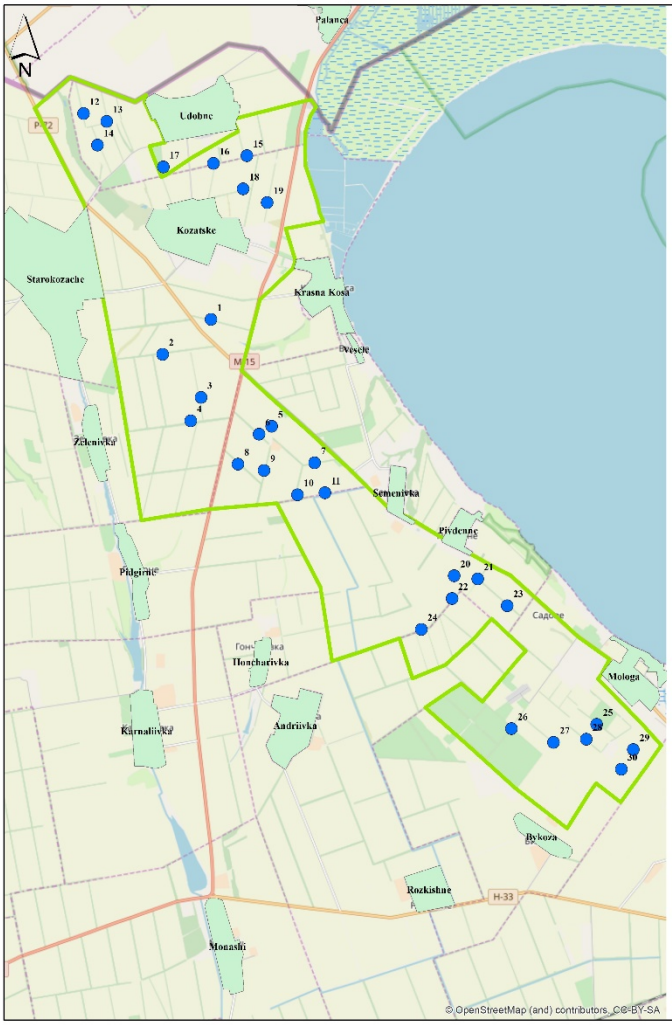
1. SHORT DESCRIPTION OF THE PROJECT

The Project will be located in Bilgorod-Dniestrovskii district of Odessa Region outside the village Starocozache, village Kozatske of Starokozatska village council (Starokozatska Joined Territorial Community (hereinafter – JTC), village Mologa of Mologivska village council (Mologivska JTC), village Semenivka of Semenivska village council and village Udobne of Mayakivska village council (Mayakivska JTC).

Site of planned Project located along the north-western bank of the Dnistrovskii estuary, in the north almost near the border with Moldova, and in the south – reaching the village Mologa. The section of the wind park is crossed by the Odessa-Izmail motorway (E-87) and the road of local significance, which passes almost through the entire WPP.

The length of the site from the northwest to the southeast is 28 km, with the largest width of 7.5 km, however, in the greater part of it is 3-4 km. The total area of the wind power plant (hereinafter – WPP) is approximately 96 km^2 [1].

Location of Dnistrovska WPP in relation to the settlements, and coordinates of the wind turbines (hereinafter – WT) are given on Figure 1.1.



Geographic coordinates of WTs location

WT	Latitude	Longitude
1	46,3262	30,051
2	46,317	30,0326
3	46,3057	30,0472
4	46,2996	30,0433
5	46,2982	30,0742
6	46,2961	30,0693
7	46,2886	30,0905
8	46,2882	30,0613
9	46,2866	30,0712
10	46,2802	30,084
11	46,2807	30,0944
12	46,3801	30,0025
13	46,3781	30,0113
14	46,3718	30,0078
15	46,3691	30,0647
16	46,3671	30,0519
17	46,3661	30,0328
18	46,3604	30,0633
19	46,3568	30,0724
20	46,259	30,1436
21	46,2581	30,1526
22	46,253	30,1428
23	46,2511	30,1638
24	46,2448	30,1311
25	46,2199	30,1979
26	46,2188	30,1655
27	46,2152	30,1815
28	46,216	30,1939
29	46,2133	30,2118
30	46,2081	30,2073

Figure 1.1 – Location of Dnistrovska WPP and geographic coordinates of WTs

2. VISUAL IMPACTS ASSESSMENT

Visual impact assessment (hereinafter – VIA) was mainly focused on the operation phase, as the wind turbines will be the main visible components of the Project.

The operational life of the Project will be a minimum of 25 years with proper maintenance and advancements that could be made in line with future technological developments.

An assessment of the visual impact of planned activity on recipients is carried out according to *Guidelines for Landscape and Visual Impact Assessment, Third Edition*, (2013), *Landscape Institute and Institute of Environmental Management and Assessment*, and *an Approach to Landscape Character Assessment (2014), Natural England* [2, 3] in Table 2.1.

Table 2.1 – Sensitivity Criteria for Visual Receptors

Impact Subject	High	Medium	Low
Visual	– Residents at home; – People, whether residents or visitors, who are engaged in outdoor recreation; – Visitors of heritage assets or to other attractions; – Communities where views contribute to the landscape setting enjoyed by residents; – Travelers on road, where travel involves recognized scenic routes awareness of views is likely to be particularly high.	– Residents at public places; – Travelers on road, rail or other transport routes.	– People at their place of work whose attention may be focused on their work or activity, not on their surroundings; – People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape.

2.1 Land Preparation and Construction Phase

The main impact during construction phase will be sourced from installation of turbines. Visual impacts of turbines will start with a relatively low magnitude and reach the highest magnitude by the end of construction phase, especially during commissioning activities.

Visual impacts during construction, due to vegetation and tree removal, earthworks, will be temporary.

2.2 Operation Phase

During the operation phase, 30 WTs will be operational, installed capacity of 3.8 MW each, with the height to the axis of the rotor 131.4 meter, and the diameter of the rotor 137 meters, Figure 2.1.

Figure 2.1 – WT General Electric 137

As detailed in the following sections, the following studies were conducted as part of the VIA:

- zone of theoretical visibility (ZTV) diagrams were produced;
- photomontages were prepared;
- effects on representative viewpoints were assessed.

2.2.1. Zone of Theoretical Visibility

The term «Zone of Theoretical Visibility» (ZTV) is used to describe the area over which a development can theoretically be seen and is based on a Digital Terrain Model (DTM) and overlaid on a map base. This is also known as a Zone of Visual Influence (ZVI), Visual Envelope Map (VEM).

However, the term ZTV is preferred for its emphasis of two key factors that are often misunderstood:

- visibility maps represent where, in theory, a development may be seen, it may not actually be visible in reality, for example due to localized screening which is not represented by the DTM; and
- the maps indicate potential visibility only, that is the areas within which there may be a line of sight. They do not convey the nature or magnitude of visual impacts, for example whether visibility will result in positive or negative effects and whether these will be significant or not.

ZTV diagrams for the Project have been generated using Geographic Information System (GIS) software, to demonstrate the number of turbines that may theoretically be seen from any point in the study area (9 viewpoints (VP)).

In the scope of the VIA study conducted for the Dnistrovska WPP, 9 representative viewpoints were selected as shown in the map provided in Figure 2.2.

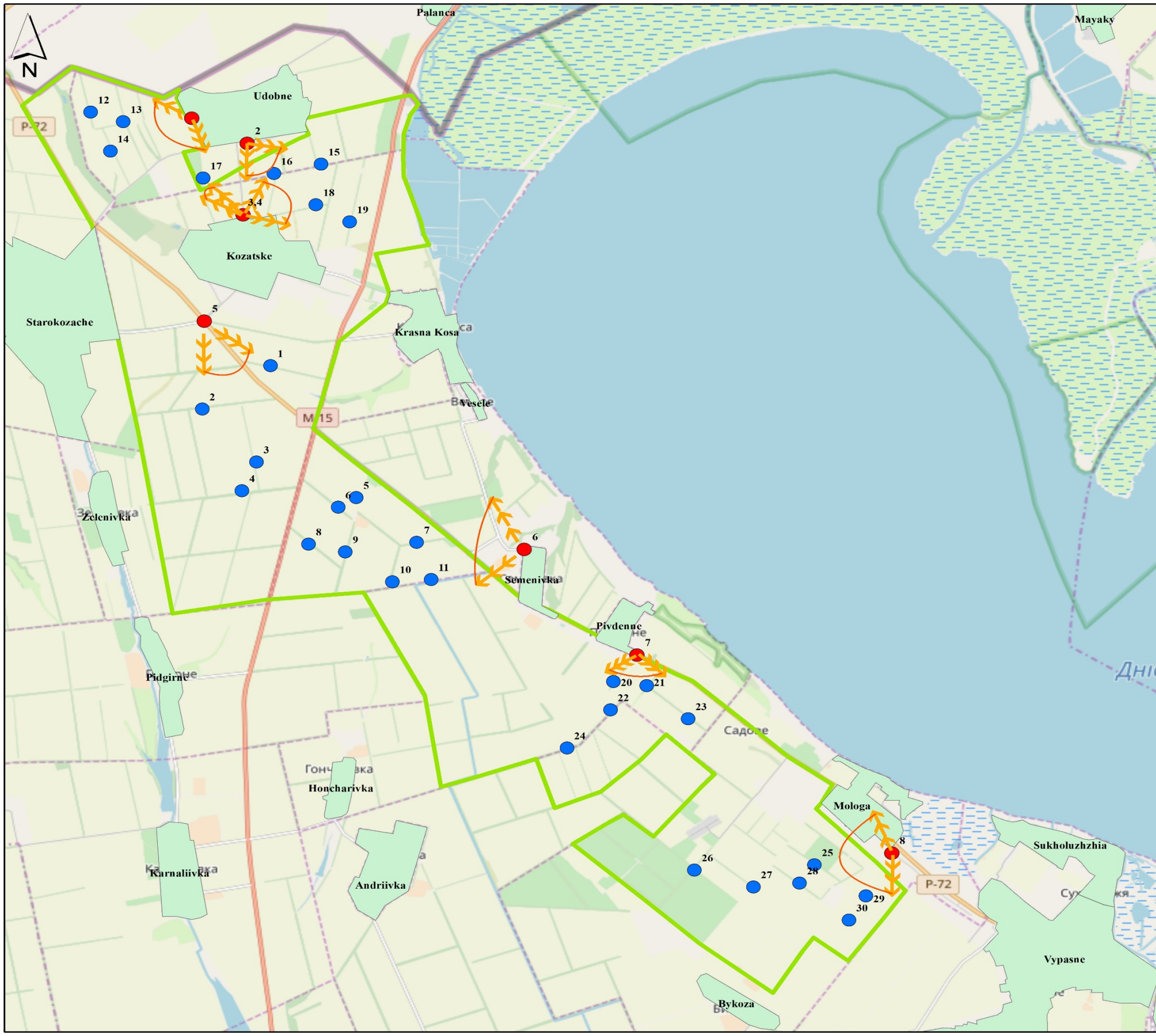


Figure 2.2 – Locations of representative viewpoints

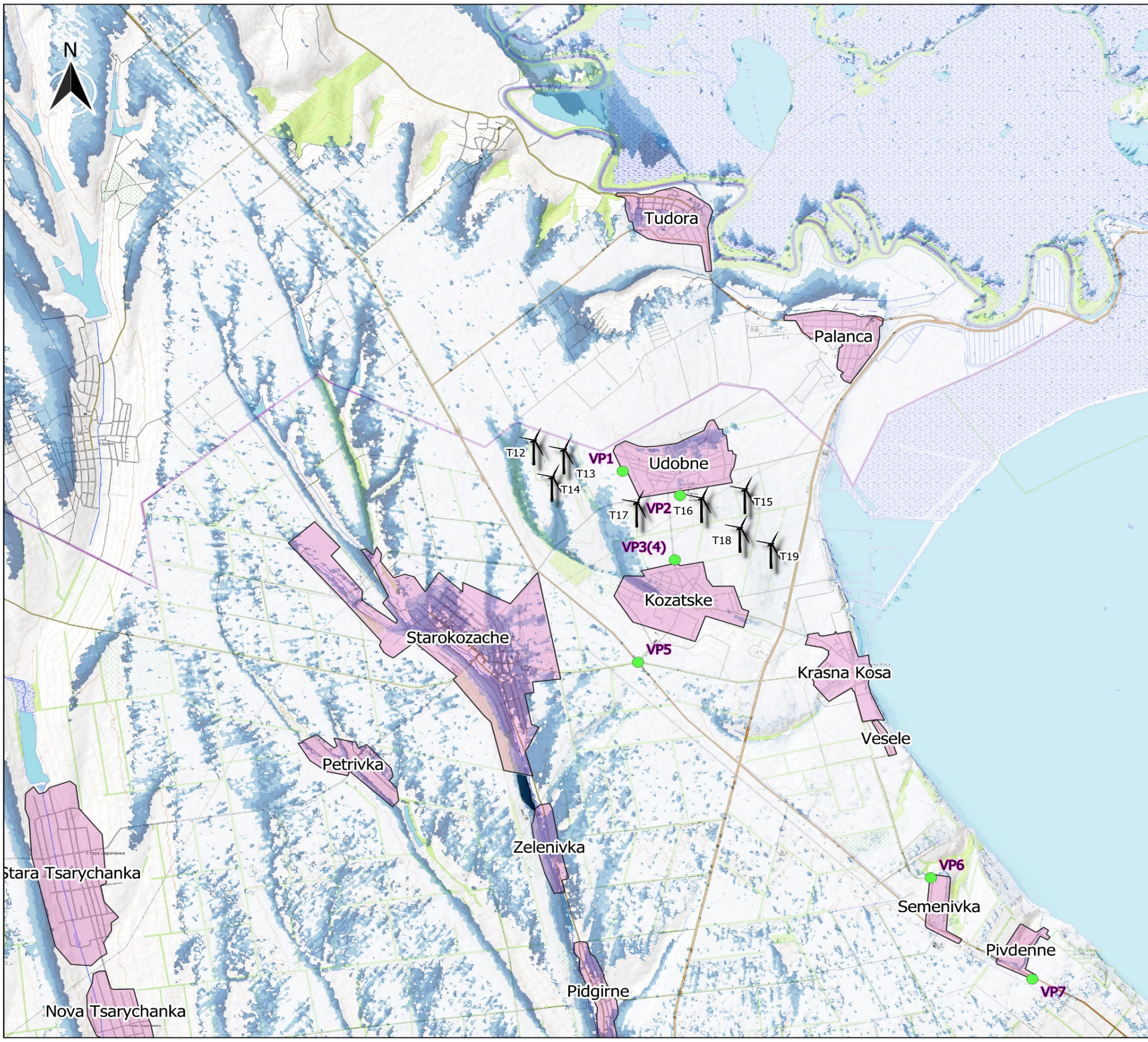


Figure 2.3 – Zone of Theoretical Visibility Maps (WTs 12-19)

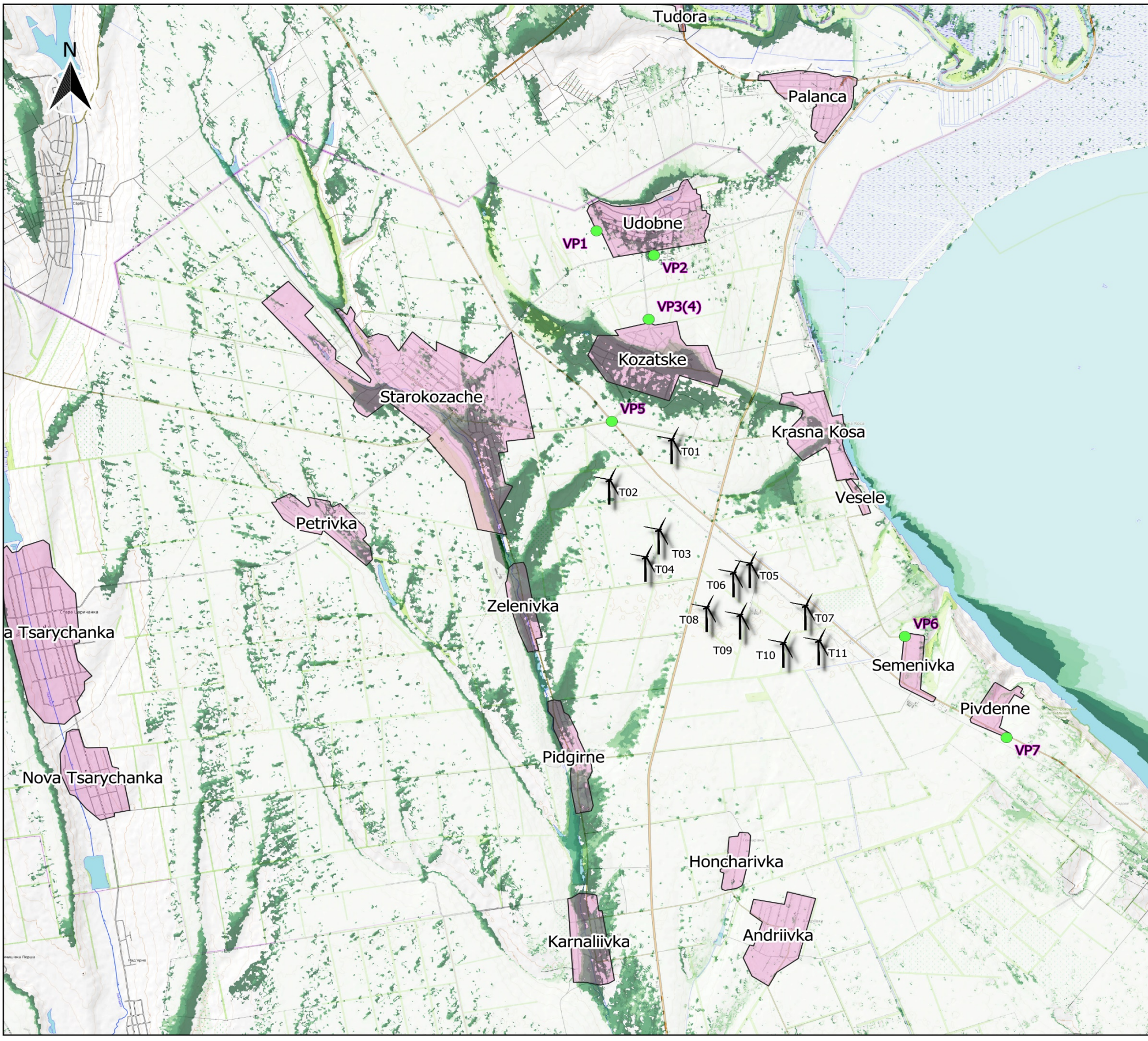


Figure 2.4 – Zone of Theoretical Visibility Maps (WTs 1-11)

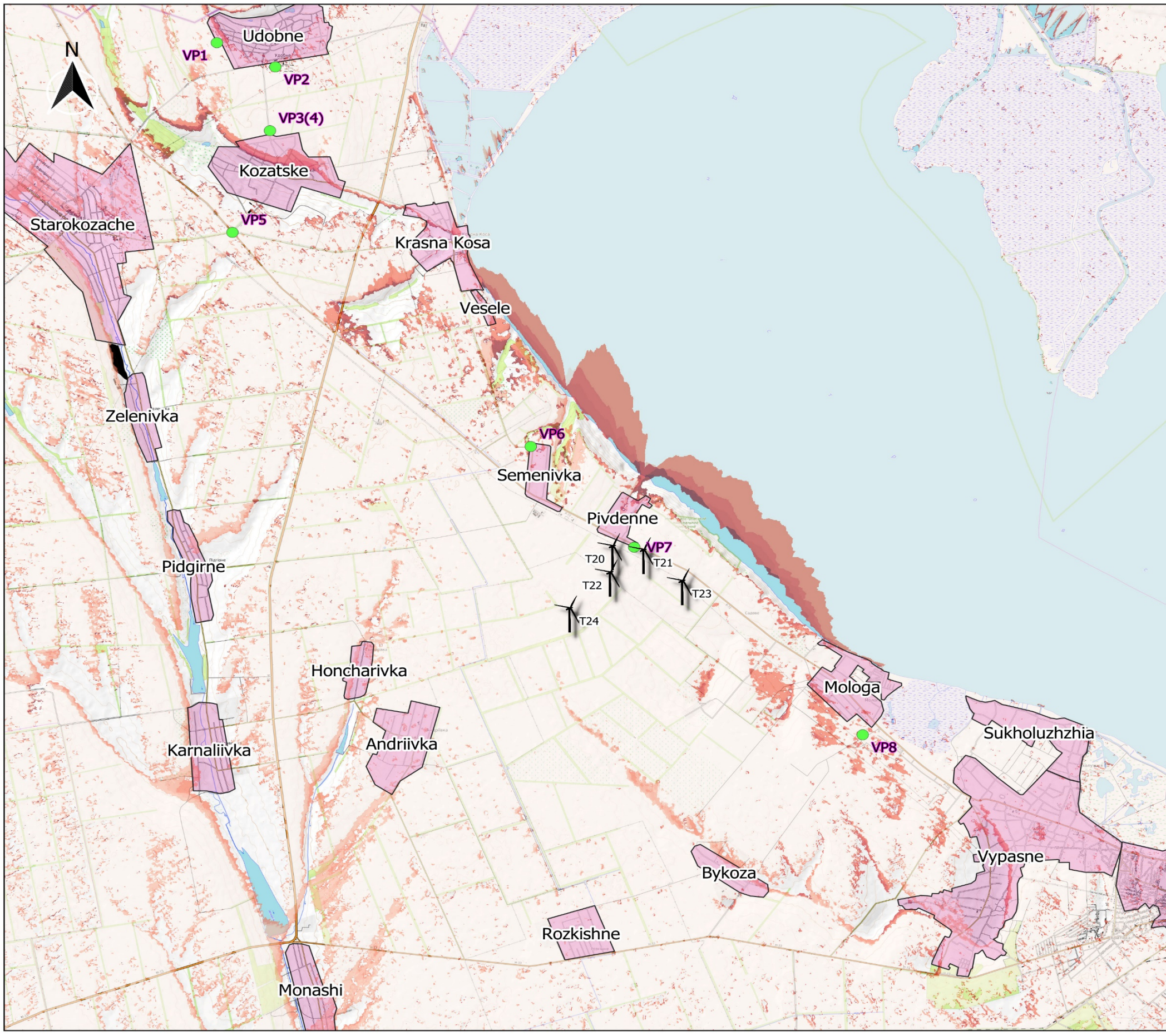


Figure 2.5 – Zone of Theoretical Visibility Maps (WTs 20-24)

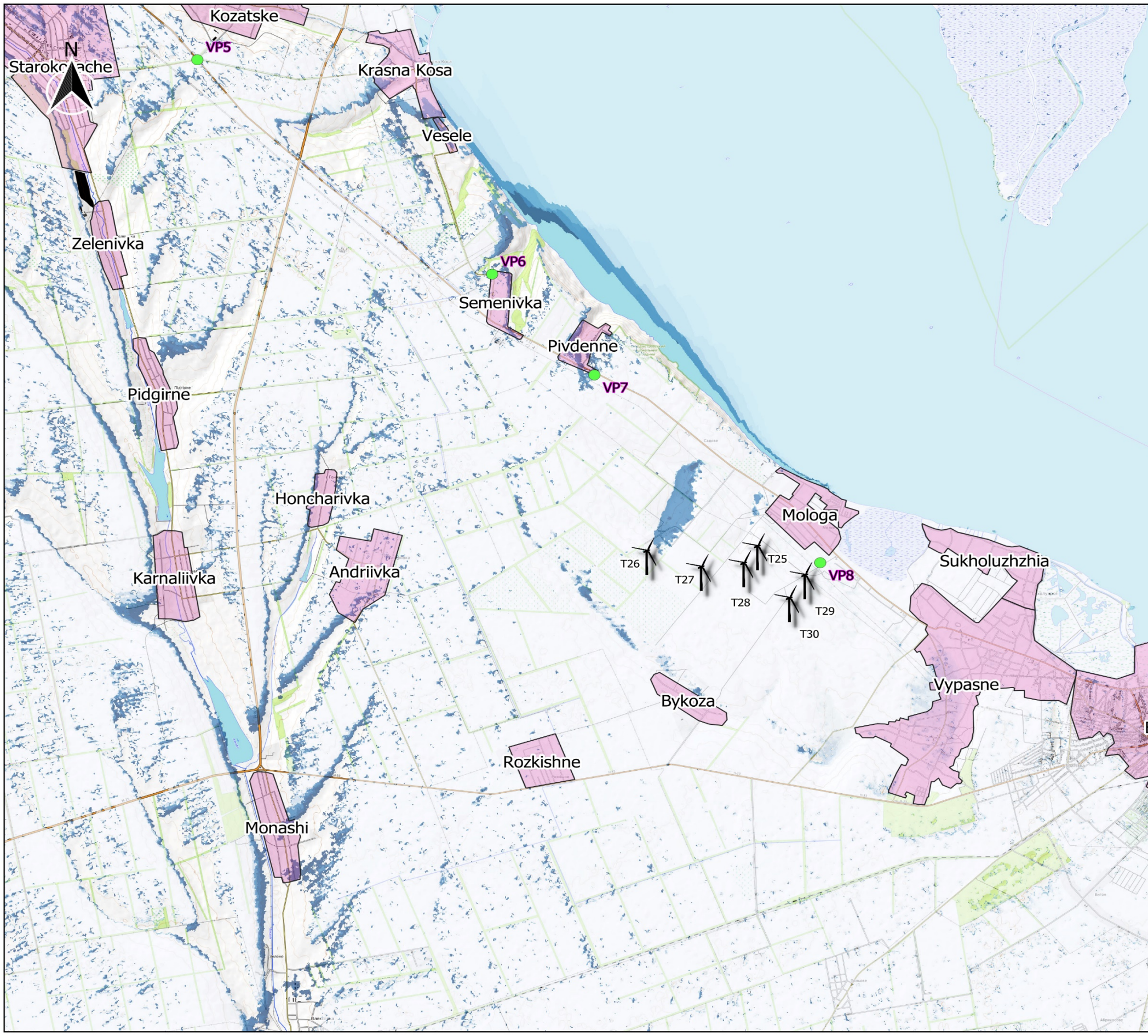


Figure 2.6 – Zone of Theoretical Visibility Maps (WTs 25-30)

2.2.2 Photomontage

Photomontages are illustrations that aim to represent an observer's view of a proposed development. For the purposes of this assessment, photomontages have been compiled to analyses the potential visual impact of the wind turbines from a selection of representative viewpoints.

The methodology used for the visualization production is based on the Guidelines for Landscape and Visual Impact Assessment 3rd edition (*Landscape Institute, IEMA, 2013*) and the Visual Representation of Wind Farms, (*Scottish Natural Heritage, December 2014*).

Nine viewpoints have been selected for the preparation of photomontages. The selection was based on the viewpoints which represent a range of viewer types (e.g. residents living in the surroundings, travelers along designated routes) and potential cumulative impacts due to other operational WPPs identified in the study area.

The photomontages were generated using digital photographs taken by Canon 1100 with 55-200 mm lens, ESRI ArcGIS software, 3D modelling software (Autodesk 3ds Max) to generate the wireline diagrams or 'wireframes', and rendering software.

To ensure the photomontages consistently present a view which is representative of the human eye, photographs were taken at average human viewing height (approximately 1.50 m).

Although the parameters of human vision when stationary are often quoted as falling between the 45-60°, humans generally move their eyes, heads and bodies as necessary to experience a view.

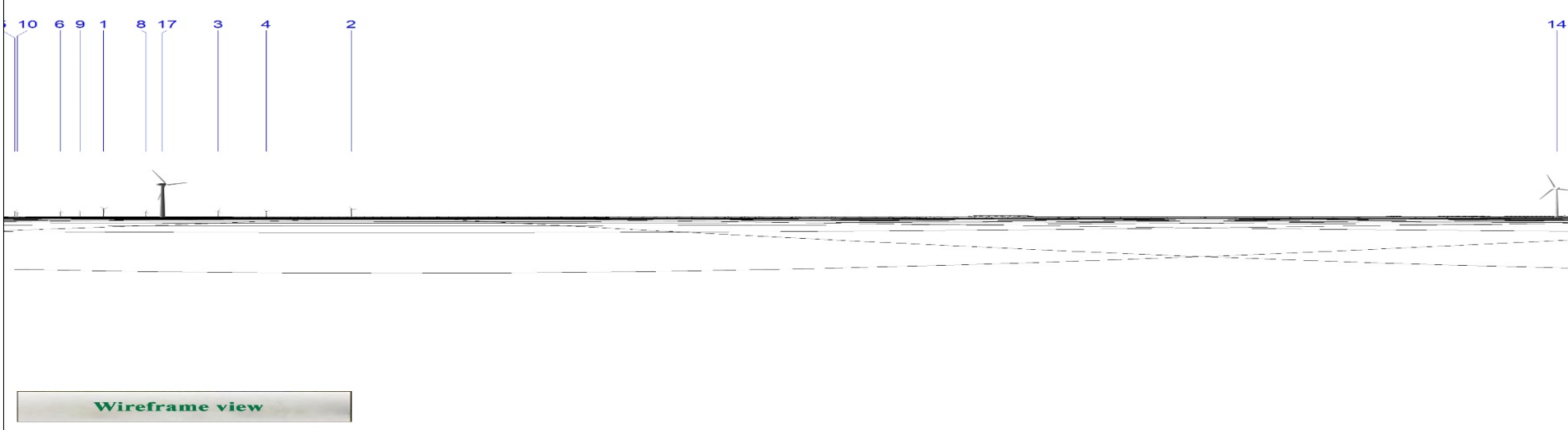
Therefore, a wider field of view has been used for the photomontages to represent panorama view Figure 2.7-Figure 2.15.

2.3. Closure Phase

During the beginning of closure phase, visual impacts associated with turbines will have the same impact significance as the operation phase.

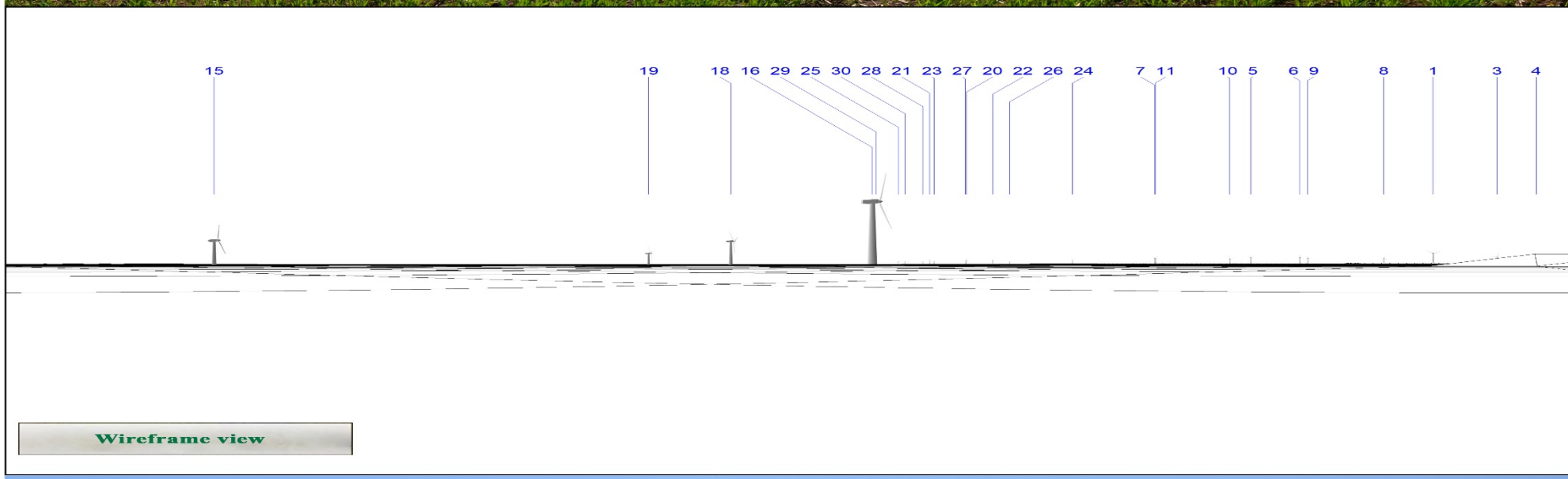
2.4. Mitigation Measures

The Project's potential visual impacts and the proposed mitigation measures for the land preparation, construction, operation and closure phases are provided in Table 2.2.



Viewpoint Location Information								
X (Easting)	Y (Northing)	Z (from sea level)	Z (Offset)	Center of panorama View Direction	Field of View (deg)	WTs within field of view	Visible WTs at tip height	Vi ho
3342773	5841231	112	+1.5	218	120 x 49	13	13	1

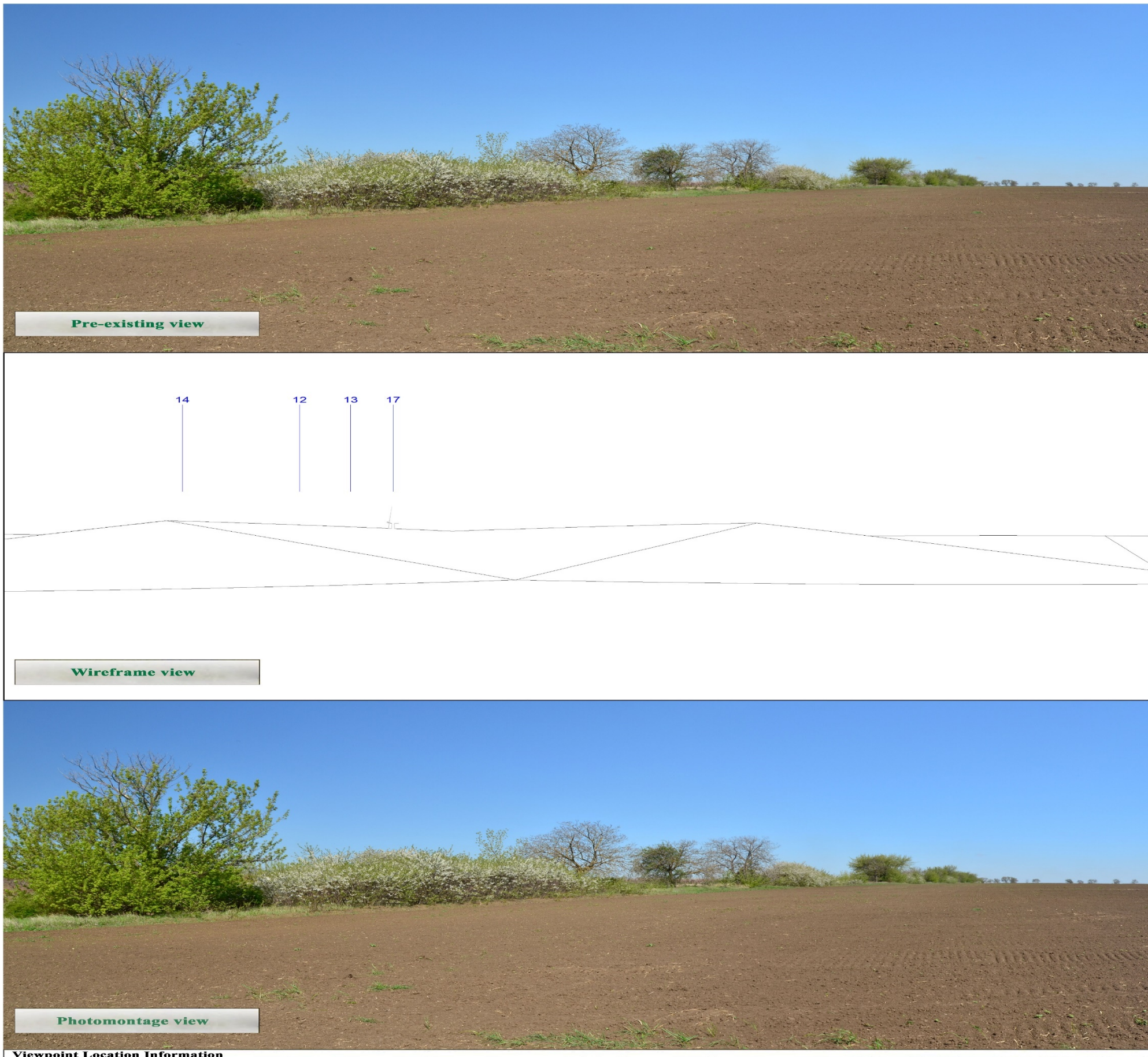
Figure 2.7 – Viewpoint 1: Existing View from Udobnoe Village



Viewpoint Location Information

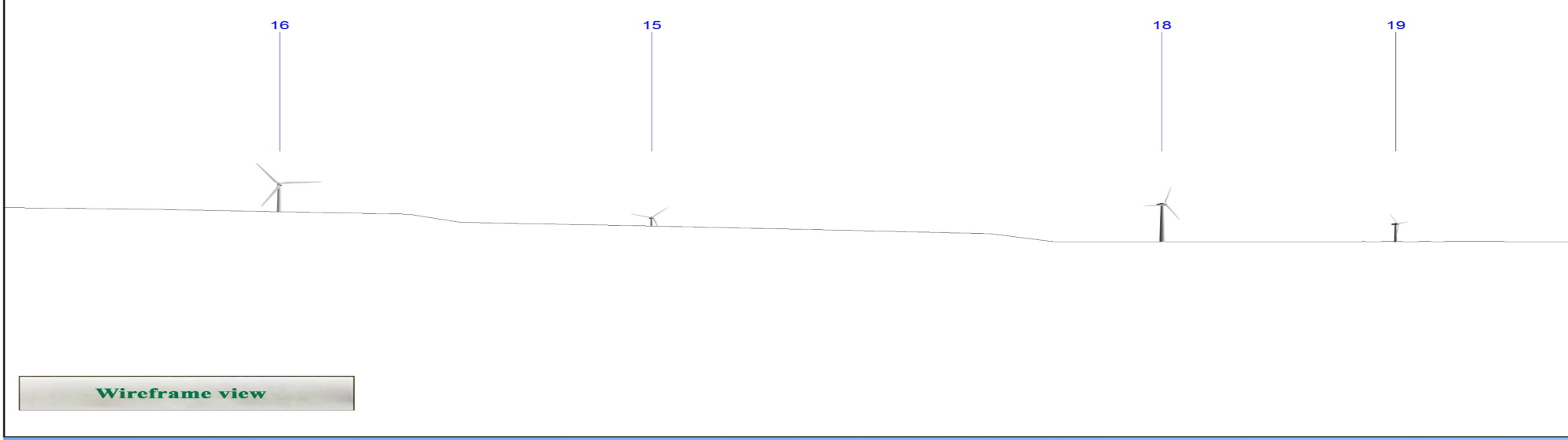
X (Easting)	Y (Northing)	Z(from sea level)	Z (Offset)	Center of panorama View Direction	Field of View (deg)	WTs within field of view	Visible WTs at tip height	Vi he
3344659	5840348	100	+1.5	156	120 x 47	26	13	1

Figure 2.8 – Viewpoint 2: Existing View from Udobnoe Village near fields



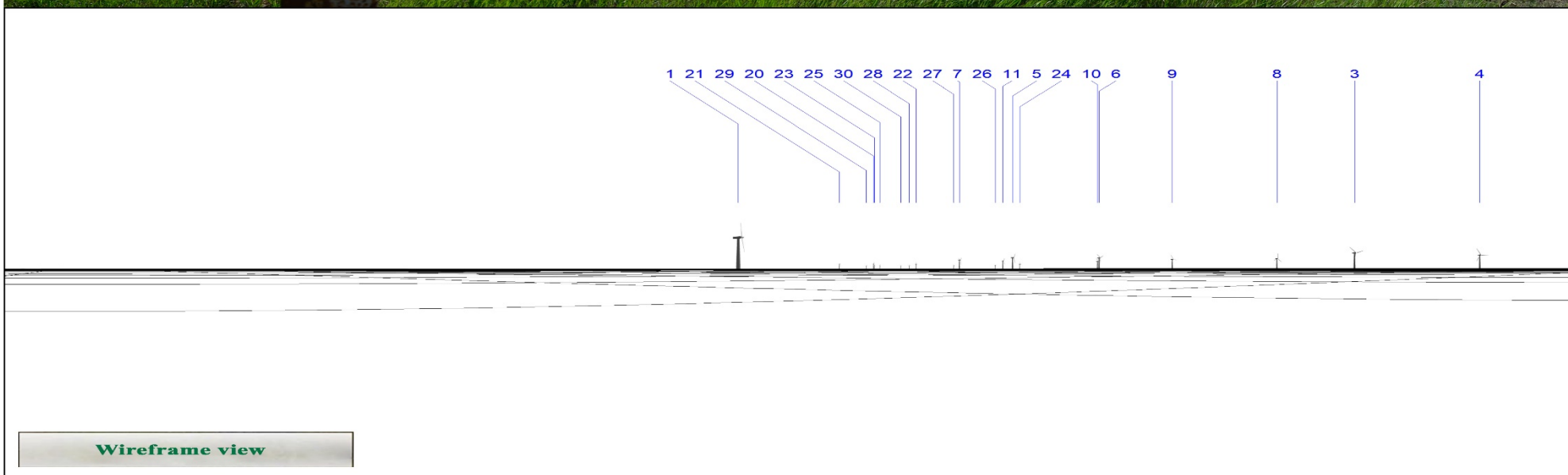
Viewpoint Location Information								
X (Easting)	Y (Northing)	Z(from sea level)	Z (Offset)	Center of panorama View Direction	Field of View (deg)	WTs within field of view	Visible WTs at tip height	V h
3344486	5838018	80	+1.5	338	120 x 49	5	1	

Figure 2.9 – Viewpoint 3: Existing View near Kazatskoe Village



Viewpoint Location Information							
X (Easting)	Y (Northing)	Z(from sea level)	Z (Offset)	Center of panorama View Direction	Field of View (deg)	WTs within field of view	Visible WTs at tip height
3344486	5838018	80	+1.5	78	120 x 50	4	4

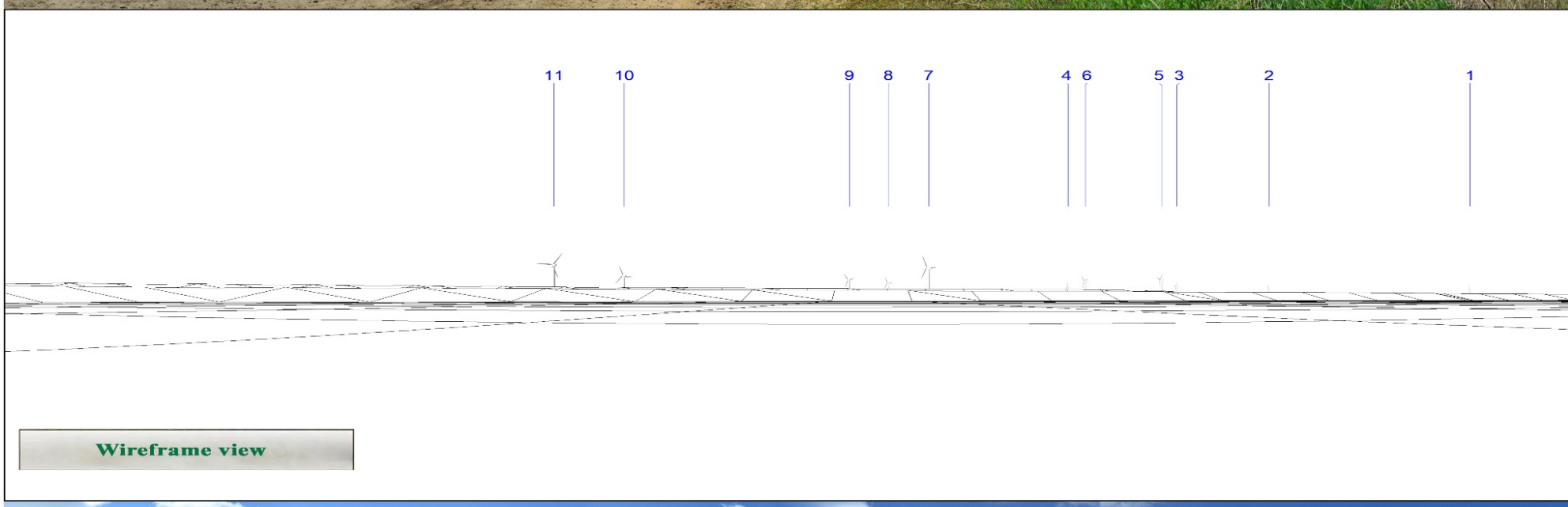
Figure 2.10 – Viewpoint 4: Existing View from Kazatskoe Village



Viewpoint Location Information

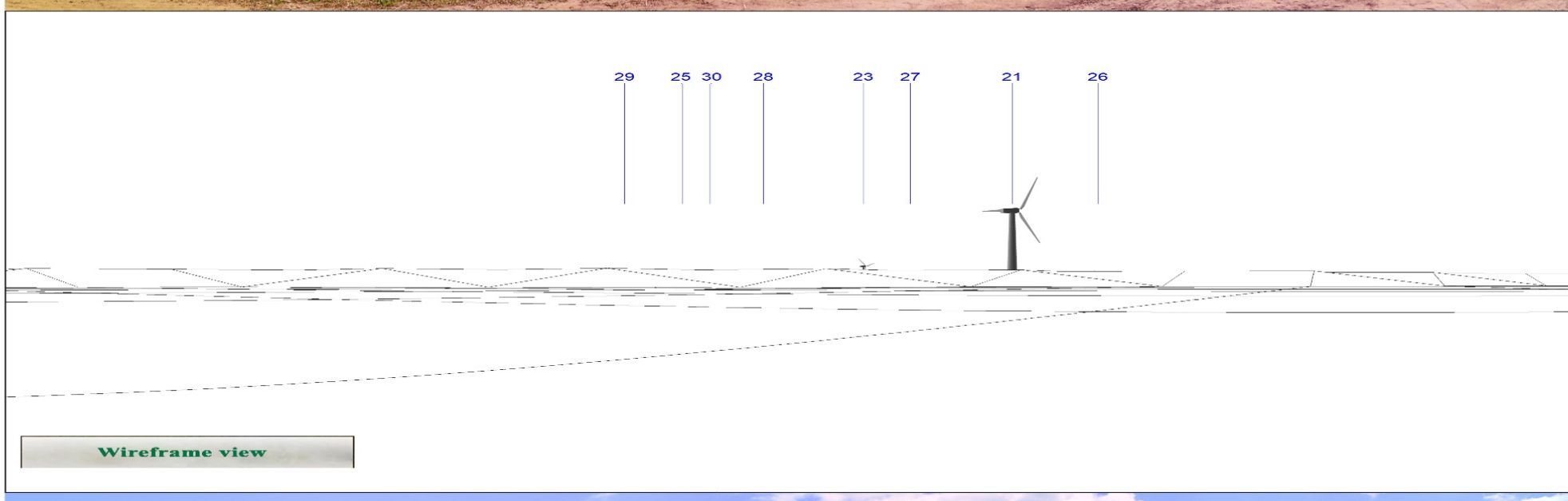
X (Easting)	Y (Northing)	Z(from sea level)	Z (Offset)	Center of panorama View Direction	Field of View (deg)	WTs within field of view	Visible WTs at tip height	V he
3343274	5834301	110	+1.5	146	120 x 58	22	13	1

Figure 2.11 – Viewpoint 5: Existing View from road P-72 near Kazatskoe Village



Viewpoint Location Information								
X (Easting)	Y (Northing)	Z(from sea level)	Z (Offset)	Center of panorama View Direction	Field of View (deg)	WTs within field of view	Visible WTs at tip height	V h
3352900	5826479	63	+1.5	284	140 x 54	19	6	6

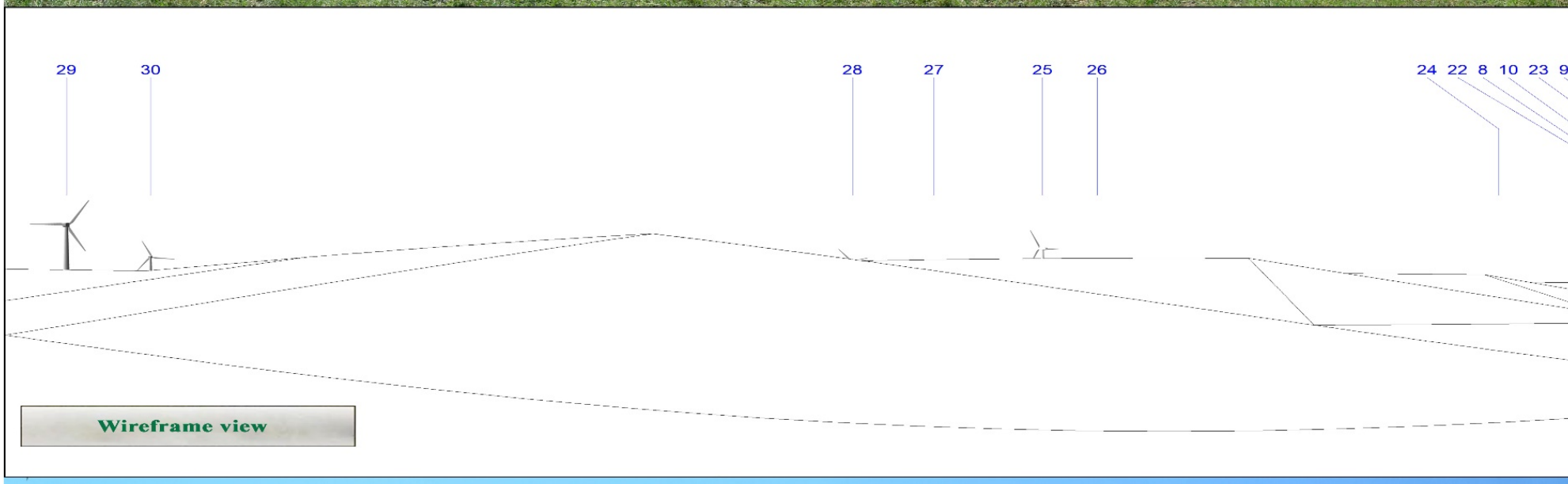
Figure 2.12 – Viewpoint 6: Existing View from Semenovka Village



Viewpoint Location Information

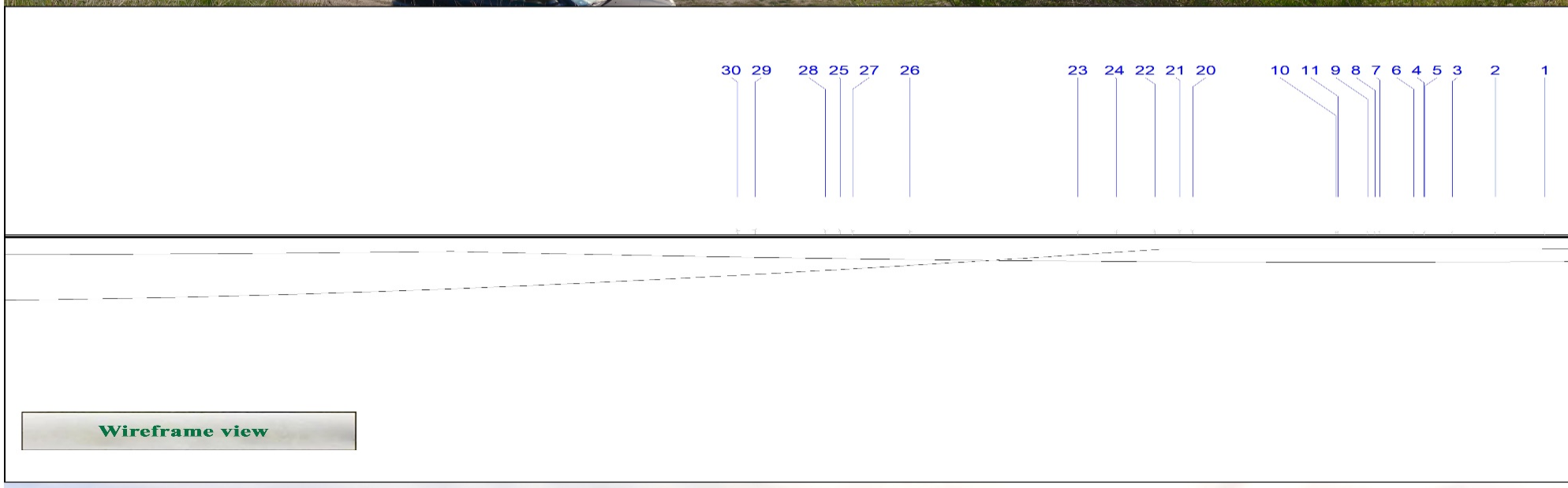
X (Easting)	Y (Northing)	Z(from sea level)	Z (Offset)	Center of panorama View Direction	Field of View (deg)	WTs within field of view	Visible WTs at tip height	Vis hei
3356238	5822799	77	+1.5	165	120 x 54	11	5	5

Figure 2.13 – Viewpoint 7: Existing View from Pivdennoe Village



Viewpoint Location Information								
X (Easting)	Y (Northing)	Z(from sea level)	Z (Offset)	Center of panorama View Direction	Field of View (deg)	WTs within field of view	Visible WTs at tip height	V… h…
3363611	5815947	20	+1.5	264	140 x 54	30	3	2

Figure 2.14 – Viewpoint 8: Existing view from in the middle of Sadovoe and Mologa Vi



Viewpoint Location Information

X (Easting)	Y (Northing)	Z(from sea level)	Z (Offset)	Center of panorama View Direction	Field of View (deg)	WTs within field of view	Visible WTs at tip height	V he
3378605	5825835	11	+1.5	253	130 x 54	30	30	3

Figure 2.15 – Viewpoint 9: Existing view from Kalaglia Village

Table 2.2 – Visual Impacts, Proposed Mitigation Measures and Residual Impacts

Impact Description	Project phase	Receptors	Impact Magnitude						Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Magnitude	Reversibility	Duration	Frequency	Overall magnitude				
Visual impact because of operation of WTs	Operation	Residents of the village Village Udobnoe	Local	High Near WTs located on distance: WT #17 – 1 km; WT #16 – 0.5 km; WT #15 – 1 km; WT #13 – 1,3 km; WT #18 – 1,61 km.	Reversible	Long-term	Continuous	High	High	Major	• Implement Grievance Mechanism in line with the Stakeholder Engagement Plan (prepared as a stand-alone document as part of the ESIA Disclosure Package) and take possible corrective actions in consultation with the local communities and authorities. • Use materials that will not result in light reflection. • Paint the turbine blades and tower with non-reflective materials.	Moderate
		Residents of the village Kozatskoe	Wide	Medium Near WTs located on distance: WT #17 – 1,21 km; WT #16 – 1,24 km; WT #18 – 0,94 km; WT #19 – 1 km; WT #1 – 1,34 km; WT #2 – 2,34 km.	Reversible	Long-term	Continuous	High	High	Major		Moderate
		Residents of the Village Zelenovka	Local	Low Near WTs located on distance: WT #4 – 2,81 km; WT #3 – 3,14 km.	Reversible	Long-term	Continuous	Medium	High	Moderate		Minor
		Residents of the Village Semenovka	Local	Medium Near WTs located on distance: WT #11 – 1,42 km; WT #7 – 1,1 km; WT #10 – 2,25 km	Reversible	Long-term	Continuous	Medium	High	Moderate		Minor
		Residents of the Village Pivdenne	Wide	High Near WTs located on distance: WT #20 – 0,77 km; WT #21 – 0,75 km; WT #22 – 1.38 km; WT #23 – 1.86 km.	Reversible	Long-term	Continuous	High	High	Major		Moderate
		Residents of the Village Sadovoee	Local	Low Near WTs located on distance: WT #25 – 1,19 km; WT #28 – 1,53 km.	Reversible	Long-term	Continuous	Medium	High	Moderate		Minor
		Residents of the Village Mologa	Local	Low Near WTs located on distance: WT #29 – 0,78 km; WT #30 – 1,45 km.	Reversible	Long-term	Continuous	Medium	High	Major		Moderate

Impact Description	Project phase	Receptors	Impact Magnitude						Sensitivity/ Value of Resource/ Receptor	Impact Significance (prior to mitigation or with existing mitigation)	Proposed Mitigation Measures	Residual Impact Significance
			Extent	Magnitude	Reversibility	Duration	Frequency	Overall magnitude				
		Residents of the Village Kalaglia	Wide	Low (30 turbines at 10 km distance)	Reversible	Long-term	Continuous	Medium	High	Moderate		Minor
		Users of road M-15	Wide	Low	Reversible	Short-term	Intermittent	Medium	Medium	Low		Low
		Users of road P-72	Wide	Low	Reversible	Short-term	Intermittent	Medium	Medium	Low		Low

LIST OF SOURCES

1. EIA report Dnistrovska WPP;
2. Visual Representation of Wind Farms, (Scottish Natural Heritage, December 2014);
3. Guidelines for Landscape and Visual Impact Assessment 3rd edition, Landscape Institute, IEMA, 2013.