Proposed Wind Farms, Pestera and Cernavoda, Dobrogea Region, Romania
Supplementary Information

EDP Renewables, Romania

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1 Introduction

1.1 BACKGROUND AND CONTEXT

1.1.1 EDP Renewables (EDPR), Romania propose to develop two wind farms at Pestera and Cernavoda, including associated transport infrastructure, to be located in the Dobrogea Region of Romania (hereafter known as “the Projects”). The Project locations are shown on Figures 1 and 2.

1.1.2 EDPR is seeking financing for the Projects from among others the European Bank for Reconstruction and Development (EBRD) and the International Finance Corporation (IFC). In line with EBRD and IFC and the Equator Principles, the Projects have been assessed against the respective institutions’ environmental and social policy requirements, and a gap analysis has been undertaken to ensure the project is structured to meet the EBRD Performance Requirements and IFC Performance Standards. This includes information disclosure and stakeholder engagement. A separate Stakeholder Engagement Plan will be implemented for the Projects.

1.1.3 The projects have been subject to Romanian permitting requirements, and an Environmental Impact Assessment (EIA) has been undertaken of each project in line with National requirements, which is in line with the EU EIA Directive. The local EIA has been subject to public consultations and the two EIA and respective permits can be found on the Environmental Protection Agency’s website. The respective Environmental permit numbers are: Cernavoda No. 24 of 29.09.2008, and Pestera No.10 of 20.06.2008, Revised on 01.10.2008.

1.1.4 This report is a supplementary report aimed at providing additional information on environmental and social impacts that are required by the EBRD, IFC and the Equator Principles and go beyond the requirements of the EU EIA Directive. This report also assesses the cumulative impacts of the two wind farms in line with best practice.

2 Description of the Projects

2.1 INTRODUCTION

2.1.1 This chapter provides background information relating to the Projects, including a description of the Projects and the existing site conditions, a summary of the performance standards and monitoring, site selection and alternatives and the current status of the projects. The information presented in this section has been obtained primarily from review of the EIA Reports (Cabinet Expert Mediu 2008), the Environmental Monitoring Plans (Cabinet Expert Mediu 2010) and discussions with EDPR.

2.1.2 Additional information relating to the environmental impacts associated with the Projects, which has been prepared by WSP as part of the Compliance Assessment / Gap Analysis is presented in Chapter 3.

2.2 SITE LOCATIONS

2.2.1 The Project sites are located in the County of Constanta in the south-west region of Romania, approximately 33km (Pestera) and 45km (Cernavoda) respectively west of Constanta on the Black Sea coast. Both sites are located in rural areas and are more than 500m from the closest residential properties.

2.2.2 The distance between the Pestera and Cernavoda sites is approximately 7km at the nearest point and approximately 15km from the centre of each site. Figure 1 shows the approximate location of the Projects.

2.2.3 The site at Pestera is located approximately 2.5km south-west of Pestera town and 1km south of Ivrinezu Mic and to the south east of Rasova. The site is accessed via the DJ223b to the west and the DJ222 to the east. The eastern part of the site is located near the Irvinezului Valley and the Movila Lui Lipan. The Danube to Black Sea Navigable Canal, a tributary of the River Danube is located approximately 2km to the north of the site, with the River Danube being approximately 10km to the west.

2.2.4 The site at Cernavoda is located approximately 1km south west of Tibrinu and approximately 4km east of the town of Cernavoda. Access to the site is via the DJ225 county road and then via the existing roads associated with general activities in the area.

2.2.5 To the north of the Cernavoda site are Lake Tibrinu (including a fish farm), the villages of Tibrinu and Gherghina and the boundary of the Cernavoda administrative area. The village of Stefan cel Mare is located to the east and to the west is the boundary of the settlement of Micea Voda. The areas of Faclia and the outskirts of Mircea Voda and Saligny are present to the south. The Danube to Black Sea Navigable Canal is located approximately 5km to the south of the site, and the River Danube itself is located 8km to the west.

2.3 OVERVIEW OF THE PROPOSED WIND FARMS

2.3.1 The proposed wind farm at Pestera will contain 30 wind turbines, providing a total installed capacity of 90MW. The wind farm at Cernavoda will comprise 46 wind turbines, providing a total installed capacity of 138MW. Some roads local to each site will be upgraded in order to accommodate heavy vehicle movements associated with transportation of the turbine components and underground and overhead powerlines will be constructed.

2.3.2 The layout of the wind farms has been designed to maximise energy generation. Construction of the Pestera site commenced in August 2009 and commissioning is programmed for September 2010. Construction of the Cernavoda wind farm commenced in October 2009 and is it planned that it will be completed and commissioned in December 2010.

2.4 EXISTING CONDITION OF THE SITES

2.4.1 The Project sites are similar in nature and consist of generally flat, apparently un-irrigated, agricultural land (including arable and pasture) although the quality of the land is relatively poor and is not

very profitable for agricultural purposes. Some of the land has not been cultivated. There are very few trees and no buildings on the sites (although construction of the projects has started), with no wetlands, significant watercourses or other notable features. Photographs of typical views of each site are provided in Section 3.1 below.

2.4.2 The proposed Projects are not located within any protected area. Information received from the Societatea Ornitologica Romana (SOR) indicates that the Pestera site lies approximately 5km from the Aliman-Adamclisi Important Bird Area (IBA) and Special Protection Area (SPA), which is an area designated under the EU Habitats Directive. The Aliman-Adamclisi IBA and SPA contains a number of bird species that are classified as threatened in the European Union, in both the summer (breeding) and migration periods. Bird species reported to move through the IBA/SPA during spring and autumn migration include Levant sparrow hawk, Red-footed falcon, Collared pratincole, Pallid harrier, Montagu's harrier and Booted eagle.

2.4.3 SOR also report that the Cernavoda site lies 6.5km from the Dunare-Ostroave IBA and SPA (also known as the River Danube SPA). This site contains a number of bird species which are classified as threatened in an EU context, in both summer (breeding), winter, and migration seasons; the River Danube it is a major flyway during spring and autumn migration periods for such species as Osprey, Little tern, Pygmy cormorant, Ferruginous duck, White-tailed eagle and Glossy ibis. The Cernavoda site is also lies approximately 5.7km from the Canaralele Dunarii Site of Community Importance (SCI).

2.4.4 In addition, SOR report that the Cernavoda site is located 10km and 14km away from the Allah Bair-Capidava IBA/SPA and Bratul Borcea IBA/SPA. Both of these sites are of value to birds in the summer (breeding) winter and migration periods, for example, the latter is reported to support the following birds during spring and autumn migration periods: Ferruginous duck, White stork, White-tailed eagle, Osprey, Pygmy cormorant, Glossy ibis and Little tern.

2.4.5 The Project sites have not been identified as being important for breeding, wintering or migratory birds, in as far as they have not been included within the boundaries of any IBA or SPA. However, a number of species which are protected under Annex 1 of the EU Birds Directive and under Romanian and International law have been recorded on or over-flying the site and occur in the general area. Several known migratory flyways for birds are located between the sites and the Black Sea to the west, including Via Pontica, one of the main bird flyways connecting Eastern Europe and eastern Africa.

2.4.6 Bird monitoring will be undertaken at each site during construction and operation as part of the environmental monitoring programme that has been devised for each Project. The need for further mitigation and monitoring in respect of birds at the Project sites, together with a shut down procedure during bird migratory periods, has been identified as part of the Gap Analysis. The additional monitoring and mitigation requirements are described in Chapter 3 of this report.

2.4.7 The area is identified as being stable in respect of seismic activity, and the Project sites are not vulnerable to landslides or flooding. There are no sewage networks present on either site. A number of irrigation channels cross the sites (see Figures 3 and 4) although there are no natural surface water features on the sites.

2.4.8 There are no known archaeological features within the sites and arrangements have been put in place to monitor any issues that may arise during construction.

2.4.9 The nearest dwelling to the Pestera site is located in the Ivrinezu Mic village, approximately 700m north of the site. The nearest dwelling to the Cernavoda site is located in the Stefan cel Mare village, approximately 600m west of the site.

2.4.10 The sites are located at an altitude of approximately 300m above sea level. The geology comprises topsoil which overlies layers of loess and silt. Groundwater is understood to be present beneath the sites at between approximately 6 and 10m below ground level.

2.5 DESCRIPTION OF INFRASTRUCTURE AND OPERATIONS

Pestera

2.5.1 The total area of land held by EDPR amounts to 1,200 ha, the development works will occur within an area of approximately 63.81 ha. However the extent of land that will be directly affected in the long-term (i.e. the development footprint) by the wind turbines is 1.92ha. The construction works will affect an area of approximately 9.55 ha, including compound areas, buried foundations and infrastructure platforms. Details of the land required to accommodate each wind turbine, including the extent of the land parcel (in ha) and footprints (in m^2) are provided in Section 1.4.2 of the EIA Report. The proposed layout of the wind farm at Pestera is shown on Figure 3.

2.5.2 The proposed wind farm at Pestera will contain 30 wind turbines (turbine model VESTAS V90 3.0MW), providing a total power of 90MW. Each wind turbine consists of a hollow steel tower with a generator nacelle, gearbox and control system and fibreglass rotor with 3 blades. The turbines will each have a total height of 150m (comprising 105m tower and 45m rotor blade above the tower height). The tower is tubular with a diameter of 4.15m at the base and 2.30m at the top, comprising five sections. Each turbine will be fitted with two integral transformer stations (at 690V to 20,000V) within the turbine nacelle. The turbines are to be connected through 20kV underground cables which will be connected to a transformer station. On start up each turbine will consume around 15 kV of electrical energy and will be connected to the following one by electrical cables of varying diameters according to the cumulative power of the turbines, resulting in 5 branches (with a maximum of 6 turbines on each branch).

2.5.3 The transformer station will be connected to the electricity grid via the nearest ENEL Dobrogea transformer station (110/20kV). The wind turbines will power a non-synchronically electric generator with 4 poles placed in a fibre glass box that protects all the turbine components against atmospheric conditions.

2.5.4 Each turbine will be ground connected, in accordance with STAS 12604, ensuring route continuity, and equipped with anti-earthquake measures. The transformation station 20 kV / 110 kV will be built according to legislative requirements and standards PE 101/85 and PE 107. The connection to the ENEL grid will be made to the aerial electrical line (LEA) with 110kV, starting from the transformer station of the wind farm.

2.5.5 The proposed layout of the turbines complies with the minimum distances stipulated by the permits issued by the electricity and telecommunications network operators. The turbines are proposed to be placed approximately 450m apart. The normal lifetime of the turbine model is 20 years.

2.5.6 The main technical specifications of the turbines are as follows:

- Power: 3.0 MW;
- Tension: 3 x 690V ± 10%;
- Frequency: 50 Hz ± 5%;
- Rotation: clockwise;
- Cut-in wind speed: 3.5 m/s;
- Rated wind speed; 15 m/s;
- Cut-out wind speed: 25 m/s;
- Nominal revolutions 16.1 rpm; and
- Brakes: aerodynamic.

2.5.7 Further information relating to the technical details of the wind farm is provided in Section 2 of the EIA Report.

2.5.8 The foundations for each tower will be reinforced concrete with dimensions of 18m x 18m x 3m buried at 1m below ground level. Mechanised excavation will be required for the works, to a depth of approximately 2.80m below ground level. Construction of each wind turbine is anticipated to require disturbance of a maximum diameter of approximately 4.15m.

2.5.9 Underground cable trenches will be 1.2 m deep and 0.8 m wide. The cables will be laid on sand and the trenches will be backfilled with compacted earth and the top soil reinstated. The 20kV transformer station / 110 kV will be constructed in accordance with the appropriate standards, including EP 101/85 for the construction of electrical installations and connections over 1 kV voltage transformers and EP 107 Regulatory framework for the design and execution of electrical cable networks.

2.5.10 A 110kV overhead powerline will be constructed between the onsite Rasova substation and the Medgidia substation located approximately 2.5kms to the east.

2.5.11 No water or sewage connections are required by the project.

2.5.12 Excavation material generated during construction of the wind farm will be reused by the Pestera City Hall for various construction works and road improvements. Some local improvements to ground conditions may be required to ensure the provision of suitable foundations for the turbines.

2.5.13 Environmental impacts during the construction works will be temporary in nature. All changes to the soil are reversible. During decommissioning of the wind farm all equipment will be dismantled and excavated, and the land will be restored to the original conditions. Where practicable parts will be re-used for future turbines or recycled to provide reusable material.

2.5.14 The county road DJ223b and existing roads within the area will be used to transport heavy equipment and specific items, including mounting platforms for the turbine foundations. The existing roads will be upgraded to allow the transportation of heavy equipment to the site. Also, new roads will be built to provide access to each wind turbine. The roads within the wind farm will be 4 m in width, 2 m for each lane, and comprise a 20 cm deep layer of filling material (replacing the topsoil layer) and 30 cm depth of gravel with melted bitumen.

2.5.15 The number of lorry movements relating to construction activities at the Pestera site (platform and foundations, roads, substation construction and turbine erection) have been calculated and a transport plan has been developed to ensure that the movements are phased and the hours of movement limited to the working day (08:00 – 17:00). In addition, the movement of construction vehicles will be routed to avoid, residential areas where possible, thereby minimising potential noise and dust impacts.

2.5.16 During operation it is anticipated that vehicular access to the wind farm will be minimal and for the purposes of periodic review, maintenance and in the event of any incident or emergency.

2.5.17 No fencing will be required around the wind turbines. The only fencing required will be around the substations associated with the wind farm, which will cover an area of approximately 100m^2.

2.5.18 The EIA Report considers the environmental impacts associated with the construction and operation of 27 wind turbines at this site, and a revision to the Environmental Permit for an extension to the development to include an additional three turbines of 3MW capacity each was approved in October 2008.

Cernavoda

2.5.19 The wind farm site is located within the development boundary of Cernavoda city and the communes of Mircea Voda and Saligny. The plot of land of covers an area of approximately 2,888 ha of which approximately 23ha will be taken from the current agricultural land use. The proposed layout of the wind farm at Cernavoda is shown on Figure 4.

2.5.20 The proposed Cernavoda wind farm comprises 46 wind turbines (turbine model VESTAS V90 3.0MW), providing a total power of 138MW. The specifications of the wind turbines will be the same as described for the Pestera site above, i.e. hollow steel towers and fibreglass rotor with 3 blades of a total height of 150m (comprising 105m tower and 45m rotor blade above the tower height) fitted with two integral transformer stations (at 690V to 20,000V) within the turbine nacelle. The turbines will be connected, through 20kV underground cables and 11 junction stations (of 20m2 in area) which will be connected to a transformer station within the wind farm, this will then be connected to the nearest ENEL transformers.

2.5.21 The connection to Dobrogea ENEL's grid will be achieved via an electricity station of 20/110 kV (100m2 in area) from which will leave two cables of 110 kV as follows:

- 69 MW at the 119 kV Tortomanu station;

- 72 MW at LEA 110 kV Mircea Voda - Medgidia Nord.

2.5.22 Each turbine will be ground connected, in accordance with STAS 12604, ensuring route continuity, and equipped with anti-earthquake measures. The transformation station 20 kV / 110 kV will be built according to legislative requirements and standards PE 101/85 and PE 107. The connection to the ENEL grid will be made to the aerial electrical line (LEA) with 110kV, starting from the transformer station of the wind farm.

2.5.23 Two 110kV overhead powerlines will be constructed at the Cernavoda site. The fist line will link the Cernavoda substation located in the western area of the site to the Tortomanu substation in the northern area of the site, a distance of approximately 3kms. The second line will connect the Tortomanu substation to the Mircea Voda North substation, located approximately 4kms to the south east of the site.

2.5.24 The proposed layout of the turbines complies with the minimum distances stipulated by the permits issued by the electricity and telecommunications network operators. The turbines are proposed to be placed approximately 450m apart. The normal lifetime of the turbine model is 20 years.

2.5.25 No water or sewage connections are required by the project.

2.5.26 The pillars are fixed in metal reinforced concrete foundations of 18m x 18m x 3m, buried at 1m below ground level. Mechanised excavation will be required for the works, the foundations will be at 3m below ground level and equipped with measures to prevent water infiltration.

2.5.27 The county road DJ225 and existing roads within the area will be used to transport heavy equipment. The existing roads will be reinforced to allow the transportation of heavy equipment to the site. Also, new roads will be built to provide access to each wind turbine. The roads within the wind farm will be 4 m in width, 2 m for each lane, and comprise a 20cm deep layer of filling material (replacing the topsoil layer) and 30 cm depth of gravel with melted bitumen. The number of lorry movements relating to all construction activities at the Cernavoda site (platform and foundations, roads, substation construction and turbine erection) have been calculated and a transport plan developed to ensure that the movements are phased and the hours of movement limited to the working day (08:00 – 17:00). In addition, the movement of construction vehicles will be routed to ensure that they don't, where possible, pass through residential areas, thereby minimising potential noise and dust impacts.

2.6 PERFORMANCE STANDARDS AND MONITORING

2.6.1 The Environmental Permit requirements relating to each of the Projects are summarised in Table 2.1 below. Details of the environmental monitoring programmes which have been prepared by Cabinet Expert Mediu (2010) for each site are also provided below.

Table 2.1 Summary of Environmental Permit Requirements

Details of Permit Requirements	Cernavoda (Environmental Permit No. 24 of 29.09.2008)	Pestera (Environmental Permit No. 10 of 20.06.2008, Revised 01.10.2008)
• The distance from the wind farm to the nearest home is more than 700 m (2 kilometres from Pestera, 2 kilometres from Ivrinezu Mic)		✓
• The wind farm distance from the nearest home is greater than 600 m	✓	
• The storage of construction material is forbidden near the site boundary	✓	✓
• The waste resulting from construction is to be stored in special areas and periodically taken and transported in the places indicated by the City Hall of		✓

Details of Permit Requirements	Cernavoda (Environmental Permit No. 24 of 29.09.2008)	Pestera (Environmental Permit No. 10 of 20.06.2008, Revised 01.10.2008)
Pestera commune		
• The waste resulting from construction is to be stored in special areas and periodically taken and transported in the places indicated by the Town Halls of the 3 localities	✓	
• The site shall be secure, with warning signs and fencing	✓	✓
• Vehicles and machinery to be cleaned prior to exiting onto public roads; vehicle speed limits to be observed within the site	✓	✓
• Provision of ecological toilets during the construction and assembly works	✓	✓
• The soil resulting from the excavation of foundations, approximately 5,500 m^3, shall be collected and transported for re-use in public facilities in places indicated by the City Hall of Pestera commune		✓
• The soil resulting from the excavation of foundations shall be collected and transported for re-use in public facilities, in places indicated by the City Halls of the 3 localities	✓	
• On the both sides of the access roads to the wind plants wood edges of small height shall be set up (maximum 2 m), adaptable to the soil and climate	✓	✓
• The provisions of the Government Decision no 321/2005 regarding the assessment and management of ambient noise shall be observed	✓	✓
• During the entire lifetime of the wind farm, that is 25 years, the only generated waste is the used hydraulic oil which shall be replaced at every 2 years, a quantity of approximately 160 litres per turbine, this waste is to be managed according to the provisions of Government Decision 235/2007	✓	✓
• The study regarding the Impact on the Environment shall be continued during the entire construction and assembly works and Monitoring of impacts on avifauna will be undertaken at the Cernavoda and Pestera sites during their operation via a video surveillance system with data registration.	✓	✓
• The assembly of efficient video systems in order to continuously monitor the wind plants, with the possibility of recording their activity on magnetic media	✓	✓

Pestera

2.6.2 Section 6 of the EIA Report for the Pestera site states that the perimeter of the wind farm will be monitored continuously to identify any incidents that might influence the local population, fauna or flora and these will be reported immediately so that corrective and preventive measures can be taken. The operation of the wind farm will be monitored remotely using specialised telecommunications equipment and radio or through observations by employees. All functions of the wind turbines themselves will be monitored and controlled by various command and control units based on microprocessors.

2.6.3 EDP will also appoint an independent ornithological Expert (IOE) to cover both the Pestera and Cernavoda sites. The IOC will be responsible for undertaking surveys and monitoring bird movements in the immediate area and instigating appropriate mitigation measures as required. This could include reducing the speed of the turbines or, potentially, for the turbines to be temporarily turned off during bird migration periods, should it be required.

2.6.4 In addition, Section 9.5 of the EIA Report indicates the requirement for monitoring of specimens of birds found dead near the wind farm and recording of these incidents on databases. Noise levels emitted from the wind farm should not exceed those stated in STAS 10009/88, and a noise target levels of 45 db(A) has been set for the Project within the EIA. If during automatic monitoring the level of noise exceeds the standards, action will be taken to reduce the noise emitted by changing the rotational speed to alter the pitch of the noise from the turbines according to the local wind conditions (a system known as Optispeed).

2.6.5 The environmental monitoring programme for the Peştera project was developed in January 2010 by Cabinet Expert Mediu. The monitoring programme was completed after the construction works had started.

2.6.6 The monitoring activities described in the environmental monitoring programme are focused on three main stages of the project development:

- Prior to construction;
- During construction; and
- During operation.

2.6.7 The main requirements of the monitoring programme for this site (Cabinet Expert Mediu 2010), as detailed in the Environmental Agreement, are summarised in the following table. The monitoring results are required to be submitted to the Environmental Protection Agency Constanta.

Table 2.2 Summary of Environmental Monitoring Programme – Pestera (Cabinet Expert Mediu 2010)

Topic	Indicator	IUCN Red List Status – Bird Species	Reporting Parameters / Comments
Prior to Construction			
Avifauna / Aliman-Adamclisi SPA (GD 1284/2007)	Raptor species: - Saker Falcon *Falco Cherrug* - Black Kite *Milvus migrans* - Short-toed Eagle *Circaetus gallicus* - Montagu's Harrier *Circus pygargus* - Red-footed Falcon *Falco vespertinus* - Booted Eagle *Hieraatus pennatus* - Stone-curlew *Burhinus oedicnemus*	 Endangered Least Concern Least Concern Least Concern Near Threatened Least Concern Least Concern	- Composition of the species - Seasonal diversity in the species - Population density and distribution - Dominant direction of flight - Average flying height - Classification of the area / function of the birds interest for the

Topic	Indicator	IUCN Red List Status – Bird Species	Reporting Parameters / Comments
			habitat (passing, breeding, migration) or its absence
During Construction			
Avifauna	Same species as listed above for prior to construction Frequency: every week Supplementary monitoring during migration and breeding periods – including recommendations for cease of construction works during this time, depending on the monitoring results	Not applicable	As above
Construction activities	Care to be taken during construction works to avoid soil contamination. Specific requirements comprise: • Construction site organisation: - Waste management collection, transport and disposal, records keeping - Ecological toilets - Good functioning state of the transport and construction equipments - Transport means with minimum Euro 3 engines - Waste oil appropriately stored and disposed of by contractor - Wastewater discharge • Technological routes, platforms construction and maintenance - Respecting the haulage routes established through the project - Fuel and lubricant leakages - Maintenance of the technological routes - Means of protection against spreading of materials and wastes on access routes • Topsoil removal - Recommendations for soil removal activities	Not applicable	Not applicable

Topic	Indicator	IUCN Red List Status – Bird Species	Reporting Parameters / Comments
	• Digging for underground cables and excavations - Transport and storage of construction material - Avoidance of loss on fuels - Staged laying of the cables • Wind turbine foundations - Control of transport of concrete - Handling of dusty construction materials - Cleaning of the transport vehicles and equipments • Fill activities - Re-use of removed soil - Rehabilitation of excavated areas - Reduced fill activities during windy periods - Disposal of the excavated non-fertile soil • Wind turbines commissioning - Avoiding degradation of the neighbouring areas - Use of areas designated by the project design for temporary storage - Proper irrigation of the land • Restoration of the temporary affected areas - Restoration of the temporary affected areas to the original condition		
During Operation			
Avifauna	Monitoring of impacts on avifauna to be undertaken during site operation via a video surveillance system with data registration. • Frequency: - Continuous by IOE	Not applicable	Table format including: - Hour - Name of the species - Number of birds - Breeding - Passing

Topic	Indicator	IUCN Red List Status – Bird Species	Reporting Parameters / Comments
	• Indicators: - Flying height - Maximum approach height towards the wind turbines - Modifications of the migration routes - Identification of breeding birds in the area - Operation of the wind farm		- Observations

Cernavoda

2.6.8 Section 5 of the EIA Report for the Cernavoda wind farm states that, as for the Pestera wind farm, the perimeter of the wind farm will be monitored continuously to identify any incidents that might influence the local population, fauna or flora and that these will be reported immediately so that corrective and preventive measures can be taken. The operation of the wind farm will be monitored remotely using specialised telecommunications equipment and radio or at the local level through observations by employees. All functions of the wind turbines themselves will be monitored and controlled by various command and control units based on microprocessors.

2.6.9 EDP will also appoint an IOE to cover both the Pestera and Cernavoda sites. The IOC will be responsible for undertaking surveys and monitoring bird movements in the immediate area and instigating appropriate mitigation measures as required. This could include reducing the speed of the turbines or, potentially, for the turbines to be temporarily turned off during bird migration periods, should it be required.

2.6.10 In addition, Section 8 of the EIA Report indicates the requirement for monitoring of specimens of birds found dead near the wind farm and recording of these incidents on databases. Noise levels emitted from the wind farm should not exceed those stated in STAS 10009/88, and a noise target levels of 45 db(A) has been set for the Project within the EIA. If during automatic monitoring the level of noise exceeds the standards, action will be taken to reduce the noise emitted by changing the rotational speed to alter the pitch of the noise from the turbines according to the local wind conditions (a system known as Optispeed).

2.6.11 The environmental monitoring programme for the Cernavoda project was developed in January 2010 by Cabinet Expert Mediu. The monitoring programme was completed after the construction works had started.

2.6.12 The monitoring activities described in the environmental monitoring programme are focused on three main stages of the project development:

- Prior to construction;
- During construction; and
- During operation.

2.6.13 The main requirements of the monitoring programme for the Cernavoda wind farm, as detailed in the Environmental Agreement (Cabinet Expert Mediu 2010), are summarised in the following table. The monitoring results are required to be submitted to the Environmental Protection Agency Constanta.

Table 2.3 Summary of Environmental Monitoring Programme – Cernavoda (Cabinet Expert Mediu 2010)

Topic	Indicator	IUCN Red List Status – Bird Species	Reporting Parameters / Comments
Prior to Construction			
Avifauna / SPA Dunarea – Ostroave	Raptor species: - Roller *Coracias garrulous* - Red-footed Falcon *Falco vespertinus* - Ferruginous Duck *Aythya nyroca* - Spoonbill *Platalea leucorodia* - Little Egret *Egretta garzetta* - Black-crowned Night Heron *Nyctocorax nyctocorax* - Glossy Ibis *Plegadis falcinellus* - Pygmy Cormorant *Phalacrocorax pygmaeus* - Purple Heron *Ardea purpurea* - White-tailed Eagle *Hallaeetus albicilla* - Squacco Heron *Ardeola ralloides* - Lesser Grey Shrike *Lanius minor* - European Nightjar *Caprimulgus europaeus* - Black Kite *Milvus migrans*	 Near Threatened Near Threatened Near Threatened Least Concern Least Concern Least Concern Least Concern Least Concern Least Concern Least Concern Least Concern Least Concern Least Concern Least Concern	- Composition of the species; - Seasonal diversity of species - Population density and distribution - Dominant direction of flight - Average flying height - Classification of the area / function of the birds interest for the habitat (passing, breeding, migration) or its absence
During Construction			
Avifauna	Same species as listed above Frequency: weekly Supplementary monitoring during migration and breeding periods – including recommendations for cease of construction works during this time, depending on the results	Not applicable	As above
Construction activities	Care to be taken during construction works to avoid soil contamination. Specific requirements comprise: • Construction site organisation: - Waste management collection, transport and disposal, records keeping - Ecological toilets - Good functioning state of the transport and construction	Not applicable	Not applicable

Topic	Indicator	IUCN Red List Status – Bird Species	Reporting Parameters / Comments
	equipments - Transport means with minimum Euro 3 engines - Waste oil appropriately stored and disposed of by contractor - Wastewater discharge • Technological routes, platforms construction and maintenance - Respecting the haulage routes established through the project - Fuel and lubricant leakages - Maintenance of the technological routes - Means of protection against spreading of materials and wastes on access routes • Topsoil removal - Recommendations for soil removal activities • Digging for underground cables and excavations - Transport and storage of construction material - Avoidance of loss on fuels - Staged laying of the cables • Wind turbine foundations - Control of transport of concrete - Handling of dusty construction materials - Cleaning of the transport vehicles and equipments • Fill activities - Re-use of removed soil - Rehabilitation of excavated areas - Reduced fill activities during windy periods - Disposal of the excavated non-fertile soil • Wind turbines commissioning		

Topic	Indicator	IUCN Red List Status – Bird Species	Reporting Parameters / Comments
	- Avoiding degradation of the neighbouring areas - Use of areas designated by the project design for temporary storage - Proper irrigation of the land • Restoration of the temporary affected areas - Restoration of the temporary affected areas to the original condition		
During Operation			
Avifauna	• Monitoring of impacts on avifauna to be undertaken during site operation via a video surveillance system with data registration. • Frequency: - Continuous by IOE • Indicators: - Flying height - Maximum approach height towards the wind turbines - Modifications of the migration routes - Identification of breeding birds in the area - Operation of the wind farm	Not applicable	Table format including: - Hour - Name of the species - Number of birds - Breeding - Passing - Observations

2.7 LABOUR STANDARDS AND CONTRACTORS

2.7.1 All the workers will have individual working contracts registered at Constanta Work Inspection Chamber and will comply with Romanian legislation, including the Work Code and law 319/2006. EDPR's "General Contracting Conditions" are mandatory and are attached to every contract to be signed by Contractors. These include provisions relating to the occupational health and safety and employment and social obligations.

2.7.2 A Health and Safety Plan has been prepared which covers construction and commissioning of the wind farm. An operational Health and Safety Plan will be implemented following commissioning of the wind farms. The exact operational provisions and procedures are not available at this stage and will be set at the time the client will be tendering for the operational contract. The health and safety plan will cover all relevant aspects to ensure compliance with health and safety legislation and international good practice relating to occupational and community health and safety to ensure that the health and safety of the workers and the local community are protected and risks to the safety of the workforce and local community are managed

appropriately. The wind farms will be used for agricultural activities and fencing will be provided around the electrical substations (there will be no perimeter fence).

2.7.3 The City Halls, EDPR and the contractors should collaborate to produce a human resource policy targeting employment of the locals for construction works for tasks which do not require specialised training.

2.7.4 Specialised courses for employment opportunities involving the maintenance and operation of the Project will be aimed towards securing a trained local labour force in the Dobrogea region (the EU objective to ensure correlation of the educational system with the demands of the labour market).

2.7.5 The details of a grievance mechanism are provided in the Stakeholder Engagement Plan (SEP) which will be implemented for the Projects.

2.8 SITE SELECTION AND CONSIDERATION OF ALTERNATIVES

2.8.1 Section 4 of the EIA report for Cernavoda includes a discussion on the consideration of alternatives, although this is limited to alternative methods for generating electricity, i.e. using fossil fuels, photovoltaic cells and wind turbines. An equivalent discussion is provided in Section 1.4.9 of the EIA Report for Pestera.

2.8.2 Based on discussions with EDPR it is understood that the sites were selected after a comprehensive wind survey programme had been undertaken to identify suitable locations for wind farm developments in Dobrogea region. A select list of sites was then identified based on additional factors including existing land use and potential environmental sensitivity. It is understood that another site was considered originally in preference to Cernavoda, but this was rejected at this stage due to it being located in an area which had the potential to be designated as a SPA.

2.8.3 The layout of both sites were developed for EDP by Wind Experts. The designs and choice of turbines were based on optimum performance in terms of energy generation. In the case of Cernavoda, a modification was required to the layout in order to avoid a potential issue relating to impacting upon a local military communications facility.

2.8.4 The discussion of alternatives presented in the EIA reports is limited. However, discussions with EDP and their specialist consultants, Wind Experts, have confirmed that alternative sites and layouts and technologies have been considered. Therefore, the development of the proposed sites at Pestera and Cernavoda have been undertaken in accordance with EIA Directive 97/11/EC which requires EIA reports to include an outline of the main alternatives studies and an indication of the main reasons for this choice, taking into account the environmental effects.

2.9 PROJECT STATUS AND TIMESCALES

2.9.1 The Projects have already obtained environmental permits (in line with Romanian National requirements) and foundation construction is currently underway on both sites. Construction of the wind farms is anticipated to be completed in the summer of 2010 with the sites being commissioned in July (Pestera) and September (Cernavoda) 2010 respectively.

3 Additional Environmental Assessment

3.1 LANDSCAPE AND VISUAL IMPACT

3.1.1 The landscape is reviewed in terms of its character (identifying and assessing the landscape characteristics, quality and condition of the area) and visibility (the potential areas within which the wind turbines may be visible, the perception of viewers and visually sensitive receptors).

3.1.2 The Project sites are similar in nature and consist of generally flat, apparently un-irrigated, agricultural land (including arable and pasture) although the quality of the land is relatively poor and is not very profitable for agricultural purposes. The sites are located at an altitude of approximately 300m above sea level and some of the land has not been cultivated. There are very few trees and no buildings on the sites (although construction of the projects has started), with no wetlands, significant watercourses or other notable features. Photographs of typical views of each site are provided in Plates 1 and 2 below.

Plate 1 - Typical View of the Pestera Site
(Source: Report on Environmental Impact Assessment for Wind Farm Pestera, 2008, Cabinet Expert Mediu – Petrescu Traian)

3.1.3 The introduction of wind turbines and ancillary infrastructure would have an impact on the existing landscape character of both sites. This impact would last for the operational period of the wind farm and be reversed on decommissioning. This would be a more significant effect within a few kilometres of the site but as distance from the site is increased, the effect would be reduced.

3.1.4 There is very little tree cover within the area of either site, and due to the nature of wind turbines there is little mitigation possible to reduce the visual impacts of the turbines. However, the open character of the turbines and their uniformity of colour and design (including sky-coloured design to reduce impact on sky-line views) enables the developments to relate well to the receiving landscape character of each site (which are currently open and expansive). Wind turbine developments of this nature and in the two proposed locations will not adversely impact upon the local landscape character of the site or the diversity of the landscape character beyond the local context (i.e. it will not impact upon the character of wider designated areas such as SPAs).

Plate 2 - Typical View of the Cernavoda Site
(Source: Report on Environmental Impact Assessment for Wind Farm Cernavoda, 2008, Cabinet Expert Mediu – Petrescu Traian)

3.1.5 In terms of visual amenity, there is the potential for wind turbines to be seen up to 60km away, which would include the coastal settlement of Constanta. However, topography limits views towards the sites to within a much more localised area.

3.1.6 The locations of the wind turbines are approximately 550m (Pestera) and 600m (Cernavoda) from various small settlements. This results in some visual impact to nearby residential receptors within a few kilometres of the site. At greater distances, the impact of the turbines on visual amenity reduces to negligible or no effect. Potential views from nearby residential areas included the following settlements:

- Cernavoda – Saligny, Tibrinu, Gherghina, Mircea Voda, Stefan cel Mare and Facila (see Plate 1 below); and
- Pestera – Ivrinezu Mic and Ivrinezu Mare (see Plate 2 below).

3.1.7 The overhead powerline which will be constructed between the site and the Medgidia substation (2.5kms) will pass over open countryside away from residential properties. Consequently the impact of the powerline on visual amenity will be minimal.

Cernavoda Site

3.1.8 Built up areas along the DN-22C road and river, including particularly Stefan cel Mare, Saligny, Faclia, Seimenii Mici, Mircia Voda, Tibrinu and Gherghina (see Plate 3 below):

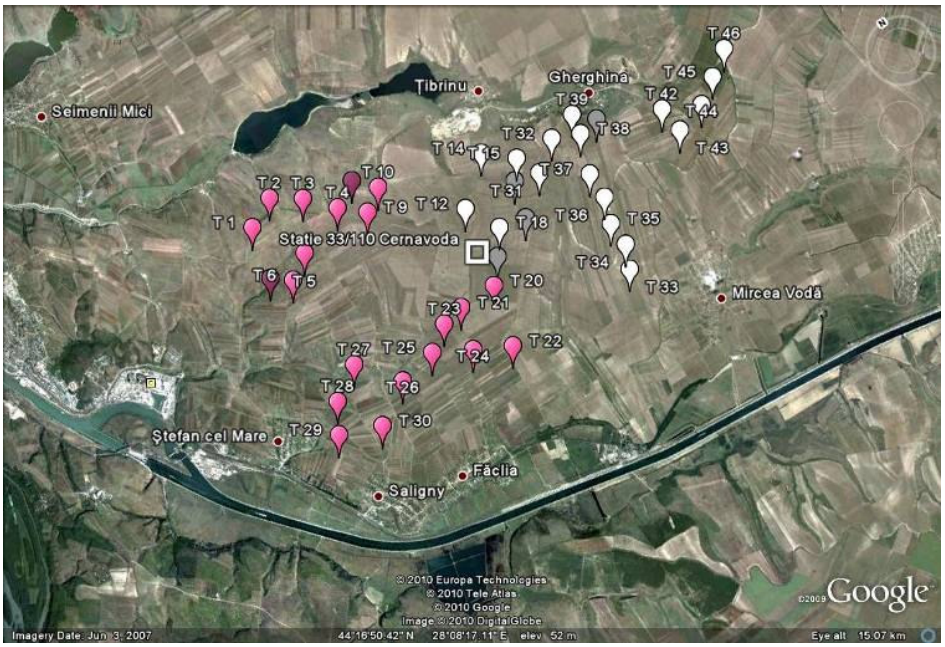

Plate 1 Location of Proposed Wind Turbines – Cernavoda Site

(Source: Photomontages prepared for EDPR)

3.1.9 The landscape in this area also contains electricity pylons. Although they are not very tall, they can be seen on the skyline of some views. The main residential areas identified above following the banks of the River Danube Navigation Canal and are at a lower level than the surrounding hills on which the turbines are located. In addition, the residential and built up areas along the water courses contain many trees and blocks of vegetation in contrast to the extensive, open plains above them. This vegetation, along with the topography helps to limit views of the turbines from residential areas.

3.1.10 Views from users of the road network will be transient views, with many views being only glimpsed or oblique views of the turbines. Due to the orientation of some of the houses to the wind turbines, many views will be oblique views only and/ or blocked by topography, vegetation or intervening built form.

3.1.11 Plate 4 below shows that, even with the turbines in operation, the openness of the existing landscape character is not greatly compromised.

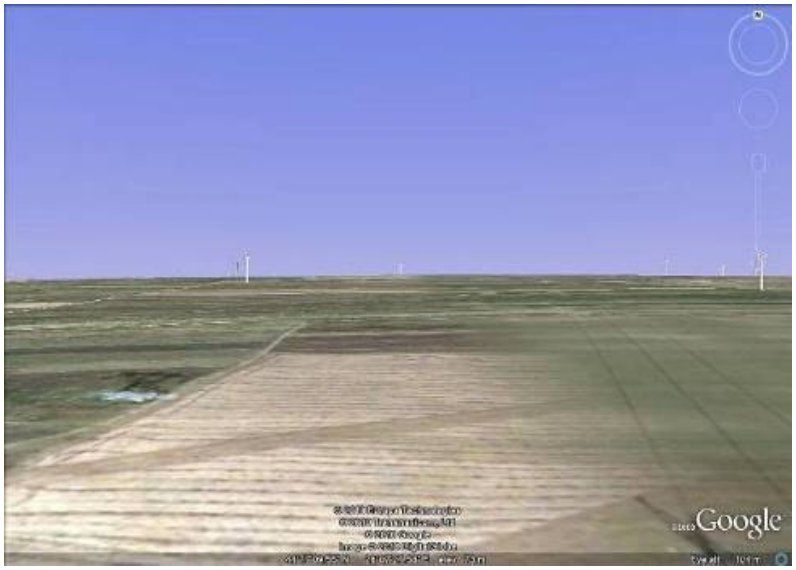

Plate 4 Cernavoda site photomontage, view looking north *(Source: Photomontages prepared for EDPR)*

Plate 5 View of existing Cernavoda site *(Source: taken during site visit, February 2010)*

3.1.12 Plate 5 shows the influence of the existing electricity pylons, existing vegetation and generally open, expansive rural landscape with limited views of settlement. The electricity pylons already encroach on skyline views further limiting the visual impact of the turbines.

3.1.13 The overhead powerlines which will be constructed on the site and between the site and the Mircea Voda North substation (3kms and 4kms respecyively) will pass over open countryside away from residential properties. Consequently the impact of the powerlines on visual amenity will be minimal.

Pestera Site

3.1.14 The nearest residential visual receptors are in the Ivrinezu Mic village, as well as Ivrinezu Mare, as shown on Plate 6 below.

Plate 6 Location of Proposed Wind Turbines – Pestera Site, *(Source: Photomontages prepared for EDPR)*

3.1.15 Due to the proximity of the Ivrinezu Mic village, it is likely that views of the turbines will be possible, as suggested in Plates 7 and 8 below:

Plates 7 and 8 Pestera site, views looking towards Ivrinezu Mic village
(Source: Photomontages prepared for EDPR)

3.1.16 Although the Ivrinezu Mic village is located at a lower topographical level than the surrounding hills, its proximity to the site and local topography means that views towards the nearest turbines will be possible.

3.1.17 However, due to the orientation of many houses to the wind turbines, many views will be oblique views only, with many views blocked by topography, vegetation or intervening built form. The colour and orientation of the turbines will help to limit their visual impact on the skyline.

Landscape and Visual Impacts Applicable to Both Sites

3.1.18 There appear to be limited opportunities for tourist or public views of either site due to the limited number of access routes or tourist attractions in the area. This reduces the number of potentially sensitive visual receptors in the vicinity, which are generally limited to nearby residential settlements.

3.1.19 The red lights on top of the turbines should be as dim as possible to limit visual intrusion into the night time scene whilst maintaining their warning function for birds.

3.1.20 There would be no significant impacts on landscape designations and limited impacts on surrounding residential receptors, all of which will be localised.

3.2 ECOLOGY AND NATURE CONSERVATION

3.2.1 The Dobrogea region is largely dry and resides between the River Danube, as it flows from south to north before forming the Danube delta, and the lagoons and Black Sea to the east. The landscape is typically rolling steppe and flat agricultural land, dotted with woodlands and brackish and freshwater lakes.

3.2.2 The two Project sites are located on largely flat land which is under intensive agricultural production, situated between the Danube delta to the west and the Black Sea coast to the east. The Cernavoda site is located approximately 50km east of the Black Sea coast and approximately 8km east of the River Danube (at the closest point). The Pestera site is approximately 38km west of the Black Sea coast and 10km south-east of the River Danube (at the closest point). As they are geographically similar sites in the same region, the potential ecological impacts of the schemes, proposed mitigation and monitoring is considered as a whole in this section.

Designated Sites and Flyways within Proximity of the Sites

3.2.3 Although the proposed Projects are not located within any protected area (Figure 6 Designated Sites), the Pestera site lies approximately 5km from the Aliman-Adamclisi Important Bird Area (IBA) and Special Protection Area (SPA). Bird species reported to move through the IBA/SPA during spring and autumn migration include Levant sparrowhawk, Red-footed falcon, Collared pratincole, Pallid harrier, Montagu's harrier and Booted eagle.

3.2.4 In addition, the Cernavoda site lies 6.5km to the east, with Pestera approximately 7km to the south east of the Dunare-Ostroave IBA and SPA (also known as the River Danube SPA). This IBA/SPA contains a number of bird species which are classified as threatened in an EU context, in both summer (breeding), winter and migration seasons.

3.2.5 The River Danube (to the west of the sites) is a major flyway during spring and autumn migration periods for such species as Osprey, Little tern, Pygmy cormorant, Ferruginous duck, White-tailed eagle and Glossy ibis. The Via Pontica (to the east of the sites) is a major flyway for migrating birds from Eastern Europe, Scandinavia and Russia. It is largely situated on the Black Sea coast with the southern Bulgarian part being a "bottle-neck". Numerous species utilise this flyway including White and Black storks, White and Dalmatian pelicans, Lesser spotted, Spotted and Booted eagles, Long-legged and Honey buzzards, and Cranes.

3.2.6 The Cernavoda site also lies approximately 5.7km from the Canaralele Dunarii Site of Community Importance (SCI). This SCI supports a high diversity of protected habitats, as well as the Carsium archaeological reserve, geological and palaeontological reserves; and sites important for mammals, amphibians, reptiles, fish, non-vertebrates, vertebrates as nominated in the EU Habitats Directive.

3.2.7 In addition, SOR report that the Cernavoda site is located 10km and 14km away from the Allah Bair-Capidava IBA/SPA and Bratul Borcea IBA/SPA. Both of these sites are of value to birds in the summer (breeding) winter and migration periods, for example, the latter is reported to support the following birds during spring and autumn migration periods: Ferruginous duck, White stork, White-tailed eagle, Osprey, Pygmy cormorant, Glossy ibis and Little tern.

Ecological Baseline

Site Overview

3.2.8 The ecological baseline on which the Ecological Impact Assessment of the Projects presented in this document has been drawn is based on information from the wider Dobrogea region and the designated sites and information directly relating to the Project sites. These sources are referenced within the document as follows;

3.2.9 Data from the wider Dobrogea region and the designated sites is presented in the following sections:

- Designated Sites and Flyways within Proximity of the Sites, paragraphs 3.2.3 to 3.2.7;
- Overview of Ornithological Interest in Romania, and in Particular within the Dobrogea Region, paragraphs 3.4.1 to 3.4.5;
- Qualifying Avifaunal Species in Natura 2000 Sites in Dobrogea, Table 3.4 and paragraphs 2.4.3 to 2.4.4 and paragraphs 3.4.12 to 3.4.16; and
- Overview of Bat Status within Romania, paragraphs 3.4.17 to 3.4.22.

3.2.10 Data relating to the project sites is referenced as follows:

- The EIA Reports undertaken for the Project Sites, throughout;
- Published EIA Reports for wind farms in the region;
- Examination of aerial photographs and photomontages, Plates 1 to 8;
- Data provided by SOR, paragraphs 2.4.3 and 2.4.4; and
- Data gathered during a field visit in February, paragraph 3.2.11 and Tables 3.1 and 3.2.

3.2.11 A site walkover was undertaken for both sites in February 2010 by an ecologist, an ornithological specialist with over 12 years experience Member of the Institute of Ecology and Environmental Management (MIEEM) and Chartered Environmentalist (CEnv). This confirmed that both sites consist of flat, apparently un-irrigated, agricultural land; without field boundary margins with very few trees or buildings on either site, and with no wetlands, significant watercourses or other notable features in close proximity.

3.2.12 The EIA Reports present the floral species present on the sites as being those typical of intensively managed agricultural land. There are no protected floral species or habitats on either of the sites.

3.2.13 The EIA Reports refer to a number of protected or rare species of rodents and reptiles that are found in the Dobrogea region. However the Project sites are not likely to support significant fauna or large numbers of fauna, other than avifauna, due to their lack of semi-natural habitats and their intensively managed homogenous status. There are no potential roosting sites for bats, nor is there foraging or commuting habitat for bats on either site. There are no waterbodies within proximity of the Pestera site and the closest waterbodies to the Cernavoda site are the River Danube and Lake Tibrinu (which are located approximately 8km to the west and 1km north respectively).

Avifauna

3.2.14 The EIA Reports reference a number of protected bird species within the Dobrogea region, however due to the nature of the sites it is unlikely that they support large numbers of breeding birds as there are no shelterbelts, trees, cliffs, foraging habitat or waterbodies close to the site. The sites have the potential to support small numbers of ground nesting birds within the sown fields. Species known to be associated with sown fields in this area include species of Skylark, Yellow wagtail, Quail and Partridge.

3.2.15 Two incidental wintering surveys of the Cernavoda site itself; and for the nearby village of Mircea Voda, were undertaken on behalf of WSPE in February 2010, the first visit lasting just under 1hr and the second lasting 5hrs. The species recorded during these visits are presented in Tables 3.1 and 3.2 below.

Table 3.1 Summary of Species recorded at Cernavoda February 2010

English Name	Scientific Name	Number	Conservation Status
Red-breasted goose	*Branta ruficolis*	15	Annex 1 of Wild Birds Directive., IUCN Endangered
Buzzard	*Buteo buteo*	1	IUCN Least Concern
Merlin	*Falco columbarius*	1	Annex 1 of Wild Birds Directive, IUCN Least Concern
Common kestrel	*Falco tinnunculus*	1	IUCN Least Concern
Grey partridge	*Perdix perdix*	5	IUCN Least Concern
Wood pigeon	*Columba palumbus*	10	IUCN Least Concern
Crested lark	*Galerida cristata*	10	IUCN Least Concern
Skylark	*Alauda arvensis*	100+	Unfavourable European conservation status.
Calandra lark	*Melanocorypha calandra*	75	Annex 1 of Wild Birds Directive, IUCN Least Concern
European Magpie	*Pica pica*	5	IUCN Least Concern
Hooded crow	*Corvus cornix*	5	IUCN Least Concern
Fieldfare	*Turdus pilaris*	2	IUCN Least Concern
House sparrow	*Passer domesticus*	50+	IUCN Least Concern
Goldfinch	*Carduelis carduelis*	150+	IUCN Least Concern
Linnet	*Carduelis cannabina*	10	IUCN Threatened

3.2.16 The flock of red-breasted geese observed over the Cernavoda wind farm site were recorded at an altitude of circa 100 metres on 3 February. No geese were recorded on, or over, the site on the 5 February site visit.

3.2.17 In addition to the above list, the following birds were recorded in, or on the outskirts of Mircea Voda village, located approximately 1-2 km away from the Cernavoda wind farm site:

Table 3.2 Summary of Species recorded at Mircea Voda February 2010

English Name	Scientific Name	Number	Conservation Status
Eurasian Sparrowhawk	*Accipiter nisus*	1	IUCN Least Concern
Rough-legged buzzard	*Buteo lagopus*	1	IUCN Least Concern
Hen harrier	*Circus cyaneus*	1	Annex 1 of Wild Birds Directive, IUCN Least Concern
Collared dove	*Streptopelia decaocto*	10	IUCN Least Concern
Feral pigeon	*Columba livia*	50	IUCN Least Concern
Jackdaw	*Corvus monedula*	5	IUCN Least Concern
Rook	*Corvus frugilegus*	50	IUCN Least Concern
European Robin	*Erithacus rubecula*	1	IUCN Least Concern
Great tit	*Parus major*	1	IUCN Least Concern
Blue tit	*Parus caeruleus*	1	IUCN Least Concern

Ecological Impact Assessment

3.2.18 The EcIA assessment process has been undertaken with the knowledge of the following legislation and guidance:

- European legislation and requirements of international conventions (to which Romania is a signatory) have been transposed into Romanian legislation by the Law of Protected Areas (462/2001). In addition to this law, there are several other regulations that relate to birds, including the Hunting and Game Management Law (407/2006), issuing 38 species on the list of game species and 182 species as “protected species for which hunting is forbidden”;
- At the end of October 2007, the Romanian Government adopted Government Decision No. 1284/2007 which designated 108 Special Protection Areas (SPAs) for the conservation of wild birds, some of which occur within the Dobrogea region;
- Romania is a member of the European Union, and therefore the Habitats Directive (92/43/EEC) and Wild Bird Directive (79/409/EEC) apply; these Directives were transposed in the Romanian legislation through GUO no. 57/2007 (Government Emergency Ordinance);
- Institute of Ecology and Environmental Management (IEEM). (2006). Guidelines for Ecological Impact Assessment;
- Scottish Natural Heritage (2000). Wind farms and birds: Calculating a theoretical collision risk assuming no avoiding action;
- Scottish Natural Heritage (2005). Survey methods for use in assessing the impact of onshore wind farms on bird communities; and
- Scottish Natural Heritage (2006). Guidance: Assessing significance of impacts from onshore wind farms on birds out with designated areas.

Potential Impacts

3.2.19 The habitat on the Project sites is of value at the site level only. No potentially significant impacts are predicted upon floral habitats due to the small amount of land take and the lack of semi-natural habitats on the Project sites.

3.2.20 Although (with the exception of avifauna) no dedicated faunal surveys have been undertaken for the sites, the lack of semi-natural habitat reduces the faunal species the sites are likely to support. Therefore no significant impacts are predicted for faunal species, with the exception of avifauna.

3.2.21 As the sites are not suitable for commuting and foraging bats with no suitable roosting sites, tree lines or waterbodies and there are no known bats caves in the area (see paragraph 3.4.17 onwards) there is no predicted impact upon bats as a result of the proposed developments on the Project sites.

3.2.22 There are four key potential impacts associated with avifauna at the wind farms on the Project sites,

- Mortality associated with collision with turbines/ overhead power lines;
- Disturbance / avoidance impacts;
- The 'barrier effect'; and
- Habitat loss.

3.2.23 Given the nature and size of the habitat to be lost (due to the turbine foundations and the access roads) and the amount of similar alternative habitat in the area, no significant impacts are predicted on avifauna with regards to habitat loss or on breeding birds.

3.2.24 Given their habitat, topography (on flat land) spacing between turbines and location between the significant flyways and away from designated sites no significant barrier effect is anticipated.

3.2.25 There is potential for local impacts due to mortality caused by collision for migrating birds and large flocking wintering birds and disturbance/avoidance during both construction and operation. The significance of this issue should be significantly minimised by the presence on site of an IOE, who will be responsible for monitoring bird movements in the area of both wind farms and applying appropriate mitigation measures as required, including reducing the speed of the turbines or, potentially, for the turbines to be temporarily turned off during bird migration periods, should it be required. In addition, the marking of overhead powerlines with bird deflectors to increase visibility will also reduce the potential for bird strikes.

3.2.26 Due to the lack of suitable breeding and foraging habitat and the location and spacing of the turbines (as discussed above) the Project Sites are not predicted to have potential for a significant effect on the qualifying species or integrity of any of the Natura 2000 sites in the area.

Mitigation and Monitoring

3.2.27 Generic mitigation for construction and an outline of the Environmental Monitoring Programme for each site is outlined in Tables 2.2 and 2.3. Specific mitigation measures for avifauna fall into two categories, mitigation altering the visibility, structure and/or operation of the turbines and monitoring measures as discussed below.

3.2.28 Recent research suggests that direct mortality due to collision is less than previously considered, largely because there is a degree of habituation which increases the avoidance of turbines by a number of species (Madsen and Boertmann 2008).

3.2.29 To aid this avoidance, there will be bright flashing lights on the top of each turbine to increase visibility at night (primarily for aircraft), and therefore promote avoidance and reduce mortality.

3.2.30 During periods when there is a higher density of birds in the vicinity of the turbines (such as bird migratory periods) the speed of the turbines will be reduced or they will be turned off temporarily as instructed by the IOE, based on an agreed protocol and detailed shut-down procedure prepared in accordance with EBRD and IFC standards.

3.2.31 The required mitigation will be informed by detailed monitoring which will be implemented during operation of the wind farm sites in accordance with the sites' environmental agreements and international

best practice, in summary the following is proposed. Further details relating to the mitigation are given in Section 3.4 below:

- The IOE will be responsible for examining the land surrounding the turbines for carcasses of birds and bats on a weekly basis during agreed periods. The results of these surveys will be reported to the Lenders and regulators on a quarterly basis and summary information published once a year. Mitigation will be reviewed and may be increased depending upon the results of these surveys;
- Monitoring will be undertaken by the IOE and agreed with the Lenders following acceptable sector standards, including any EU Guidance;
- Ornithological Survey Areas (OSAs) will be drawn up for the Project sites and within a wider area so that avoidance / displacement impacts within the wind farm sites can be established;
- In these OSAs wintering bird surveys will be carried out monthly (October to February inclusive) using The Brown and Shepherd (1993) methodology;
- In these OSAs breeding bird surveys will be carried out using the Common Bird Census (CBC) approach and notations monthly (March to July inclusive);
- In these OSAs migratory bird surveys will be undertaken (July to October inclusive) using The Brown and Shepherd (1993) methodology;
- A minimum of four appropriate fixed Vantage Points will be chosen for each of the Project Sites. Each month Vantage Point Surveys will be undertaken at these sites using SNH (2005) methodologies;
- These surveys will be reported quarterly and will be used to inform mitigation. The mitigation will be summarised in an annual report; and
- The surveys will continue initially for 3 years until confidence in the residual effect prediction for the Projects sites and for their predicted contribution to potential cumulative impacts is confirmed.

3.2.32 In addition, a Collision Risk Assessment will be completed within two years of the sites becoming operational. The results of the assessment will be made available to the Lenders, regulators, local community and published on the web site. The results of the Collision Risk Assessment will be used to further define site specific mitigation measures and will be included within the Project Environmental Management and Monitoring Plan. The Company will follow any National and EU guidance developed for wind farm monitoring and approved as the basis of monitoring and operating wind farms.

Residual Effects

3.2.33 It is anticipated that combined with the proposed mitigation detailed above, monitoring results will confirm that there are no significant effects on avifauna at a greater than site level. There may be a degree of mortality, avoidance and disturbance but this is likely to only affect small numbers of bird species in the immediate area, many of which will habituate to using other similar habitat which is readily available in the local area.

3.3 POTENTIAL FOR CUMULATIVE IMPACTS OF CERNAVODA AND PESTERA WIND FARMS, IN COMBINATION WITH OTHER NEARBY WIND FARMS

Number and Location of the Schemes Included in this Assessment

3.3.1 The good wind conditions found in the Dobrogea region of Romania have resulted in a significant number of wind farm developers locating considering locating sites in the area.

3.3.2 Consultation has been held with the City Halls at Pestera, Cernavoda, Mircea Voda and Saligny to identify other wind farm projects within the area around the Cernavoda and Pestera Projects. The results of this consultation are incorporated within Table 3.3 and their locations are illustrated in Figure 5. For completeness the Pestera and Cernavoda sites are included at the end of this table. It should be noted that

some details relating to the proposed wind farms is not available at this stage and the location of the wind farms are indicative (generally these relate to the nearest towns or villages).

3.3.3 In addition, this consultation confirmed that only the proposed EDPR sites at Pestera and Cernavoda have been issued with a building permit. Building permits are known to have been issued for six other wind farms within Constanta County, these are located between approximately 60km and 100km from the Pestera and Cernavoda sites.

3.3.4 Additional wind farm projects are located in the area and these are at various stages of development. Some are only at the Urban Certificate stage (the very first stage when starting a project) and it is uncertain how many of these developments will be implemented. In order to be constructed each project has to have a connection contract signed with ENEL Dobrogea.

3.3.5 For the purposes of this project the cumulative impact assessment considers those wind farm proposals in the vicinity of the Cernavoda and Pestera sites which are considered to be within the zone of influence of the two subject sites. In accordance with best practice guidance, the assessment of cumulative effects should only consider those areas where there is the potential for the cumulative effect of a proposal, which taken with other existing or proposed projects, might add to a significant cumulative effect from a natural heritage perspective. The zone of influence of the Cernavoda and Pestera projects has been identified through consideration of the likely spatial extent of the potential environmental effects arising from these wind farm developments in respect of ecological effects (specifically avifauna and bats), landscape and visual impacts and noise impacts. Although the zone of influence varies between environmental topics, given the nature of the surrounding area (including the habitat types, topography, land uses and the location of Natura 2000 sites and known flyways used by birds) the anticipated zone of influence associated with the potential effects has been identified as being approximately 10 – 15km from each site.

3.3.6 This approach is in line with best practice in respect of cumulative effects and effects on Natura 2000 sites, including the following guidance:

- Scottish Natural Heritage (2005) Cumulative Effect of Wind Farms
- European Commission (2001) Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites
- European Commission (2000) Managing Natura 2000 Sites

3.3.7 The nearest known locations of other wind farms existing or proposed in the local area comprise:

- A wind turbine project located approximately 5-6 km south from Pestera village and approximately 10-11km from the Pestera wind farm site (environmental agreement obtained, building permit not obtained to date); and
- Two approved wind farms in the vicinity of Galbiori (approximately 18km from the Cernavoda site and approximately 30km from the Pestera site respectively) and Crucea (approximately 26km from the Cernavoda site and approximately 38km from the Pestera site respectively), to the north of the project sites.

3.3.8 The first project identified above is not located within any protected area and is at least 10km from any Natura 2000 site or IBA. The latter (two approved) wind farms to the north of the Project sites are close to the Allah Bair SPA and IBA. In addition the Bratul Borcea SPA and IBA is located to the west of these proposed developments.

3.3.9 Therefore, based on the anticipated zone of influence for the Cernavoda and Pestera projects (approximately 10 – 15km from each site) only the first of the proposed wind farms listed above has been considered in respect of the potential for cumulative environmental impacts associated with the Cernavoda and Pestera wind farms. It should be noted that, based on available information, a building permit for this wind farm has not been obtained to date.

Table 3.3 Wind Farm Projects in the Vicinity of Cernavoda and Pestera Sites (please note project locations are approximate)

No.	Company	Location	Capacity (if known)	Status (if known)	Distance and Direction from Pestera and Cernavoda
1	SC Eolica Dobrogea SA	Sacele commune, Constanta County	Construction of wind turbines network	Obtained environmental agreement – January 2009	Located 53km NE of Pestera town and 51km ENE of Cernavoda town
2	SC Eolica Dobrogea SA	Istria commune, Constanta County	Construction of wind turbines network	Obtained environmental agreement – January 2009	63km NE of Pestera town and 59km NE of Cernavoda town
3	SC ROMWIND SRL SI SC NEG PROJECT TWO	Ciocarlia commune, Constanta County	Construction of new energy production facilities - 5 wind turbines -	Obtained environmental agreement – April 2008 7/04.04.2008	63km NE of Pestera town and 59km NE of Cernavoda town
4	SC ROMWIND SRL SI SC NEG PROJECT 1	Topraisar commune, Constanta County	Construction of new energy production facilities - 3 wind turbines	Obtained environmental agreement – April 2008 9/05.05.2008	32 KM SE of Pestera town and 49km SE of Cernavoda town
5	SC ROMWIND SRL SI SC NEG PROJECT TWO	Mihai Viteazu commune, Constanta County	Construction of new energy production facilities - 7 wind turbines -	Obtained environmental agreement – April 2008 4/28.03.2008 5/28.03.2008	67km NE of Pestera and 60 km ENE of Cernavoda
6	NEG PROJECT TWO + SC ROMWIND SRL	Not available	Construction of Wind Farm – 3 turbines (or 3 farms, not clear)	Obtained environmental agreement 12/26.06.2008	Not known
7	NEG PROJECT 1	Not available	Construction of Wind Farm – 4 turbines (or 4 farms, not clear)	Obtained environmental agreement 11/26.06.2008	Not known
8	SC Eco Power Wind SRL	Targusor commune, Constanta County	Construction of Wind Farm - Mireasa II	Obtained environmental agreement – October 2008 29/15.10.2008	38km NE of Pestera and 32km ENE of Cernavoda
9	N/A / SC EOLIENE	Pecineaga Wind	6 MW	Building permit obtained -	This wind farm is situated 70km from

No.	Company	Location	Capacity (if known)	Status (if known)	Distance and Direction from Pestera and Cernavoda
	SRL	Farm		October 2010. Environmental agreement: 50/25.11.2008	Pestera WF.
10	SC ATRA ECO SRL	Pecineaga Wind Farm	Not available	Environmental agreement obtained 39/04.11.2008	Not sure if it is the same as above, as the environmental agreement was obtained after the building permit
11	CEZ	Fantanele Wind farm	Extension with 23 MV	Building permit obtained April 2009.	This wind farm is situated 9 km from Pestera wind farm. Situated in the administrative territory of Fantanele and Coceag Local Councils. Fantanele Town is located 60km NE of Pestera and 52km NE of Cernavoda
12	SC WIND POWER PARK SRL	Dorobantu Wind Farm	51 MW	Building permit obtained issued in January 2009. Environmental agreement: 27/09.10.2008	This wind farm is situated 7 km from Pestera wind farm. Situated in the administrative territory of Nicolae Balcescu and Tortoman Local Councils. Dorobantu town is located 24km ENE of Pestera and 30km NE of Cernavoda.
13	N/A / SC MIREASA ENERGIES SRL	Mireasa Wind Farm	10 MW	Building permit obtained issued in October 2009. Environmental agreement: 35/28.10.2008	This wind farm is situated 85km from Pestera wind farm. Situated in the administrative territory of Targusor Local Council. Mireasa town is located 38km NNE of Pestera and 31km NE of Cernavoda
14	SC SILISTEA ENERGIES SRL	Silistea Wind Farm	25 MW	Building permit obtained in October 2009 Environmental agreement:	This wind farm is situated 60km from Pestera wind farm. administrative territory of Tortoman Local Council.

No.	Company	Location	Capacity (if known)	Status (if known)	Distance and Direction from Pestera and Cernavoda
				26/08.10.2008	The town of Silistea is located 24km NNE of Pestera and 12km NE of Cernavoda.
15	SC EOLIENE SRL	Dulcesti wind farm	Not available	Environmental Agreement: 34/28.10.2008	Town of Dulcesti is 40km SW of Pestera and 58km SW of Cernavoda
16	SC WIND STARS SRL	Silistea Wind Farm	Not available	Environmental Agreement obtained 32/16.10.2008	SC SILISTEA ENERGIES SRL Town of Silistea is located 12 km N of Cernavoda and 25km north of Pestera
17	N/A (SC MONSSON ALMA SRL)	Galbiori Wind Farm	5 MW	Building permit obtained issued in April 2009 Environmental agreement: 31/16.10.2008	Administrative territory of Crucea Local Council. The wind farm is situated 72km from Pestera WF. Galbiori town is 36km NNE of Pestera and 25km NNE of Cernavoda
18	SC EOLICA DOBROGEA SRL	Mihai Viteazu Wind farms	Not available	Obtained environmental agreements: 40/05.11.2008 41/05.11.2008 42/05.11.2008 43/05.11.2008	The Town of Mihai Viteazu is located 309km NW of Cernavoda and 320km of Pestera
19	CEZ + SC OVIDIU DEVELOPMENT S.R.L.	Wind Farm Cogealac (understood to be further stage of the Fantanele project)	101 turbines, power 252.5MW	Announced on M website to be set for operation before 01.04.2011,	Constanta county North-east of the Constanta county, 45km from Constanta town. Coge lac town is 54km NE of Pestera and 48km NE of Cernavoda
20	SC EOLICA DOBGROGEA TWO SRL (SA-II)	Sacele	Not available	Screening decision: Significant environmental impact Status: Under procedure 20.01.2009	Not known

No.	Company	Location	Capacity (if known)	Status (if known)	Distance and Direction from Pestera and Cernavoda
				(applied to REPA)	
21	SC EOLICA DOBGROGEA TWO SRL (SA-III)	Sacele	Not available	Screening decision: Significant environmental impact Status: Under procedure 20.01.2009 (applied to REPA)	Not known
22	SC EOLICA DOBGROGEA TWO SRL (SA-IV)	Sacele	Not available	Screening decision: Significant environmental impact Status: Under procedure 20.01.2009 (applied to REPA)	Not known
23	SC EOLICA DOBGROGEA TWO SRL (IS-I)	Istria	Not available	Screening decision: Significant environmental impact Status: Under procedure 20.01.2009 (applied to REPA)	Not known
24	SC EOLICA DOBGROGEA TWO SRL (IS-II)	Istria	Not available	Screening decision: Significant environmental impact Status: Under procedure 20.01.2009 (applied to REPA)	Not known
25	SC RENOVATIO POWER SRL (PESTERA)	Pestera	30 turbines, power 90MW	Environmental Agreement obtained 10/20.06.2008, reviewed on 01.10.2008. Building permit obtained 30.10.08, building permit for extension obtained 24.12.08	This is the Pestera site

No.	Company	Location	Capacity (if known)	Status (if known)	Distance and Direction from Pestera and Cernavoda
26	SC CERNAVODA SRL (CERNAVODA PROJECT)	Cernavoda	46 turbines, power 138MW	Environmental Agreement obtained 24/29.09.2008. Building permit obtained 19.12.08	This is the Cernavoda site

Sources: Information provided to EDPR by City Halls of Pestera and Cernavoda (March 2010) and search of the EPA Constanta website (March 2010)

Potential Cumulative Impacts

3.3.10 The Project sites at Pestera and Cernavoda have also been assessed for their potential to contribute to cumulative impacts that may be associated with the identified potential wind farm development which is located approximately 10 – 11km from the Pestera site; the key potential cumulative impacts are:

- Avifauna and bats – potential for mortality due to direct collisions with or pressure changes due to turbines, disruption to migratory routes and flight pathways and barrier effects reducing available flying space;
- Landscape and visual impacts – significant change in the landscape character of the area; and
- Noise impacts – significant increase in noise levels with resultant disturbance to noise-sensitive ecological species.

Cumulative Impacts on Avifauna and Bats

3.3.11 The main potential concern in respect of cumulative effects arising from the proposed wind farms at Pestera and Cernavoda together with the other potential wind farm development within 10- 15km of the sites is related to ecological impacts on avifauna and bats; these are discussed in Section 3.4 below.

Cumulative Landscape and Visual Impacts

3.3.12 Potential cumulative impacts on the local landscape character and visual amenity of an area are dependent on the topography of the area, the sensitivity of the existing landscape and the presence of visual receptors. In relation to wind farms, the movement of the operational turbines can be considered a significant impact, but this is also a matter of perception as it dependent on people's personal impressions. In addition, wind farms are also often located in remote rural areas away from major population centres, although their setting, often on high ground, can increase their visibility.

3.3.13 In the case of the Cernavoda and Pestera wind farm sites, the nearest proposed wind farm is a considerable distance away at approximately 10 - 11km. However, should future development be proposed closer to the sites, then the potential for cumulative landscape impacts should be considered by the City Hall, Environmental Protection Agency and the proposed developer.

Cumulative Noise Impacts

3.3.14 The distance between the proposed wind farm sites at Pestera and Cernavoda and the nearest other potential wind farm is more than 10km and therefore no cumulative noise impact is anticipated. However, each proposed development requires a specific assessment of the potential for local cumulative noise impacts to occur, taking into account the existing and known wind farms and any other proposed developments within the range of noise impact.

Summary

3.3.15 Based on the above, there is the potential for cumulative impacts to occur on birds and bat species from the combination of the development of the Pestera and Cernavoda wind farms together with another potential wind farm approximately 10 – 11km from the Pestera site. Therefore these potential impacts are discussed in the following section.

3.3.16 Due to the distance between the other identified potential wind farm project (for which a building permit has not been obtained to date) and the proposed developments at Pestera and Cernavoda (approximately 10 – 11km) and the localised nature of impacts relating to landscape and visual impacts and changes in noise levels, no further consideration is given in this report to the potential for cumulative impacts in respect of landscape and visual conditions and ambient noise levels.

3.4 POTENTIAL CUMULATIVE ECOLOGICAL IMPACTS

Overview of Ornithological Interest in Romania, and in Particular within the Dobrogea Region

3.4.1 A total of 385 bird species have been recorded in Romania, of which 66% have bred (Anon, 2008). There are 109 species that are resident (present year-round); 36 winter visitors; 134 summer visitors; 36 regular passage migrants; and 70 'vagrants' (recorded only occasionally). Of these 385 species, 102 regularly-occurring species are listed in Annex 1 of the Wild Birds Directive (79/409/EEC).

3.4.2 Moreover, Romania may be instrumental in maintaining breeding populations of bird species of European importance due to the high percentage of certain species breeding there. For example, there are 7 species with more than 50% of their European population breeding in the country, and 13 species for which 10-50% of the European breeding population is found within Romania (Anon, 2008).

3.4.3 Romania is also a key geographical region on the route of one of Europe's major migratory flyways, Via Pontica. Via Pontica is the main flyway connecting Eastern Europe with the eastern coast of Africa; it supports hundreds of thousands of waterfowl, birds of prey and passerines annually (Anon, 2008). Via Pontica passes through Dobrogea, relatively close to many of the wind farm sites being assessed here, particularly those close to the Danube Delta and Black Sea coast. The Danube Delta SPA/IBA, located approximately 57km north-east of the Cernavoda site and approximately 62km north-east of the Pestera site, is one of the most important protected areas in Europe; it is reported to accommodate between 470,000-950,000 migratory waterfowl annually; the western Black Sea coast also supports significant numbers of waterfowl, with an estimated 110,000 – 250,000 individuals stopping to feed their on migration every year.

3.4.4 Species of note which breed, migrate through or over winter in Romania include a number of 'globally threatened' species, such as the Red-breasted goose *Branta ruficollis* (estimated world population of 88,000 birds); Lesser white-fronted goose *Anser erythropus* (estimated world population of 28-33,000 pairs); White-headed duck *Oxyura leucocephala* (estimated world population of under 10,000 pairs); and the Greater spotted eagle *Aquila clanga* (estimated world population of less than 10,000 pairs, with a total European population of approximately 900 pairs). All of these species are declining; population estimates were obtained from the Birdlife International website (Anon, 2010).

3.4.5 Information on Special Protection Areas (SPAs, Natura 2000 sites established because of the Wild Birds Directive), and on Important Bird Areas (IBAs) in the vicinity of these wind farm sites is provided later in the assessment. Figure 6 shows the location of the SPAs, IBAs and Sites of Community Importance (SCIs).

Overview of Protected Areas and Natura 2000 Sites in Dobrogea

3.4.6 There are a number of Natura 2000 sites and other protected areas (such as IBAs) in the area surrounding the wind farm sites listed in Table 3.3 (presented on Figure 5). These include four SPAs and IBAs, which are designated to protect bird populations, within 15km of the Pestera and Cernavoda wind farm sites. These SPAs and IBAs are important for various wintering bird species and provide feeding and roosting areas for a range of species.

3.4.7 The closest designated sites to the proposed wind farms at Pestera and Cernavoda (Aliman-Adamclisi IBA and SPA and Dunare-Ostroave IBA and SPA) are described below and shown on Figure 6. The potential wind farm project approximately 10 - 11km from the Pestera wind farm, which has been identified for consideration in the cumulative impact assessment, is not located within any protected area and is at least 10km from any Natura 2000 site or IBA.

3.4.8 Other designated sites which are located within 15km of the proposed wind farms at Pestera and Cernavoda include:

- Bratul Borcea SPA and IBA – located approximately 14km west of the Cernavoda site; and
- Allah Bair-Capidava SPA and IBA – located approximately 10km north of the Cernavoda site.

3.4.9 The Pestera site lies approximately 5km from the Aliman-Adamclisi IBA and SPA. The Aliman-Adamclisi IBA (RO128) occupies 19,849 hectares and comprises non-irrigated arable land, natural grasslands, broad-leaved forest, pasture and agricultural land with significant areas of natural vegetation. It

qualifies as an IBA mainly under category C6 (species threatened at the European Union level); essentially this means that this IBA is one of the ten most important sites in Romania for certain species, which are all considered 'threatened' in the European Union, these include species such as the black kite, stone curlew and nightjar.

3.4.10 The Cernavoda site lies approximately 6.5 km from the Dunare-Ostroave IBA and SPA and approximately 5.7km from the Canaralele Dunarii Site of Community Importance (SCI). The Dunare-Ostroave SPA (RO0032) (also known as the River Danube SPA) occupies an area of 19,468 ha and qualifies as an SPA because it supports certain defined bird species.

3.4.11 The Canaralele Dunarii SCI (ROSCI0022) covers a total area of 26,064ha and extends across three counties: Calarasi, Constanta and Ialomita. It supports a high diversity of protected habitats, as well as the Carsium archaeological reserve, geological and palaeontological reserves; and sites important for mammals, amphibians, reptiles, fish, non-vertebrates, vertebrates as nominated in the EU Habitats Directive.

Qualifying Avifaunal Species in Natura 2000 Sites in Dobrogea

3.4.12 Birds listed as qualifying species for each SPA under the provisions of the EC Birds Directive have been illustrated in Table 3.4 overleaf (in blue rows); additional bird species listed under IBA citations, but not identified as qualifying criteria of SPAs per se, have also been listed (in white rows).

3.4.13 From the data presented in Table 3.4 it may be seen that 74 Annex I species, listed as qualifying criteria for one or more SPA occur in proximity to at least one of the wind farm proposals listed in Table 3.3. An additional 30 non-Annex 1 bird species, are also recorded in significant numbers within one or more of the IBAs.

3.4.14 The Danube Delta SPA/IBA has been highlighted in yellow in Table 3.4. This SPA/IBA is by far the most important within Romania, and in fact in Europe. It holds the majority of the Annex 1 species listed in Table 3.4, and measuring 51.5 km^2 it occupies an area similar in size to all of the other SPAs in Dobrogea combined.

3.4.15 The contribution both the Danube Delta and Black Sea protected areas make to the Via Pontica (the main bird flyway between Eastern Europe and the east coast of Africa) is also significant. Information contained within Anon (2008), and reproduced in Table 3.4 illustrates that the Danube Delta supports between 470,000 – 950,000 migratory waterfowl, and the Black Sea between 110,000 – 250,000 migratory waterfowl annually. These figures refer to the number of waterfowl that stop to feed at these sites during migration; additional waterfowl may fly over the sites without stopping, and of course birds of prey and passerines, not included in these figures, may also stop to feed and/or fly over these sites. Although these considerable numbers of bird movements are focussed within the Danube Delta and along the western Black Sea coasts, some migratory movements also occur north and south along the River Danube, located approximately 50 km to the west. Although the Via Pontica bird movements will occur along a broad front which may encompass all of the wind farm sites listed in Table 3.3, it is likely to be focussed on coastlines, steppes and major rivers rather than flat agricultural planes.

3.4.16 According to SOR (Cazacu, 2010) there are also significant movements of birds from the Black Sea coast moving west to the River Danube, particularly in freezing weather, and back again to the Black Sea in warmer conditions. Such movements include those made by the red-breasted goose, a globally threatened species, almost the entire global population of which over winters near the Black Sea.

Overview of Bat Status within Romania

3.4.17 Published information on the status of bats in Romania is limited. Information obtained from EUROBATS. AC7.14, 'Agreement on the Conservation of Bats in Romania', March 2002 (Anon, 2002), states that there are 30 bat species in Romania.

3.4.18 Information received from the Romanian Bat Protection Agency (Szodoray-Paradi, March 2010) suggests that six bat species are likely to occur within the zone of influence of the proposed wind farms at Pestera and Cernavoda, namely:

- Noctule *Nyctalus noctula*;
- Common pipistrelle *Pipistrellus pipistrellus*;

- Kuhl's pipistrelle *Pipistrellus kuhlii*;
- Soprano pipistrelle *Pipistrellus pygmaeus*;
- Nathusias' pipistrelle *Pipistrellus nathusii*; and
- Serotine *Eptesicus serotinus*.

3.4.19 Anon, 2002 also reports that the country has a number of cave systems which have, at least in the past, held significant aggregations of breeding, mating and hibernating bats (in winter); many of these systems have been damaged, or subject to vandalism, which has resulted in levels of displacement, whereby bats have left these caves.

3.4.20 Most of the caves are in the Carpathian Mountains, a significant distance from the wind farm sites, three caves are documented with regard to bats in the Dobrogea region (Ifram and Procora, 2007). Pestera (meaning cave) Casian, Liliecilor de la Gura Dobrogei and Limanu have been found to support the following species:

- Daubenton's *Myotis daubentonii*;
- Mehely's Horseshoe *Rhinolophus mehelyi*;
- Greater Horseshoe *Rhinolophus ferrumequinum*;
- Lesser Mouse-Eared *Myotis blythii*;
- Whiskered Myotis *Mystacinus bulgaricus*;
- Serotine *Eptesicus serotinus*;
- Large bentwing *Miniopterus schreibersii*;
- Grey long-eared *Plecotus austriacus*;
- Brown long-eared *Plecotus auritus*; and
- Parti-coloured *Vespertilio murinus*.

3.4.21 These caves are still over 10km from either of the wind farm sites at Pestera and Cernavoda.

3.4.22 It is during swarming and migration for the mating period that potential impacts on bats are generally predicted whereby direct mortality is caused due to proximity to and collisions with wind turbines.

Table 3.4 SPAs (and their Qualifying Criteria Bird Species under the Birds Directive) Located within a 15 km Radius of the Wind Farms Listed in Table 3.3

Qualifying criteria bird species	Name of SPA										
	Ostrovu Lung – Gostinu	Podisul Harti-baciului	Cheile Dobrogea	Magura Odobeoti	Danube Delta	Dumbraveni Plopeni	Aliman-Adamclisi	Balta Vederoasa	Allah Bair	Bratul Borcea	Dunare-Ostroave
Accipiter brevipes Levant sparrowhawk	B		B, M			B	B, M				
Acrocephalus melanopogon Moustached warbler					B					B	B
Alcedo atthis Kingfisher					B				B	B	B
Anas clypeata Shoveler					M						
Anas crecca Teal					M						
Anas penelope Pintail					M						
Anas platyrhynchos Mallard					W						
Anas strepera Gadwall					W						
Anser albifrons White-fronted goose					W					W	
Anser anser Greylag goose					W						
Anser erythropus Lesser white-fronted goose					W						
Anthus campestris Tawny pipit		B				B	B				
Aquila clanga Greater spotted eagle					W						
Aquila heliaca Imperial eagle			B, M				B				
Ardea purpurea Purple heron					B				B	B	B
Ardeola ralloides Squacco heron					B					B	B
Asio flammeus Short-eared owl					B						
Aythya ferina Pochard				W	W						
Aythya fuligula Tufted duck				W	W						
Aythya marila Scaup				W							
Aythya nyroca Ferruginous duck					W					B, M	B, M
Botaurus stellaris Bittern					B						
Branta ruficollis Red-breasted goose			M	M	W					W	W
Burhinus oedicnemus Stone curlew		B	B, M		B		B				
Buteo rufinus Long-legged buzzard	B	B	B, M				B				
Bucephala clangula Goldeneye				W	W						
Calandrella brachydactyla Short-toed lark		B	B				B		B		

Qualifying criteria bird species	Name of SPA										
	Ostrovu Lung – Gostinu	Podisul Harti-baciului	Cheile Dobrogea	Magura Odobeoti	Danube Delta	Dumbraveni Plopeni	Aliman-Adamclisi	Balta Vederoasa	Allah Bair	Bratul Borcea	Dunare-Ostroave
Calidris alpine Dunlin					M						
Calidris ferruginea Curlew sandpiper					M						
Calidris minuta Little stint					M						
Caprimulgus europaeus Nightjar							B				
Charadrius alexandrinus Kentish plover					B, M						
Charadrius morinellus Dotterel					M						
Chlidonias hybridus Whiskered tern				M	B						
Chlidonias niger Black tern					B						
Coracias garrulus Roller	B	B	B		B	B	B		B	B	B
Ciconia ciconia White stork					B					B, M	
Circaetus gallicus Short-toed eagle	B	B					B				
Circus aeruginosus Marsh harrier					B						
Circus cyaneus Hen harrier		M, W				M, W					
Circus macrourus Pallid harrier		M	M			M	M				
Circus pygargus Montagu's harrier	B		B, M		B		B, M				
Cygnus Cygnus Whooper swan				W	W						
Cygnus olor Mute swan					W						
Dendrocopus syriacus Syrian woodpecker						B	B		B		
Dendrocopus medius Middle spotted woodpecker	B										
Egretta alba Great white egret					B, W						
Egretta garzetta Little egret					B					B	
Emberiza hortulana Ortolan bunting			B			B			B		
Falco cherrug Saker	B	B	B, M		B						
Falco columbarius Merlin			M, W		B						
Falco naumanni Lesser kestrel					B						
Falco vespertinus Red-footed falcon	B	B, M	B, M		B		B, M		B	B	B
Fulica atra Coot				W	W						
Gallingo media Great snipe					M						
Glareola pratincola Collared pratincole			M		B		M				

Qualifying criteria bird species	Name of SPA										
	Ostrovu Lung – Gostinu	Podisul Harti-baciului	Cheile Dobrogea	Magura Odobeoti	Danube Delta	Dumbraveni Plopeni	Aliman-Adamclisi	Balta Vederoasa	Allah Bair	Bratul Borcea	Dunare-Ostroave
Gelochelidon nilotica Gull-billed tern	G			M	B, M						
Haliaeetus albicilla White-tailed eagle					B					B, M	B, M
Hieraeetus pennatus Booted eagle	B					B	B, M				
Himantopus himantopus Black-winged stilt					B, M						
Ixobrychus minutus Little bittern					B						
Lanius minor Lesser grey shrike		B	B			B	B		B		
Larus cachinnans Caspian gull				B							
Larus canus Common gull				M	M						
Larus genei Slender-billed gull				M	M						
Larus melanocephalus Mediterranean gull				M	B						
Larus minutus Little gull				M	M				M		
Larus ridibundus Black-headed gull				M	B, M						
Limicola falcinellus Broad-billed sandpiper					B, M						
Limosa limosa Black-tailed godwit					M						
Lullula arborea Woodlark							B				
Melanocorypha calandra Calandra lark		B	B				B				
Mergus albellus Smew				W	W						
Mergus merganser Goosande				W	W						
Milvus migrans Black kite	B		B, M		B		B		B		
Netta rufina Red-crested pochard					W						
Numenius arquata Curlew					M						
Numenius tenuirostris Slender-billed curlew					M						
Nyticorax nycticorax Night heron					B					B	B
Oenanthe pleschanka Pied wheatear	B		B		B		B				
Pandion haliaetus Osprey										B, M	M
Pelecanus crispus Dalmation pelican				M	B						
Pelecanus onocrotalus White pelican					B						
Phalacrocorax carbo Cormorant				W	W, M						

Qualifying criteria bird species	Name of SPA										
	Ostrovu Lung – Gostinu	Podisul Harti-baciului	Cheile Dobrogea	Magura Odobeoti	Danube Delta	Dumbraveni Plopeni	Aliman-Adamclisi	Balta Vederoasa	Allah Bair	Bratul Borcea	Dunare-Ostroave
Phalacrocorax pygmaeus Pygmy cormorant					B, W, M				W	W, M	B,W,M
Phalaropus lobatus Red-necked phalarope				M	M						
Philomachus pugnax Ruff					M						
Platalea leucopterus Spoonbill					B					B	B
Plegadis falcinellus Glossy ibis					B					B, M	B, M
Pluvialis apricaria Golden plover					M						
Podiceps grisegena Red-necked grebe				W							
Podiceps nigricollis Black-necked grebe				W							
Porzana parva Little crake					B						
Porzana porzana Spotted crake					B						
Puffinus yelkouan Yelkouan shearwater				M	M						
Recurvirostra avosetta Avocet					B, M						
Sterna albifrons Little tern				M	B					M	B, M
Sterna caspia Caspian tern				M	M						
Sterna hirundo Common tern				M	B						
Sterna sandvicensis Sandwich tern				M	B, M						
Tadorna ferruginea Ruddy shelduck					W				B		
Tringa erythropus Spotted redshank					M						
Tringa stagnatilis Marsh sandpiper					M						
Tringa totanus Redshank					M						
Migratory waterfowl				M	M					W	

Key to status of qualifying criteria bird status within SPA (based on EC Birds Directive): B = breeding; M = migration; W = winter.

The location of the SPAs is illustrated in Figure 6.

Potential Cumulative Ecological Impacts

3.4.23 The main potential concern in respect of cumulative effects arising from the proposed wind farms at Pestera and Cernavoda together with the other proposed wind farm located within the zone of influence (approximately 10-11km from the Pestera wind farm site) is related to ecological impacts, specifically impacts on the activity and migration routes used by birds, and most likely to a lesser extent bats. Such impacts may include the creation of barriers to migration routes and an increased risk of direct mortality due to collisions (mainly in respect of raptors, waterfowl and waders) and pressure changes "barotrauma" (in the case of bats).

3.4.24 It should be acknowledged that the locations of the proposed Pestera and Cernavoda wind farms have been pre-selected to minimise impacts on migrating birds and known flight routes, such as the Via Pontica, and there are no designated areas close to either of the sites, the nearest being approximately 5km from the Pestera site and 6.5kmfrom the Cernavoda site. In addition, there is a significant distance between the Cernavoda and Pestera sites (approximately 7km) and the nearest other wind farm, located approximately 10-11km from the Pestera site. Therefore, the potential for cumulative ecological impacts associated with the Cernavoda and Pestera sites and the other identified wind farm development should be limited. The types of potential ecological impacts are discussed in the following sections.

Potential Cumulative Impacts on Avifauna

3.4.25 There are three key potential cumulative impacts associated with the wind farm projects to be considered. Direct habitat loss, is not considered as a cumulative impact as it tends to be limited given the relatively small footprint of the turbines themselves:

- Direct mortality associated with collision with and proximity to turbines/ overhead power lines;
- Disturbance / avoidance impacts; and
- The 'barrier effect'.

Direct Mortality

3.4.26 High mortality rates are primarily related to topographical bottlenecks where migrating or local birds fly through a relatively confined area, for example mountain passes or land-bridges between waterbodies. Other susceptible locations are slopes with rising winds where the birds gain lift, and near wetlands or shallow seas that attract large numbers of feeding or resting birds. Flight corridors between feeding areas, roosting sites or breeding sites are also particularly susceptible (Barrios and Rodriguez 2004).

3.4.27 The Pestera and Cernavoda wind farm sites are both located on flat intensively managed agricultural land, without waterbodies, woodland or scrubland and therefore they are unlikely to attract birds in significant numbers. Therefore, the contribution the sites would make to potential bird collision figures is unlikely to be significant.

3.4.28 However in order to further minimise the potential significant of this impact, EDPR propose to implement a series of mitigation measures including the appointment of an Independent Ornithological Expert (IOE) for the sites. The IOE will have responsibility for undertaking bird monitoring and surveys on site, including wintering, breeding and migratory bird surveys and Vantage Point surveys, which will be agreed with the Lenders and follow acceptable sector standards, including any EU Guidance. The results of the surveys will be reported to the Lenders on a quarterly basis, and summary information published once a year. The results will inform mitigation measures associated with operation of the wind farms, the mitigation will be summarised in an annual report. The surveys will continue initially for 3 years until confidence in the residual effect prediction for the Projects and their predicted contribution to potential cumulative impacts is confirmed.

3.4.29 The IOE will also be responsible for examining the land surrounding the turbines for carcasses of birds and bats on a weekly basis during agreed periods. The results of these surveys will be reported to the Lenders and regulators on a weekly basis, and summary information published once a year.

3.4.30 The IOE will also have the authority to implement appropriate mitigation measures based on an agreed protocol, including the reducing the speed of the turbines or, potentially, for the turbines to be temporarily turned off should a migrant flock be observed to be approaching either site. A detailed shut-

down procedure for each wind farm will be developed and implemented in accordance with EBRD and IFC standards.

3.4.31 In addition, the marking of overhead powerlines with bird deflectors to increase visibility will also reduce the potential for bird strikes.

3.4.32 In addition, a Collision Risk Assessment will be completed within two years of the wind farms becoming operational. The results of the assessment will be made available to the Lenders, regulators, local community and published on the website. The results of the Collision Risk Assessment will be used to further define site specific mitigation measures which will be included within the Environmental Management and Monitoring Plan for each site. EDPR will follow any National and EU guidance developed for wind farm monitoring and approved as the basis of monitoring and operating the Pestera and Cernavoda wind farms.

Disturbance / Avoidance Impacts

3.4.33 Disturbance can be caused during the construction of the wind farms and due to the sight, noise and/or vibration of the turbines during their operational phase. Associated maintenance activities may also cause disturbance. This disturbance produces sub-lethal effects such as loss of condition due to reduced foraging habitat or failure to breed that could have a significant effect for the maintenance of certain species (Langston and Pullan, 2004).

3.4.34 Researchers generally agree that 600 meters is the maximum avoidance distance from individual turbines (Drewitt and Langton 2006) that could amount to a cumulatively significant exclusion area for each wind farm. Although recent studies have indicated that birds may develop a degree of habituation to wind turbines (Madsen and Boertmann 2008).

3.4.35 Given the significant distance between the Pestera and Cernavoda sites and the nearest other proposed wind farm in the zone of influence (10-11km), the proposed spacing of the turbines (450m), the open topography and the lack of semi-natural habitats on the project sites, it is considered unlikely that the sites would contribute towards and significant cumulative disturbance effect.

3.4.36 The mitigation measures described above, including results of the wintering, breeding and migratory surveys as well as Vantage Point surveys, will also assist in confirming that there are no significant cumulative disturbance effects on avifauna.

Barrier Effect

3.4.37 Wind farms may act as barriers if located along migration routes or flyways, or, at a more local level, along regular flight routes between feeding areas and resting or breeding sites (Kirby et. al. 2008). Wind farm avoidance is reported to be highly variable, it may occur at a distance of 100 metres to 3 km during daylight, whereas at night the distance is likely to be closer' (Desholm and Kahlert 2005).

3.4.38 The Pestera and Cernavoda wind farms, which have a spacing of 450 metres between turbines, and which are set within a vast, flat landscape, do not appear to have potential to result in significant barrier effects. The gaps between turbines is large, and the turbines are not set, for example, within a narrow valley; birds could either fly between the turbines, or simply fly around the entire turbine cluster forming the wind farm. Furthermore, many birds migrating across large, flat landscapes may do so at height, above the sweep zone of the turbines.

3.4.39 Given the spacing between the Pestera and Cernavoda wind farms and the nearest other proposed wind farm in the zone of influence (approximately 10 - 11km from the Pestera site) and that most modern wind farms consist of large turbines, with a typical spacing of 450 metres or more, it is unlikely that a significant 'barrier effect will occur. Due to their location and the lack of semi-natural habitats on the Pestera and Cernavoda sites it is predicted that these developments would not contribute towards any significant cumulative barrier effect. The mitigation measures described above, including results of the wintering, breeding and migratory surveys as well as Vantage Point surveys, will also assist in confirming that there is no significant cumulative barrier effect.

Potential Cumulative Impacts on Bats

3.4.40 The potential cumulative impacts of the Pestera and Cernavoda wind farm projects together with the other potential wind farm project located approximately 10 – 11km from the Pestera site (as identified in Section 3.4 above) on bats is discussed below.

3.4.41 Mortality caused by collision with turbines may be a more significant problem for bats than for most birds (Sovacool 2009) partly because bats have a lower annual reproductive output and a long life expectancy, so their populations may be susceptible to even small amounts of increased mortality.

3.4.42 Bats do not need to be struck by turbines to be fatally injured by them; "barotrauma" caused by rapid pressure changes in the lungs as bats pass close to a moving blade, is the more significant cause of mortality (Baerwald et. al 2008). This mortality is largely thought to occur when bats are migrating or swarming at mating time and thus not using their echolocation (for foraging) although this is by no means established by empirical data (Rodrigues et. al. 2008).

3.4.43 The potential for wind farms to cause disturbance to bats, or for the turbines to produce some kind of barrier effect to the movement of bats, both at a local level and when migrating, is little-studied. However, based on the behaviour and morphology of bats, it seems likely to be less significant than for birds.

3.4.44 In the case of Pestera and Cernavoda, both sites are located in very flat landscapes, almost totally devoid of trees, woodland margins, scrub, water bodies or water courses (which tend to be used by foraging bats far more than open agricultural landscapes, for example) and without any potential roost sites (such as buildings or mature trees). It is unlikely therefore that either site would support significant numbers of bats and therefore no significant effects on bat populations are anticipated for either wind farm or in terms of cumulative impacts associated with the other potential wind farm located approximately 10 – 11km from the Pestera site.

Mitigation for Cumulative Effects on Avifauna and Bats

3.4.45 The mitigation to be implemented for the Project sites (as described in paragraphs 3.2.29 to 3.2.32, and paragraphs 3.4.28 to 3.4.32) will reduce impacts for both avifauna and bats. The turbine towers will be fitted with a red flashing light; this is likely to make them more visible at night and therefore less likely to be flown into by birds.

3.4.46 Temporary slowing or cessation of turbine rotation will also be operated by the IOE for the sites, in accordance with an agreed protocol, as informed by observations and monitoring (as described in paragraphs 3.2.27 to 3.2.31) during incidences of higher avifaunal and bat densities such as the migration periods (July to October inclusive for birds and August to September inclusive for bats). In addition, the marking of overhead powerlines with bird deflectors to increase visibility will also reduce the potential for bird strikes.

3.4.47 The monitoring and surveys will be undertaken by the IOE, as agreed with the Lenders and in accordance with acceptable sector standards and EU Guidance, will determine the success of the mitigation and the results will be used to inform the mitigation requirements.

3.4.48 The surveys will continue initially for 3 years until confidence in the residual effects predicted for the Project sites and their predicted contribution to potential cumulative impacts is confirmed.

Residual Cumulative Effects on Avifauna and Bats

3.4.49 Given the mitigation measures proposed in paragraphs 3.2.27 to 3.2.31 it is anticipated that the Project sites will not contribute to any residual cumulative effects from wind farm developments proposed in the local area. This assessment of no significant residual effect and no significant effect will be confirmed by the proposed mitigation and monitoring measures.

4 Conclusions

4.1 OVERVIEW

4.1.1 This section presents the main conclusions and recommendations of the additional information on environmental and social impacts, including potential cumulative impacts, associated with the Pestera and Cernavoda wind farms that are required by the EBRD, IFC and the Equator Principles and go beyond the requirements of the EU EIA Directive.

4.1.2 Should further wind farm developments be proposed in the vicinity of the Pestera and Cernavoda sites, consideration should be given by the City Halls and the EPA to further assessment of the potential cumulative impacts on ecology (specifically birds and bat species) and landscape and visual conditions. In addition, each development would require a specific assessment of the potential for cumulative noise impacts to occur, taking into account the existing and know wind farms and any other proposed developments within the range of noise impact.

4.2 LANDSCAPE AND VISUAL ASSESSMENT OF PESTERA AND CERNAVODA WIND FARMS

4.2.1 The introduction of wind turbines and ancillary infrastructure will have an impact on the existing landscape character of both sites. There is very little tree cover within the area of either the Pestera or Cernavoda wind farms and due to the nature of wind turbines there is little mitigation available to reduce the potential visual impacts of the turbines. However, the open character of the proposed wind farms and their general uniformity of colour and design enables the developments to relate well to the receiving open and expansive landscape character of the sites. Therefore the proposed wind farms will not adversely impact upon the local landscape character beyond the local context.

4.2.2 The proximity of the wind farms to various small settlements (within 550m and 600m respectively) will result in some visual impact to nearby residential receptors within a few kilometres of the sites. At greater distances the impact of the turbines on visual amenity reduces to negligible or no change. Whilst views will be possible from residential areas near the sites, the presence of vegetation, the local topography and intervening built development will help to limit views of the turbines from residential areas. In addition, due to the orientation of many houses to the wind turbines, many views will be oblique views only. There will be limited visual impacts on surrounding residential receptors, all of which will be localised.

4.2.3 It is recommended that the red lights on top of the turbines are as dim as possible to limit visual intrusion into the night-time scene whilst maintaining their warning function for birds.

4.3 CUMULATIVE ECOLOGICAL EFFECTS ASSESSMENT OF CERNAVODA AND PESTERA WIND FARMS IN COMBINATION WITH OTHER WIND FARMS IN THEIR ZONE OF INFLUENCE

4.3.1 In the absence of bat roosting, foraging and commuting habitat and the distance from maternity and mating sites and in view of the proposed mitigation it is anticipated that the Pestera and Cernavoda wind farm Projects will not contribute to a significant cumulative residual effect on bats.

4.3.2 Given the distance between the Pestera and Cernavoda sites and the nearest other proposed wind farm identified within the zone of influence of the Project sites (approximately 10 - 11km from the Pestera site), the spacing of the turbines, the location and lack of semi-natural habitats on the Project sites and the comprehensive mitigation measures proposed it is predicted that the Project sites developments would not contribute towards any significant residual cumulative effect or any significant effect upon the integrity of Natura 2000 sites.

4.3.3 The results of the proposed mitigation and monitoring will confirm this assessment of no residual effect.

5 Limitations

5.1.1 The findings of this supplementary report are based on a review of publicly available information, discussions with various regulatory authorities, the contractors and SOR, a site visit on behalf of WSP Environmental and a review of information supplied by EDPR for the Projects. It has not been possible, and is not part of this brief, for WSP Environmental to validate the data provided in these reports; however, reliance has been made on the data provided within. WSP Environmental accepts no responsibility for the interpretation of data which has not been validated. No sampling, testing intrusive or monitoring works have been undertaken during preparation of this supplementary report.

5.1.2 The consideration of landscape and visual impacts associated with the proposed developments is based on a site visit and review of photomontages provided by EDPR. The photomontages have not been validated by WSP Environmental.

5.1.3 Information relating to other wind farm projects in the Dobrogea region has been provided by EDPR based on consultation questionnaires issued to the City Halls of Pestera, Cernavoda, Mircea Voda and Saligny. This information does not include exact locations for the wind farm projects and in some instances complete information relating to the number of turbines, the total power capacity and status of these projects is not available.

5.1.4 It should be noted that the inclusion of information relating to other wind farm projects summarised in Table 3.3 does not infer that these projects will be constructed. This information is representative of applications for urban certificates which have been submitted to the City Halls and it is uncertain how many of these developments will be implemented.

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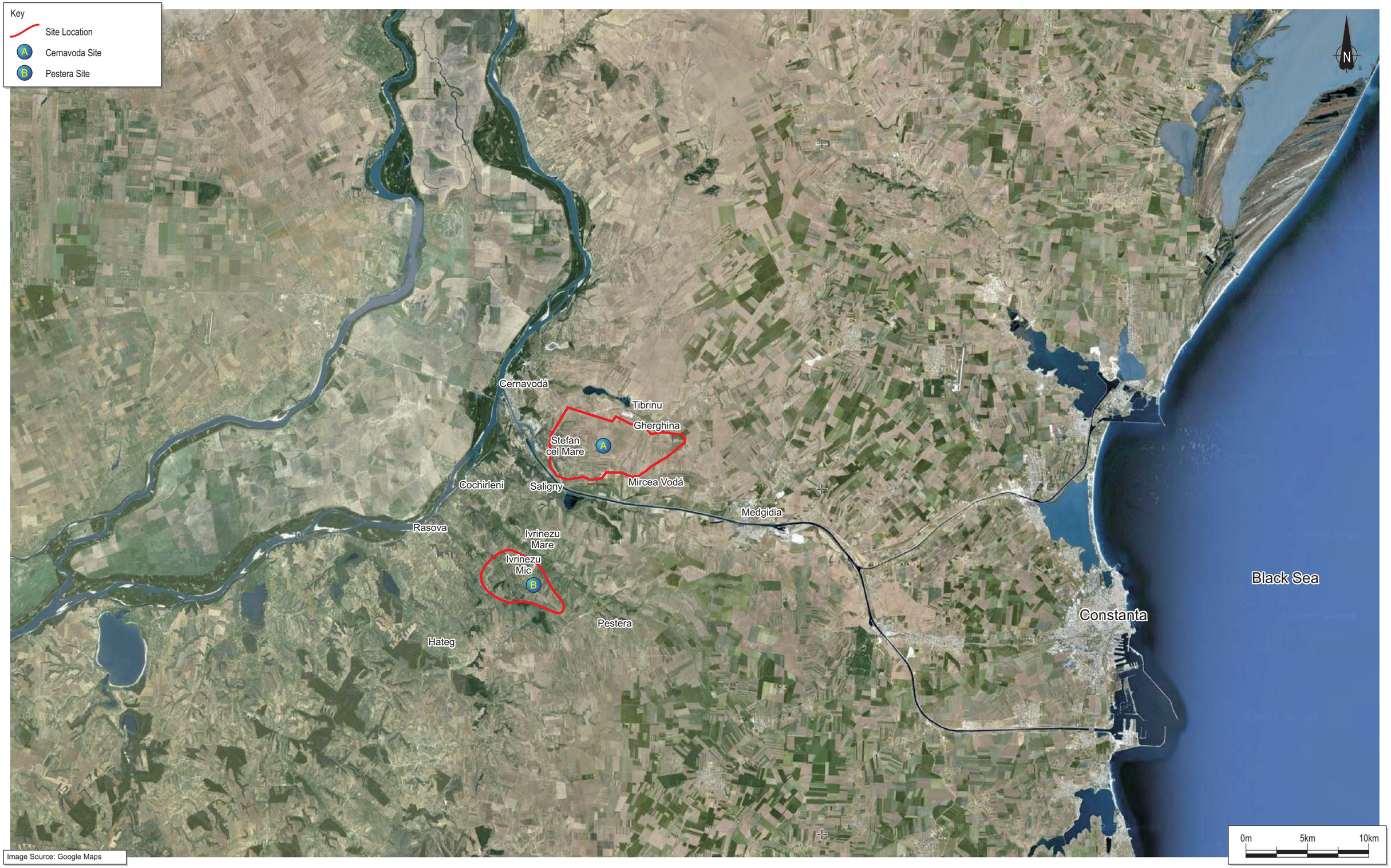
Appendices

Appendix A Figures

FIGURE 1 – Site Location Plan

Site Location Plan

Figure 1



PROJECT: Pestera and Cernavoda Wind Farms, Romania
PROJECT No: 12269413-001
CLIENT: EDP Renovavies

DRAWN: GH
CHECKED: JF
APPROVED: JF
REVISION: A
DATE: March 2010

WSP

FIGURE 2 – Site Context Plan

Site Context Plan

Figure 2

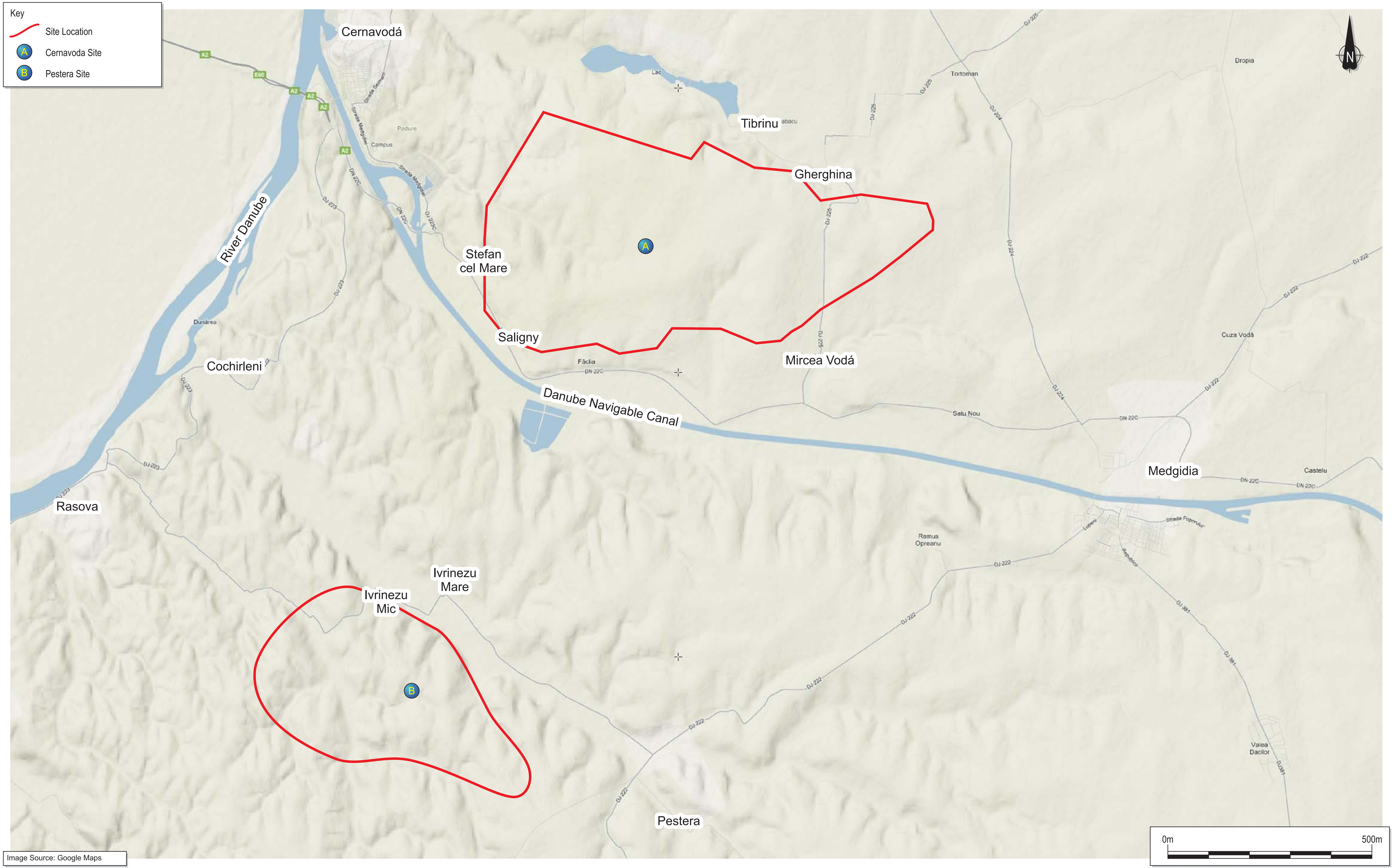


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FIGURE 3 – Layout Plan Pestera Wind Farm

WEATHER TOWER	X	Y
TM-1	741557,0000	304605,0000
TM-2	742311,0000	306900,0000

WIND TURBINE GENERATOR (WTG)	X	Y
1	742294,6327	307755,4003
2	742208,5013	306613,1137
3	743338,5915	306852,3917
4	742527,8440	306247,5819
5	742928,8514	305959,2904
6	743546,7116	306158,2590
7	742553,8020	305667,3070
8	744022,2230	305855,8432
9	743504,7169	305561,9781
10	742877,5187	304948,2009
11	743006,8413	304404,1830
12	744962,5193	305766,0508
13	744622,9541	305461,0704
14	744292,214	305048,7118
15	744655,3253	304656,7327
16	744929,4690	305019,9479
17	740981,8653	306490,7585
18	743894,9400	304924,4302
19	744220,6951	304530,3862
20	744922,6352	304291,6268
21	745289,8902	303991,3128
22	745674,5050	304336,3170
23	741393,1352	304882,9899
24	741762,5393	304320,0448
25	746007,0000	303748,0000
26	746592,9449	303472,4057
27	743996,6353	306407,8010
28	744144,6110	306834,3530
29	743490,0000	304570,0000
30	740387,0000	305840,0000

LEGEND

- WIND TURBINE GENERATOR (WTG)
- IRRIGATION CHANNELS
- WIND FARM INNER ROADS
- EXISTING ROAD
- NEW 110 kV POWER LINE
- EXISTING 110 kV POWER LINE

WEATHER TOWER - TM-2

WEATHER TOWER - TM-1

PESTERA SUBSTATION
33/110 kV

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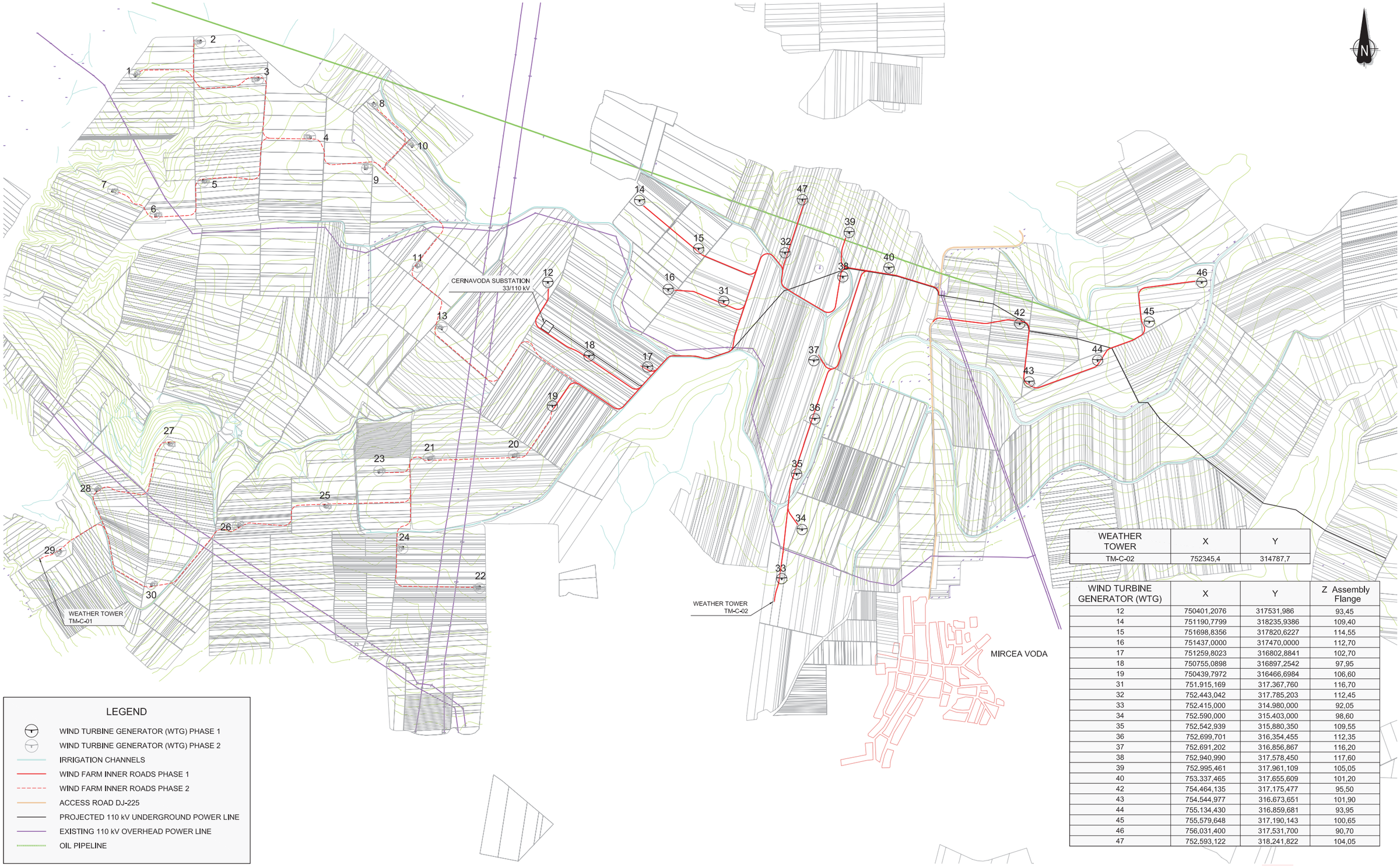
FIGURE 4 – Layout Plan Cernavoda Wind Farm



WEATHER TOWER	X	Y
TM-C-02	752345,4	314787,7

WIND TURBINE GENERATOR (WTG)	X	Y	Z Assembly Flange
12	750401,2076	317531,986	93,45
14	751190,7799	318235,9386	109,40
15	751698,8356	317820,6227	114,55
16	751437,0000	317470,0000	112,70
17	751259,8023	316802,8841	102,70
18	750755,0898	316897,2542	97,95
19	750439,7972	316466,6984	106,60
31	751.915,169	317.367,760	116,70
32	752.443,042	317.785,203	112,45
33	752.415,000	314.980,000	92,05
34	752.590,000	315.403,000	98,60
35	752.542,939	315.880,350	109,55
36	752.699,701	316.354,455	112,35
37	752.691,202	316.856,867	116,20
38	752.940,990	317.578,450	117,60
39	752.995,461	317.961,109	105,05
40	753.337,465	317.655,609	101,20
42	754.464,135	317.175,477	95,50
43	754.544,977	316.673,651	101,90
44	755.134,430	316.859,681	93,95
45	755.579,648	317.190,143	100,65
46	756.031,400	317.531,700	90,70
47	752.593,122	318.241,822	104,05

PROJECT: Pestera and Cernavoda Wind Farms, Romania
PROJECT No: 12269413-001
CLIENT: EDP Renovavies

DRAWN: GH
CHECKED: JF
APPROVED: JF
REVISION: A
DATE: March 2010

WSP

FIGURE 5 – Indicative Location of Identified Wind Farm Sites

Location of Identified Wind Farms in the Local Area

Figure 5

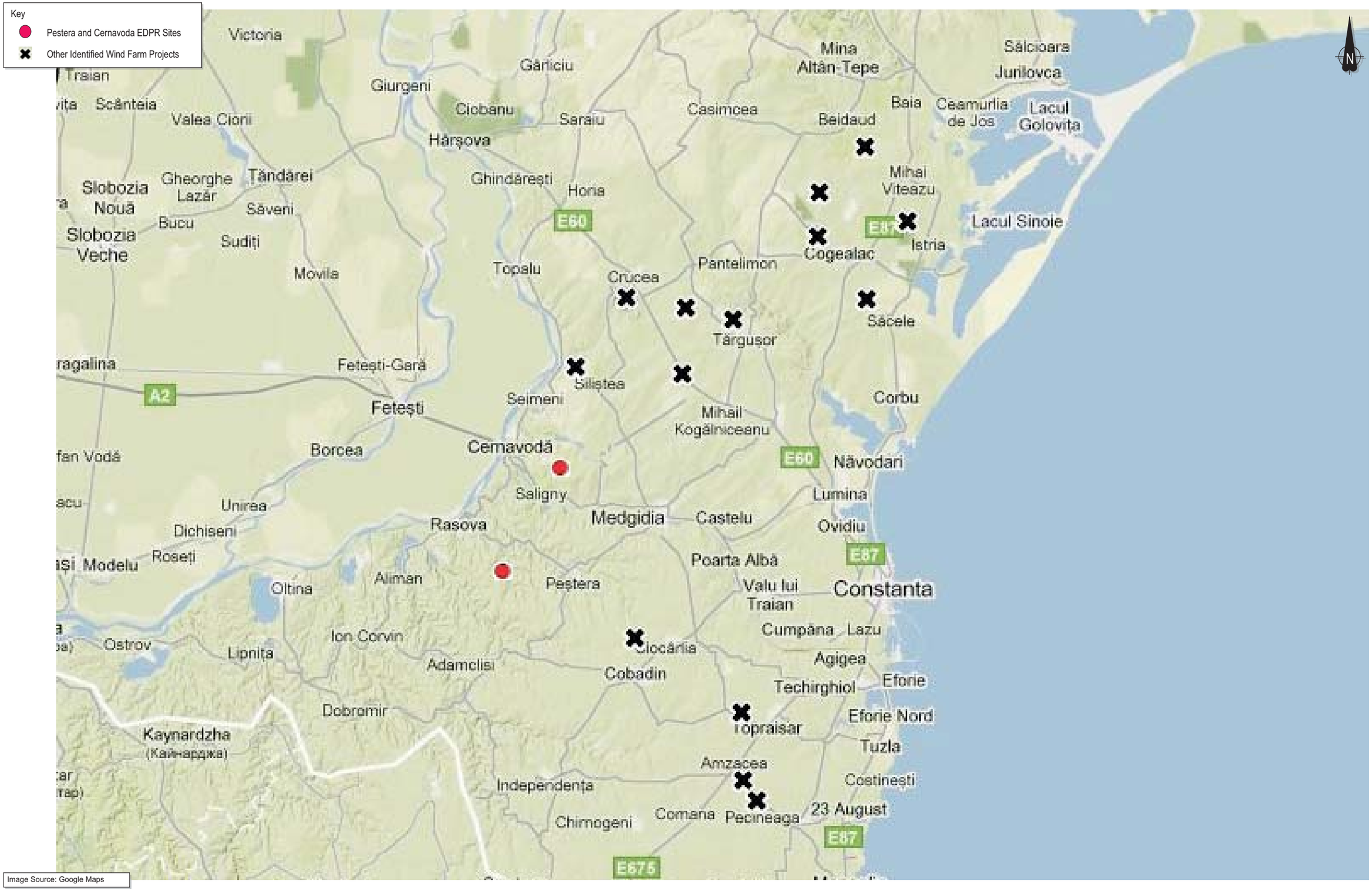


Image Source: Google Maps

PROJECT: Pestera and Cernavoda Wind Farms, Romania
PROJECT No: 12269413-001
CLIENT: EDP Renovavies

DRAWN: GH
CHECKED: JF
APPROVED: JF
REVISION: A
DATE: March 2010

WSP

FIGURE 6 – Location of Designated Sites

Key

- Pestera and Cernavoda EDPR Sites
- Special Protection Area
- Important Bird Area
- Sites of Community Importance

SPAs Within 15km of the Porposed Developments:

1) Ostrovu Lung Gostinu
2) Podisul Hartibaciului
3) Chiele Dobrogei
4) Magura Odobeoti
5) Danube Delta
6) Dumbraveni
7) Aliman-Adamclisi
8) Balta Vederoasa
9) Allah Blair
10) Bratul Borcea
11) Dunare-Ostroave

SCIs Within 15km of the Proposed Developments:

A) Canaralele Dunarii
B) Dumbraveni Valea Urliuia Lcaul Verderoasa

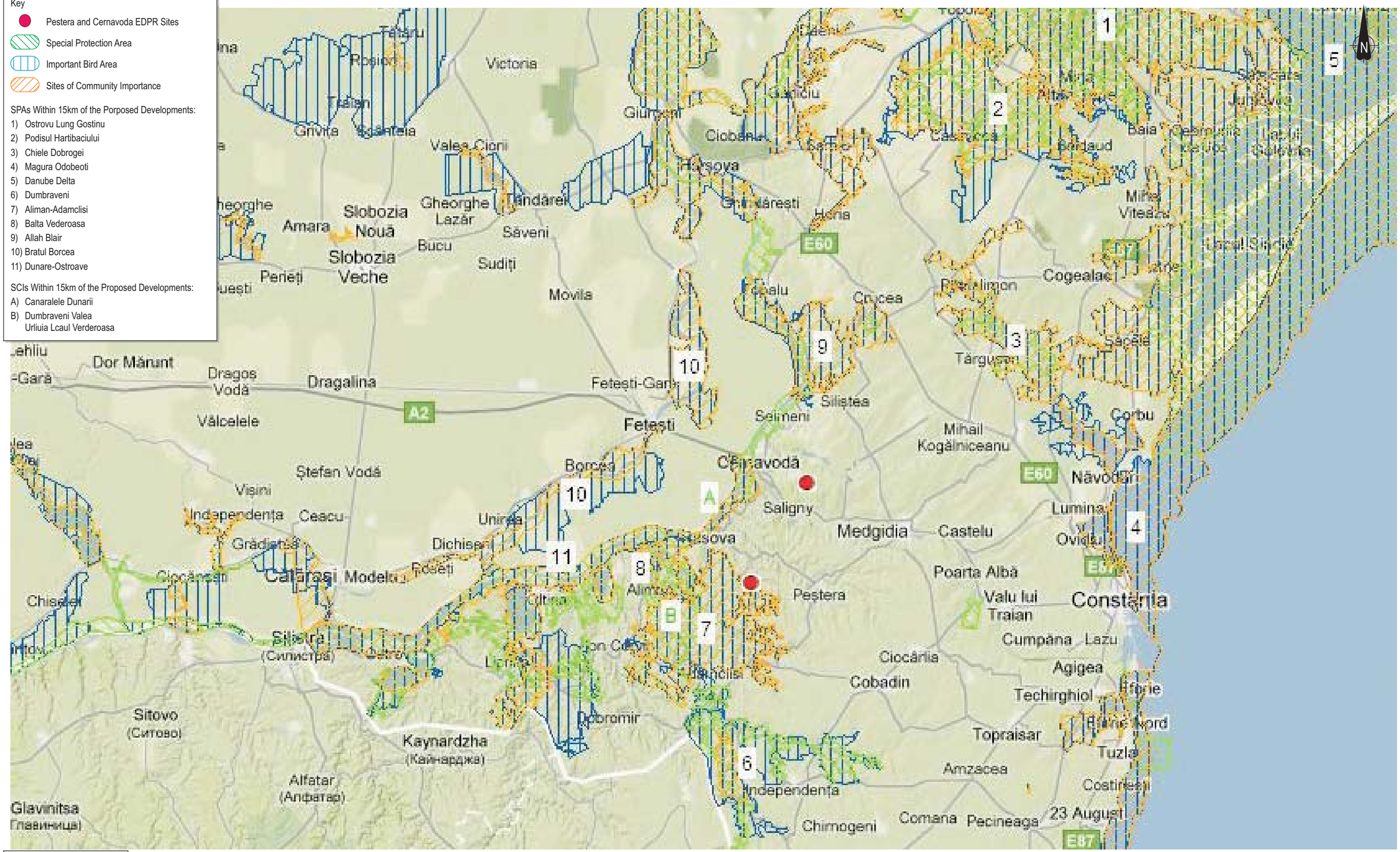


Image Source: Google Maps

PROJECT: Pestera and Cernavoda Wind Farms, Romania
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WSP

Appendix B List of Abbreviations and Acronyms

CA	Construction Authorisation
EDPR	EDP Renewables
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EBRD	European Bank of Reconstruction and Development
GIIP	Good International Industry Practice
IBA	Important Bird Area
IFC	International Finance Corporation
IOE	Independent Ornithological Expert
NTS	Non-Technical Summary
PR	Performance Requirements
PS	Performance Standards
SCI	Site of Community Importance
SEP	Stakeholder Engagement Plan
SPA	Special Protection Area
UC	Urban Certificate