CRNI VRH WIND POWER PLANT, SERBIA

Environmental and Social Impact Assessment

Non -Technical Summary

August 2022

Contents

Figures

Tables

1 Introduction

Crni Vrh Power doo, Žagubica ("CVP") intend to develop a wind power plant in Eastern Serbia, Braničevo district. As CVP is likely to seek financial support for the Project from an International Finance Institute or a major commercial bank, they have chosen to adopt Good International Industry Practice in the assessment of the environmental and social impact of the Crni Vrh WPP project. This means that in addition to the regulatory requirements of Serbia, an Environmental and Social Impact Assessment was completed to ensure compliance with the requirements of the Equator Principles and the environmental and social guidelines published by the International Finance Corporation.

This Non-Technical Summary ("NTS") describes the key findings of the Environmental and Social Impact Assessment of the proposed Crni Vrh Wind Power Plant (referred to in this document as the "Project"). The NTS includes a description of the Project, its location and design, the benefits of the development to Serbia and the region, as well as the mitigation of any potentially significant negative environmental and social impacts identified during the impact assessment.

If you would like any additional information then please visit the project website (http://www.cvpower.rs/) or contact Ms. Marija Senić Andrić at Crni Vrh Power doo, Žagubica (the developer):

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2 Context of the Crni Vrh Wind Power Plant

CVP were initially attracted to Braničevo district as this part of Serbia has a significant wind resource; one of the highest in Serbia. After careful consideration, CVP selected a site that is sparsely populated and dominated by commercial forestry. The site is close to the 110 kV power grid which means that the overhead lines needed to connect the WPP to the national power grid will be short.

The site is about 12km east of the town of Žagubica and 17km northwest of the town of Bor (see Figure 2-1, below). The total area of the WPP site is about 2,700 hectares.

The Zoning Plan permits CVP to develop a wind power plant ("WPP") of up to 32 wind turbines. These turbines will be placed along two parallel ridges that run north-south across the site. The narrow valley between the ridges is crossed by a number of small streams and forest tracks.

Whilst the area around the WPP site is open and mountainous there are a number of developments that have caused the progressive industrialisation of the area. These developments include:

- The Lipe open cast copper mine is situated in the valley that lies between the rows of turbines the forest road that runs along the bottom of the valley may form an access road for the Project. The "Lipe" mine closed in 1967.
- About 500m from the southern boundary of the site is the ski resort of "Crni Vrh". The resort is very small and comprises two ski runs and one ski lift. Within the centre is a huge unfinished hotel complex partially built in the late 1990s and abandoned since 2000.
- The closest active open pit copper mine is Cerovo, about 6km east of the site. The Cerovo mine reopened in March 2020.
- About 7km south-east, in a valley below Crni Vrh Mountain is the Bor Jezero reservoir built in 1959 to provide water supply for the copper smelting plant. The reservoir has become a centre for local tourism and recreation.
- Bor is the regional industrial centre with a large copper smelting plant and several active open pit mines. It is hoped that the Zijin mining and smelting complex at Bor, which has a high electricity demand, would be an important customer for the WPP.

The Crni Vrh WPP is to be developed in a region where industrial mining is both intensive and extensive. Open cast mining has a devastating impact on the overall biodiversity and is considerably greater than any impacts from wind turbines. In addition, local forests are managed for timber production rather the protection of biodiversity. The biodiversity in the region is exposed to very pronounced negative impacts of mining and poor forestry practices.

Figure 2-1 Location of the Crni Vrh WPP

The boundary of the WPP is shown in red and includes the area below the new overhead line to the north east.

The development of Crni Vrh WPP will require:

- Lease or purchase of land plots for the siting wind turbines;
- Improvement of existing forest tracks to allow access of construction equipment and then maintenance technicians during WPP operation;
- Clearance of land required for the wind turbine foundations and maintenance platforms;
- Creation of appropriate foundations for the wind turbines;
- Transport of turbine components to the site;
- Installation of the wind turbines using large cranes;

- Construction of appropriate infrastructure including underground power and communication cables, a substation and connection to the main grid;
- Operation of the wind turbines for approximately 25 years; and,
- Replacement or decommissioning of the wind turbines once the WPP comes to the end of its operational life.

3 Why is Crni Vrh WPP Needed?

The purpose of the Crni Vrh WPP is to generate renewable electricity that will be supplied to the Serbian national grid. The Serbian energy sector is very dependent on fossil fuels and the use of reliable, renewable wind power will help Serbia to reduce its use of expensive, polluting fossil fuels. The Project will to the Government of Serbia's commitment to promote the development of renewable energy projects.

The proposed Crni Vrh WPP is needed as it will:

- Generate renewable energy that will contribute to national targets for reducing carbon emissions into the atmosphere;
- provide a valuable source of renewable energy for use within Serbia to support infrastructure development and the national building programme;
- strengthen Serbia's energy sector by helping to diversify its energy sources (which proved to be of great importance after the serious floods in May 2014);
- reduce the need for Serbia to import energy from neighbouring countries;
- providing enough electricity to power 110,000 homes;
- displace about 469,000 tonnes of carbon dioxide per year that would be emitted if the same amount of electricity was produced from a coal fired power station;
- reduce the annual emissions from existing coal fired power plant by 12,300 tonnes of sulphur dioxide, 1,425 tonnes of oxides of nitrogen and 495 tonnes of fine dust.

4 Project Alternatives

The conditions of the Project site are optimal for wind development and unfavourable for the majority of other renewable technologies. Solar energy could be exploited at the Crni Vrh site but this would mean the use of a much larger area of land and a significant increase in the loss of forestry land. The increased impact on biodiversity there would be significant negative change the character of the area. The Scoping Study concluded that a renewables project based on wind power generation was appropriate for the region and the site.

The initial layout was selected to take the greatest advantage of the wind resources and to keep away from residential properties. However, the Scoping Study indicated that a number of turbine locations would have a disproportionate impact on local habitats and species populations. The Scoping Study concluded that six turbines were to be located in important areas of natural habitat. The initial focus of the ESIA was therefore to consider if the WPP layout could be modified to avoid these areas. The assessment of turbine locations and numbers formed the basis of primary mitigation of the WPP impact. This analysis resulted in an alternative WPP design being agreed with CVP. The alternate design of the WPP then formed the basis of the subsequent ESIA.

5 Meeting Serbian Regulations

Serbian EIA regulations require WPP developments of 10 MW installed capacity or over to be subject of an environmental impact assessment procedure. An EIA for the Crni Vrh WPP was completed and was based upon the findings of the ESIA report. The Zoning Plan and SEA for the Crni Vrh WPP and OHL were approved in October 2021.

To initiate the Serbian EIA Study procedure, the local authorities, in this case the Town of Bor, Municipality of Žagubica and Municipality of Majdanpek, developed and adopted a Zoning Plan that includes a basic

description of a new project. The approval of the Zoning Plan includes consultation with a series of national and regional statutory bodies that provide their conditions for the development of the Project.

The Zoning Plan is subject to a Strategic Environmental Assessment (SEA) that has to be approved by the local authority. While the Zoning Plan is approved by the local authority (municipality), the permits for WPP developments (Location permit, Building permit, Operation permit, Energy permit) are awarded by national authorities.

Once the Zoning Plan has been agreed, the Developer can proceed with a procedure for acquiring the Location permit (also called the Location Conditions). The Location permit provides specific conditions for connection of the project to the existing infrastructure onsite. The conditions included in the Location permit are provided by the same statutory stakeholders involved in the development of the zoning plan.

The following Table (Table 5-1) provides a summary of the E&S conditions in the development permits that directly regulate the construction, operation and decommissioning the Crni Vrh WPP.

Table 5-1 E&S Conditions in Permits

Permit	Date Obtained	E&S Conditions
Energy Permit	24th May 2021	No E&S conditions are set by the permit.
Location Permit	6th December 2021	**Design/ Pre-Construction:** • The final WTG layout should be defined based on results of the one-year pre-construction flora, habitat and fauna surveys. • All sensitive, relic and wetland habitats should be avoided to preserve habitat diversity within the site. • The maximum height to blade tip shall not exceed 206m. • Blades must be painted to be easily noticeable to wildlife. • The flashing obstruction lights should be used on wind turbines. Lighting of other structures must be minimised and directed downwards. • All installations must be grounded, secured and insulated to prevent or minimise animal electrocution and mortality. The substation 33/110kV, cabling network and other auxiliary structures must be designed to prevent bird nesting or bat roosting. **Construction:** • No construction work is allowed in areas with high concentration of birds and bats, particularly in areas of their roosts, and foraging and nesting areas. • Existing roads should be used as much as possible. Degradation of natural, semi-natural or agricultural habitats should be avoided. • Stockpiles of earthen material/ spoil must be protected from erosion and dust generation and finally properly disposed off-site. • New access tracks shall not cause instabilities or erosion. • Cable trenches and turbine foundations should be properly backfilled to keep out burrowing animals and prevent attracting raptors. • Upon completion of the construction, all degraded areas must be restored (excluding planting near the turbines and access tracks). • Only native plants should be used in restoration of degraded areas. Introduction of invasive species is prohibited.

Permit	Date Obtained	E&S Conditions
		Operation: • Post-construction mortality monitoring is required for at least 3 years. The results must be reported to the IfNC on a regular basis. The report should include photographs of carcass, location and time of the finding, distance to the nearest WTG and record on weather conditions. • Based upon the post-construction mortality monitoring results, in case of high fatality rates, curtailment of turbines should be considered. The causes of fatalities and related mitigation should be identified in consultation with the IfNC. • If regular concentration of birds or bats is recorded in the vicinity of turbines (e.g. due to the attraction to structures, trees or waste dumps), appropriate mitigation should be defined in consultation with the IfNC (including the removal of problematic structures or technical measures to prevent concentration). • Bird and mammal carcass shall be regularly removed from the site (following appropriate recording within the scope of the mortality monitoring). • To protect the migratory species, the WPP must be equipped for continual monitoring of bird and bat movements over the site area. • Shrub and weed growth shall be removed within a radius of 200m from the turbines and mowed at a height of 20cm, in particular at the turbine bases. • Operational noise should be monitored and controlled. In case of exceedance of legal noise limits, curtailment of turbines should be considered. If the noise level is increased due to turbine faults, the turbine must be stopped and repaired. • Disposal of organic or construction waste is prohibited at the site. If present, existing illegal landfills/dumps shall be removed. • Open wet areas at the site should be properly drained to minimise the concentration of insects which might attract birds and bats. **Decommissioning:** • Upon completion of the WPP operational phase, all structures and equipment must be removed, and the site must be completely restored.
Building Permit	Expected in September 2022	No E&S conditions are set by the permit. The EIA Study (unconsented) is included in the permit application.
Registration of Works	Expected in 2023	The EIA Consent is a prerequisite for the Registration of Works and requires implementation of mitigation measures listed in the EIA Study.

6 How Does a Wind Turbine Work?

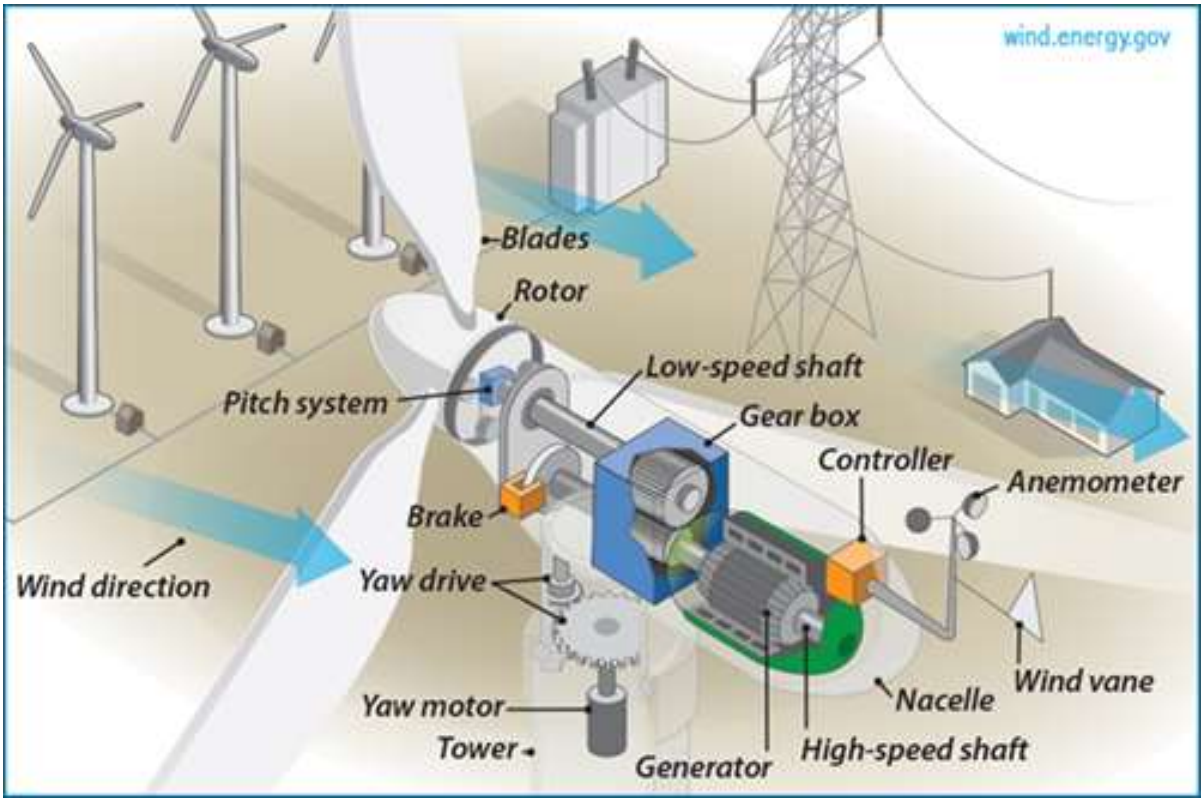
Wind turbines consist of three main elements: a hollow steel tower, the nacelle, and the fibreglass rotor blades (which are attached to a rotor on the front of the nacelle). The nacelle houses the generator, gearbox, transformers and control systems (see Figure 6-1).

The five basic steps of electricity production from wind power plants are:

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

The turbine nacelle is rotated by the yaw motor so that the rotor points directly towards the wind. This is in the same way that the sails on a boat are oriented towards the wind by the crew. The direction of the wind is sensed by the wind vane and the wind speed is monitored by and the anemometer. The WPP also has a tall mast where the meteorological sensors at mounted. This mast is typically much taller than the turbines.

Figure 6-1 Generic Wind Turbine Design



The basic operation of each turbine is controlled by its' own computer systems. The operation of the turbines is monitored from the control room but all of the turbines can be monitored and managed remotely. It is normal for the wind turbine manufacturers to monitor each unit from a control room. This means that the turbines are monitored continuously, 24 hours per day, 365 days per year.

When the wind reaches and maintains constant speeds of over 3 m/s, the turbine blades will start to turn in a clockwise direction. The rotor shaft slowly drives the gearbox that converts the mechanical energy into electrical energy through an electrical generator (which spins at a much higher speed than the rotor).

At a constant wind speed of 3 m/s each turbine will generate about 20kW. At 6 m/s, the output is about 0.600MW but this rises sharply to the maximum power output at a wind speed of 10 to 12 m/s, when the turbine will generate the design or rated power, 6MW in this case.

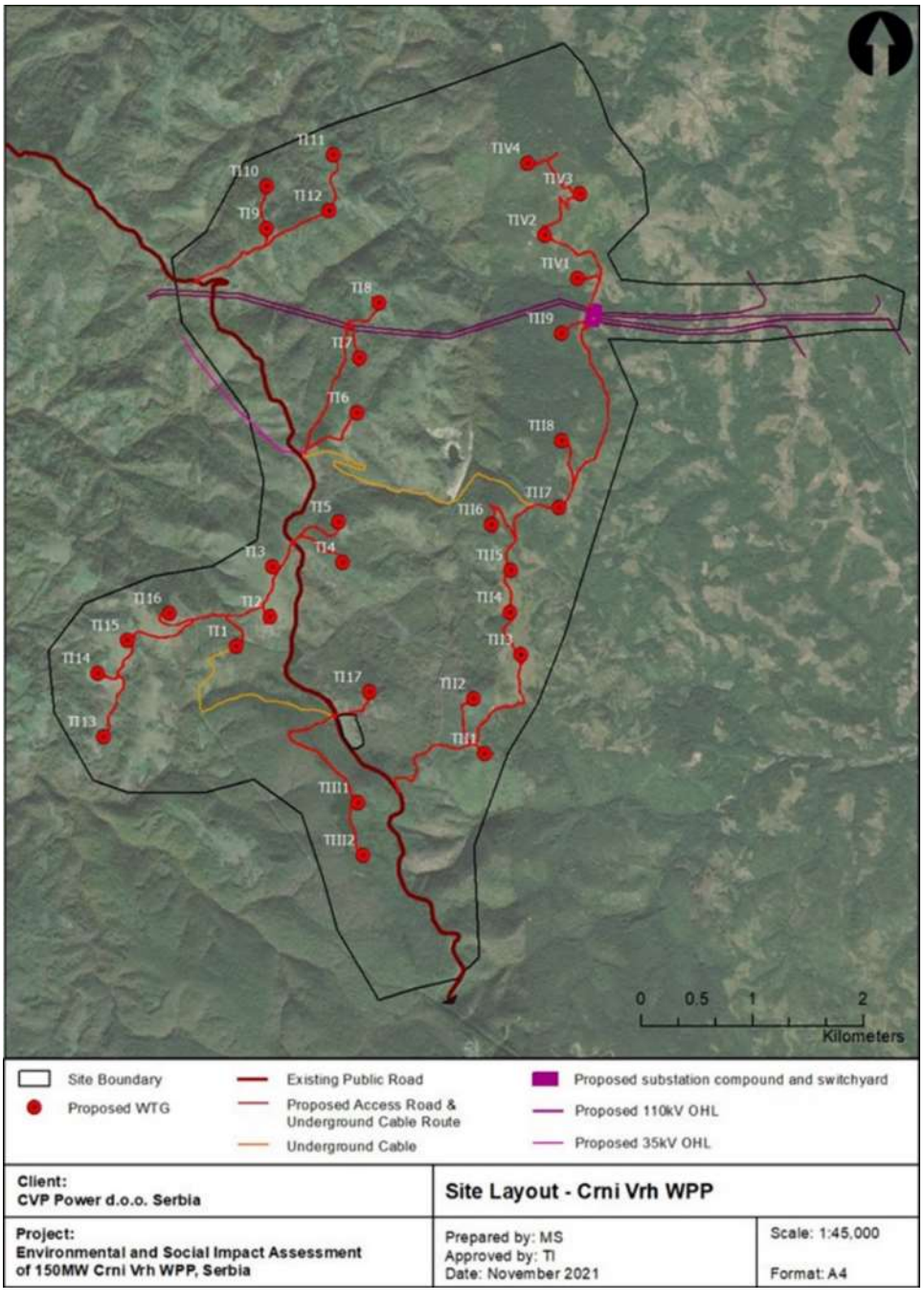
At wind speeds above 25 m/s, the turbine blades are stopped by the control systems to prevent excessive wear and tear on the mechanisms. The blades are stopped by rotating the blades on the hub. This change of blade angle means that the blades are no longer driven by the wind; a process called "feathering" the blades.

Most of the electricity produced by the wind power plant will be transferred to the grid but a small amount of electricity is used by the turbines (e.g. the yaw motor and pitch controls) and on-site control facilities.

7 Description of the Crni Vrh WPP

The Crni Vrh WPP will include up to 32 wind turbines with a total capacity of 158.4 MW. The final number of WTGs to be installed will depend on the size and generation capacity of the turbines selected. For example, if a 6MW unit is used then only 25 turbines will be required to achieve the permitted installed capacity. This flexibility meant that the ESIA specialists, working closely with CVP, could develop the final layout of the turbines in order to minimise impact – the primary mitigation of the WPP.

Figure 7-1 Conceptual Location of the WTGs, Site Access Tracks, and Sub-station



At the time of writing, the turbine supplier or model had not been selected. CVP are considering four suppliers, each company has been designing, installing and operating wind power plants for many years. The WTG suppliers currently under consideration are listed in Table 7-1, below.

Table 7-1 Potential WTG Suppliers and Models

Potential Supplier	WTG Generating Capacity (MW)	Overall Rotor Diameter (m)	WTG Hub Height (m)
GE 158 5.5MW	5.2	158	120.9
Nordex N149 5.7MW	5.7	149	105.0
Nordex N163 5.7MW	5.7	163	118
Vestas V150 5.6MW	5.6	150	105.0
Vestas V162 5.6MW	5.6	162	125.0
Siemens Gamesa SG 6.0-155	6.2	155	102.5

This table illustrates that the WTGs being considered for the Crni Vrh WPP vary in generating capacity and physical dimensions. The ESIA has been undertaken on an assumed 'worst case', i.e. the physically largest WTG, the Nordex N163. The overall height of this unit is 206m.

Due to the size of the turbines, it will be necessary to construct substantial foundations. Each WTG foundation is likely to be about 550 m^2 and at least 3m deep. Piling may be required for some of the WTG foundations depending on the local ground conditions. The location of the concrete batch plant that will provide concrete for the foundations has not yet been established but it is likely that it will be off-site.

The turbines will be connected by 33kV underground cables (about 36km) to a new 33 kV/110 kV power transformer station. The Crni Vrh transformer station will be connected to the electricity transmission grid by three x 110 kV overhead transmission lines; one at 1.6 km, one at 2.4 km and one at 4.0 km in length.

OHLs will consist of single circuit steel lattice pylons. The towers will be up to 39.1 m high to the top.

The new Crni Vrh sub-station will be located on the north-east corner of the site (marked in purple in Figure 7-1). This location has been chosen as it close to the 110 kV line that runs north-south to the east of the site. In addition, there is alternate route to the west of the substation and switch yard (connecting to OHL no.122 B). The existing KRST sub-station is located on central-west margin of the site, adjacent to the state road and close to the 110 kV line that runs north-south to the west of the site.

The WPP control room will be located in the electrical sub-station. This control room will be staffed from 08:00 to 16:00 from Monday to Friday. The sub-station will include welfare facilities for the WPP operators and the Operation & Maintenance ("O&M") Contractor.

7.1 Site Access

The Crni Vrh WPP will have a single entrance. This entrance will be from the state road No. 161 Žagubica-Brestovac which crosses the western part of the site.

The area is used extensively for commercial forestry and is already crossed by a large number of access tracks. Where possible, CVP have positioned the WTGs alongside these tracks. The tracks will need to be upgraded to allow construction vehicles, erection cranes and WTG component delivery. Once the WPP is completed, the tracks will be used by the maintenance teams. The WPP will be provided 25.5km of upgraded tracks.

7.2 Construction

It is CVP's current intention to appoint an Engineering, Procurement and Construction ("EPC") contractor to build the WPP on their behalf. It is likely that the EPC will appoint one or more separate contractors to undertake the civil work, including the turbine foundations, access roads and crane pads next to each turbine.

Specialist contractors would be employed to construct the electrical sub-station and overhead power line to connect the WPP to the grid.

Construction activities will include:

- Surveying of the site.
- Clearance of vegetation for:
  - Construction compound, including equipment and material storage areas.
  - Lay-down areas.
  - New access tracks.
- Upgrading of the site tracks and construction of new access tracks to each WTG.
- Establishment of the construction compound (includes offices, welfare facilities, parking, and secure stores).
- Levelling and excavation (for turbine pads and foundations).
- Installation of electrical infrastructure.
- Cement pouring (mainly for the turbine foundations).
- Installation of the turbines.
- Installation of the new transformer.
- Commissioning the WPP and control systems.
- Landscaping the turbine bases.
- Final surfacing of the access tracks and maintenance pads.

The construction compound is temporary and will be removed following the completion of the construction. This compound will be used for storage of construction machinery, materials and wastes as well as the location for site office and welfare facilities. It will also include an area for worker and visitor parking.

Due to the size of the turbines, it will be necessary to construct substantial foundations. Each foundation is likely to be about 550 m^2 and at least 3m deep. Piling may be required for some of the turbine foundations depending on the ground conditions. About 1,000m^3 of concrete is required to complete the foundations for each WTG. The supplier of the concrete has not yet been established but it is likely that CVP will use it will be off-site. Steel reinforcement for the structural concrete is expected to be sourced from a local provider but this will be confirmed at a later date.

The turbine maintenance pads, which each cover an area of 2,000 to 2,500 m^2 depending on the terrain. Each pad will be surfaced with compacted, crushed stone. This crushed stone may be obtained during the levelling of the WTG maintenance pads or from borrow pits within the site.

The installation of the turbines requires two, or possibly three, large cranes. The biggest crane is transported to the site by truck and assembled on site. A construction pad (of compacted crushed stone) will be prepared at each turbine for the cranes. These pads will remain in place for the life of the WPP and will be available for use by access cranes should any major repair be required to the turbine. Where the terrain allows, the large crane will move under its own power (“crawling”) from one to the construction pad to the next. If the terrain is unsuitable (too soft, wet or steep), then the large crane may need to be disassembled and be moved along the service track and re-assembled at the next WTG location. The turbine components will be placed on the construction pad before being lifted into place. The base of the tower is bolted to the foundations. Each tower section is lifted into place and bolted to the section below. The blades may be bolted to the hub before being lifted to the nacelle or may be fixed once the hub is in place; this varies by turbine manufacturer.

The smaller, crawler cranes will be moved from one turbine location to the next along the site tracks. Existing tracks will be upgraded during the initial site preparation work and will connect the turbines and the substation compound. The roads will be constructed to a specification similar to the access road, including roadway preparation, stormwater controls, and placing gravel where needed. Roads connecting the compound to the turbines will be about 4 to 6 m wide, again similar to the access road.

A 33-kV underground power transmission line will be placed in a trench alongside each of the access tracks. These cables will be armoured with woven metal and buried to a depth of about 1m. Excavated material will be used to backfill the trenches.

The turbine supplier has not yet been confirmed but the turbines will be manufactured outside Serbia. It is likely that the turbine components will be brought to Serbia on the Danube River and off-loaded at the port of Prahovo. The likely route from the port of Prahovo to the site is c. 100km long and will include a trans-shipment area 20km from the site.

The turbine components will be transported from Prahovo using oversized road transporters and will comprise:

- Turbine tower sections – five loads per turbine (hub, top section, middle 1, middle 2, bottom section), each transported separately.
- Blades – three loads per turbine, each transported separately.
- Nacelle – one load per turbine.

These convoys will have a police escort and will pass through a number of villages on their way to site. Residents of each village will be given prior notifictation of the date and time of each convoly.

7.3 Operation

It is likely that the Energy Permit for the Crni Vrh WPP will require CVP to establish and maintain a seven strong team to operate and maintain the windfarm. The senior roles agreed under the Generating Licence are:

- General Manager;
- Operations Manager;
- Maintenance Manager.

The day-to-day responsibility for EHS matters lies with the Operations Manager (OM).

The WPP control room will be located in the new electrical sub-station. The operation and performance of the turbines will be managed by a specialist team provided by the O&M Contractor. The control room will be staffed from 08:00 to 16:00 from Monday to Friday. The control room team will also operate an out-of-hours standby system to manage breakdowns or emergencies.

The O&M Contractor will also provide continuous monitoring of the WTGs (including any fault or failure conditions) from an off-site Control Room. Should any operational issues arise then the O&M Contractor will try to resolve these from the Control Room and send an information email to their local team in Serbia.

The operation of the sub-station is the responsibility of CVP, while the Interconnection infrastructure is the responsibility of the Serbian statutory transmission Electricity Supply operator, Elektromreža Srbije (“EMS”). The Interconnection infrastructure includes a High-Voltage Switchyard and Overhead line 110 kV, as well as Interconnection facility.

7.4 Decommissioning or Re-powering the WPP

The operational life of the WPP is expected to be about 25 years; this is the typical working life of a wind turbine blade. As the wind power plant approaches the last few years of operation CVP will consider the closure or the continued operation of the WPP by replacing the wind turbines (called re-powering). Should CVP choose to re-power the Crni Vrh WPP then the turbines will be replaced with new, higher capacity turbines. Re-powering can add 5 to 20 years to the operational life of a WPP.

The decommissioning of a wind power plant is not a complicated process and largely comprises the dismantling of the turbines, removal of the turbine foundations and site clearance. Steel and other useful materials will be recycled. Inert materials that cannot be re-used or recycled will be taken to a suitable landfill.

It is unlikely that the turbine foundations will be removed completely. Instead, the concrete will be demolished and excavated down to a nominal depth of 1m. This will allow for agricultural activities to be undertaken safely once the excavation has been filled with top soil. All temporary roads, areas where the land has been compressed by heavy plant activities, and laybys and temporary platforms will be reinstated.

The sub-station may continue to be occupied, and the transmission line may continue to be used.

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

8 Project Timeline

At the time of writing, the construction timeline is expected to be:

- Start of construction: autumn 2022.
- Site tracks and roads construction: autumn 2022 to spring 2023.
- Foundations and WTG crane pad construction: summer 2023.
- OHL 110 kV and switchyard 110kV construction: autumn 2022 to autumn 2023.
- WTG installation: summer 2023 to spring 2024.
- WPP commissioning: autumn 2024.

9 Preparation of the ESIA

In line with Lender requirements, an ESIA Scoping Study was undertaken in 2020 to establish the most important environmental and social impacts and benefits of the Crni Vrh WPP and to plan the completion of the ESIA. The Scoping Study concluded that the ESIA should consider the following topics in detail:

- Ecology and Nature Conservation – woodland habitats of conservation concern, woodland plant species of conservation concern (orchids in particular), birds, bats, and other woodland fauna;
- Landscape and Visual;
- Socio-economic;
- Shadow Flicker;
- Traffic and Transport;
- Operational Noise;
- Ice Throw and Ice Fall Risk;
- Forest Fire Risk.

In addition, consideration would be given to:

- Noise during construction and decommissioning;
- Archaeology and Cultural Heritage;
- Surface Water and Effluent;
- Land and Groundwater;
- Aviation Safety and Radars Obstructions;
- Electromagnetic Interference and Telecommunication;
- Ecosystem Services;
- Air Quality;
- Community Health, Safety and Security.

9.1 Baseline Studies

A series of surveys and studies were planned to obtain the information that would be assessed during the ESIA. A summary of these surveys is provided in Table 9-1, below.

Table 9-1 ESIA Surveys

Key Issues for the ESIA	ESIA Surveys Undertaken
Ecology and Nature Conservation - Birds	Extensive surveys of local and regional bird populations were completed over a one-year period. These included: • Vantage Point Surveys, • Breeding Raptor Surveys (walkover). • Breeding Nocturnal Species (Owls) Surveys, • Breeding Woodland and Farmland Bird Surveys (transects). The VP surveys are designed to quantify the level of flight activity and its distribution over the survey area. The VP surveys provide input data for the Collision Risk Model. Breeding Bird surveys allow the evaluation of occurring population numbers, site's importance and help quantify impacts from disturbance and displacement.
Ecology and Nature Conservation – Bats	Extensive bat survey work was completed over a one-year period. These included: • Investigation of roost sites. • Manual bat detector surveys at ground level (transects). • Automated bat detector surveys at WTG locations, • Automated bat detector surveys at height (if mast is available for installation of the equipment). • Mist-netting surveys.
Ecology and Nature Conservation – Woodland habitats of conservation concern and their plant species	Woodland habitat and flora surveys included: • Walkover surveys, • Phytocoenological sampling (to record species and phytocoenoses). • Habitat mapping.
Ecology and Nature Conservation – Woodland fauna other than birds and bats	Woodland fauna surveys included: • Walkover surveys (driven and walking transects, day and night), • Camera trapping. • Live trapping.
Socio-economic	A land acquisition survey was undertaken with a sample of landowners whose land was acquired for the project to determine if compensation was provided at full replacement cost and if livelihoods were affected, and if so, fully restored. During the survey interviews, people will be asked about general dependence of the local population on the affected land for livelihood related activities, including exploitation of timber/ firewood, mushroom or herb picking, etc.
Landscape and Visual Impact	The landscape and visual assessment were based upon a desk study and field observations. The study area of 45km was used. Zone of Theoretical Visibility models were calculated for the worst-case turbine model. Fieldwork was undertaken to select the relevant viewpoints and take viewpoint photographs as a basis for visualisations.
Shadow Flicker	A Study Area of ten rotor diameters (1,620m) around each proposed turbine was considered. The shadow flicker model was developed using WindPro software. A field survey was undertaken to inspect the receptors predicted to be affected by more than 30 hours of shadow flicker per year.
Ecology and Nature Conservation – Habitats other than woodland of conservation concern and their plant species	Targeted survey work was completed during the vegetation season. Habitat and flora surveys included: • Walkover surveys; • Phytocoenological sampling at the WTG locations along the site access tracks; • Habitat Mapping of the WTG locations and the routes of the site access tracks.
Traffic and Transport Impact	A desk-based assessment of transport and traffic impacts was completed to: • establish the baseline traffic conditions along the route, • estimate the traffic levels likely to be generated during the construction phase, • conduct qualitative assessment of potential impacts, and • propose control and mitigation measures.

Key Issues for the ESIA	ESIA Surveys Undertaken
Operational Noise	The location of the noise survey locations was based on an assessment of all noise-sensitive receptors within 2km of each WTG. Field work was undertaken to confirm the status of all receptors in terms of the current and future occupancy. A baseline noise survey was undertaken at key representative locations of noise sensitive receptors. The survey was undertaken in combination with anemometry measurements to determine the wind speed at the proposed turbine hub height. The survey considered the range of wind speeds and wind directions during both daytime and night-time periods.
Ice Throw and Ice Fall Risk	All potential receptors that might be affected by ice throw within the 500m-radius were identified: owners of the summer houses, users of roads and footpaths. A qualitative ice throw risk assessment was undertaken in line with the 2018 International Recommendations for Ice Fall and Ice Throw Risk Assessments by IEA Wind Task 19: Wind Energy in Cold Climates.
Forest Fire Risk	A desk-based analysis of the historical forest fire data for Crni Vrh (2000-2020) was undertaken. The vulnerability of the WPP project to climate change will be assessed, based on the regional models for Serbia. A qualitative forest fire risk assessment was undertaken.

10 Changes to the WPP Design as part of the ESIA

The Scoping Study was based upon the original design of the WPP that included 40 x 4.2MW turbines, more than was needed to meet the export capacity of 150MW (see Figure 7-1). The location of the 40 turbines was set to maximise the use of local wind patterns, ease of grid connection, topography, use of existing access tracks through the forests, and land availability. CVP were seeking flexibility in the conceptual design so that the design could be optimised once a preferred turbine had been selected.

The area in and around the Crni Vrh WPP site is characterised by woodland (both natural and cultivated), open meadow and low-grade agricultural land. Several of the woodland areas within the boundary of the WPP are considered to be near-natural forest habitats and some of the woodland flora and fauna species are of particular conservation concern. A number of WTGs were originally located, and some segments of the site tracks were routed, in mature near-natural woodland.

Following the completion of the Scoping Study it was clear that the siting of a small number of WTGs within or close to mature woodland would have a detrimental impact on these woodland habitats. The impact on these habitats, and the species dependant on them, would be permanent, detrimental and significant, i.e. a number of species could be displaced or suffer fatalities in nests, roosts and lairs. Following the completion of the Scoping Study it was agreed with CVP that these impacts could be mitigated by removing or relocating a number of turbines and by re-routing a some of the tracks; the objective being to avoid these habitats entirely. These changes were made prior to the start of the ESIA. Other impacts were investigated and design changes agreed with CVP during the ESIA.

It was agreed with CVP that eight turbines would be removed from the scheme and that three turbines would be re-sited to the areas of lower ecological risks. It was also agreed that the network of tracks could be significantly reduced (by about 30%) and in large part, only existing rough tracks will be developed into site tracks.

All these modifications were adopted within the Project Zoning Plans and were approved during 2021. This meant that the most significant adverse impact on sensitive forest habitats were avoided. The ESIA was undertaken on the basis of a WPP that would include no more than 32 WTGs. At the time of preparing the ESIA the developer was considering turbines with a capacity in excess of 5MW. This would allow a further reduction in turbine numbers. If a 5.6MW unit is used then only 27 turbines will be required to achieve the permitted export capacity. This meant that there was an opportunity for the ESIA specialists to consider the removal of other WTGs that might have a potentially significant impact on sensitive human receptors.

The consideration of the maximum capacity of the WPP allowed under the Zoning Plan and, in combination with the increasing capacity of the current generation of WTGs, CVP have been able to remove a number of the turbine locations suggested in the conceptual design from the final WPP design. Working with the ESIA consultants, CVP have settled on a final design that will include no more than 32 WTGs; eight of the high-impact WTGs have been removed. Specifically:

- CVP worked with the owners and occupants of properties that might be at risk of impact from noise and shadow flicker to reach mutually agreeable mitigations. This included the provision of financial compensation for any affected structures at full replacement cost, so that they may be taken out of use, or for any loss in amenity the owners may suffer.
- Agreement was reached with the owners of four properties that their affected structures would be purchased by the Developer and will be taken out of use.
- A string of four turbines would be removed from the scheme to reduce noise levels at two properties.
- Following the removal of turbine string IV the shadow flicker effect on the receptors in the north-east will be completely avoided. This means that only 4 weekend houses would be affected, all in the south-west. However, these houses are surrounded by vegetative screening which is likely to mitigate the flickering effects.

A plan of the final scheme, following the design changes listed in this Chapter, is shown in Figure 10-1. In addition, Figure 10-2 shows how the layout has changed due to the completion of the Scoping Study and the ESIA.

Figure 10-1 Final Layout of Crni Vrh WPP

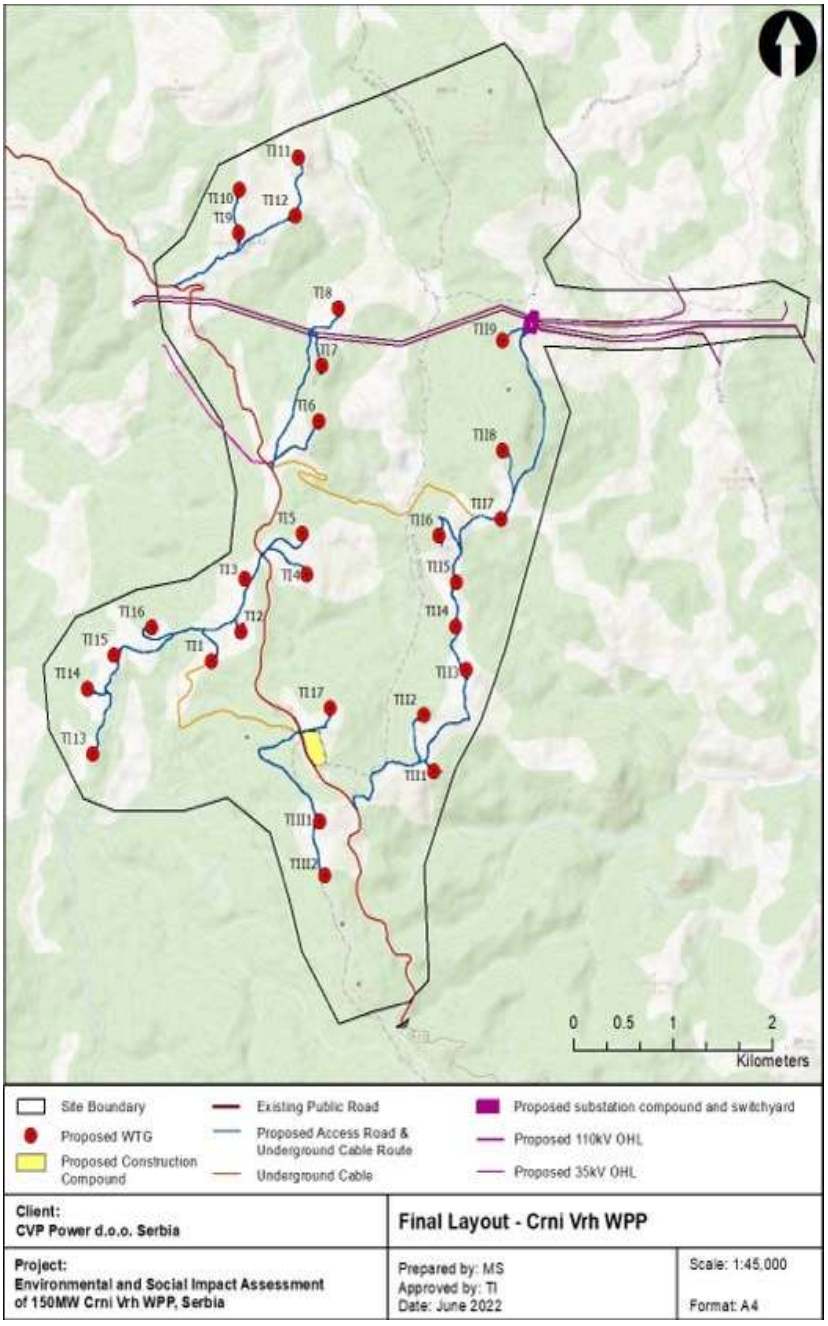
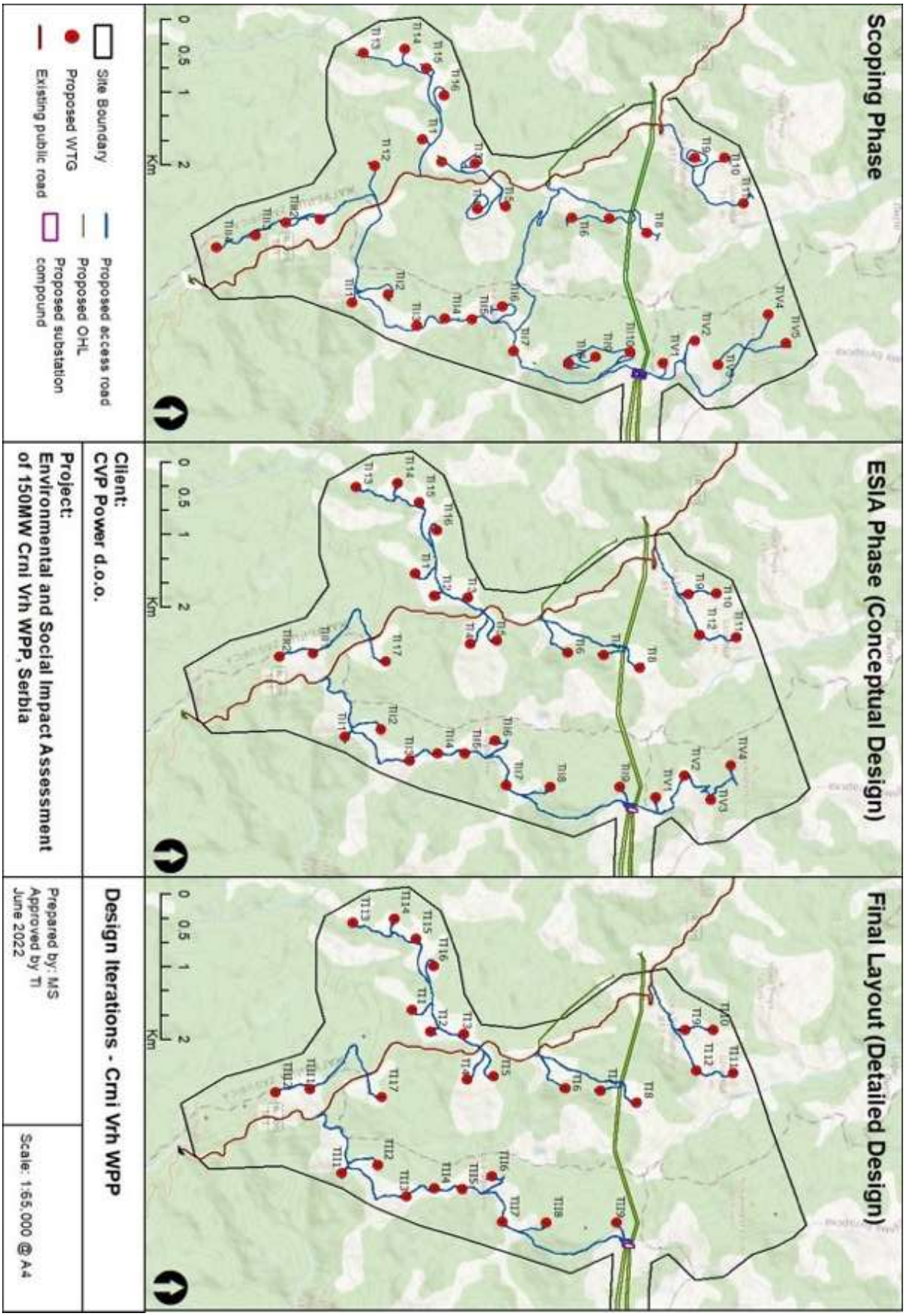


Figure 10-2 Layout Changes of the Crni Vrh WPP



11 Findings of the ESIA

The Scoping Study indicated that the development of the WPP could lead to a number of environmental and social impacts, both negative and positive. The ESIA considered each impact and proposed a series of design changes and control measures to mitigate the negative impacts.

The impact mitigations and management controls required by this ESIA are summarised in the Environmental and Social Management and Monitoring Plan, or "ESMMP", and will be delivered within the framework of the Project Environmental and Social Management System. The ESMMP is very detailed and is included in the main ESIA report.

11.1 Habitats and biodiversity

The changes to the WPP design have ensured that almost all potential negative impacts of the Project on habitats and biodiversity have been avoided or significantly reduced.

The ESIA concludes that there will be **no significant** impact of construction on designated sites, habitats, birds and bats. There is the potential for negative impact on the habitats and populations of three plant and one insect species populations. None of these populations are susceptible to WPP operation but would be impacted if physically damage during construction. The Construction Environmental and Social Management Plan will include a requirement for the construction contractor to fence off the sensitive areas so that construction equipment can be excluded from the sensitive areas. The residual impacts on these species are **negligible** at most.

Some bird collision fatalities from WTGs are inevitable over the operational life of the WPP. The collision risk assessment indicates that there will be a **negligible impact** on the regional populations of at-risk species: Short-toed Snake Eagle, Western Marsh Harrier, Eurasian Sparrowhawk, Northern Goshawk, Common Buzzard, and Long-legged Buzzard. The remaining species observed within the WPP site are considered not susceptible to collision mortality or are of very low nature conservation value. Although incidental single collision fatalities of these species cannot be completely excluded, such a low (potential) additional mortality could not affect their populations at the site or regional level. Some bird collision fatalities from OHLs are inevitable, though site and project-specific collision risk from Project OHLs is considered **negligible**.

Some bat fatalities from operational turbines are inevitable. The impact on the majority of bat populations from mortality caused by operating turbines is assessed as **none** or **negligible**, and therefore **not significant**. The impact on the valued Western Barbastelle Bat resident population and Leisler's Bat resident and migratory population is assessed as **negligible to minor negative regional** and **not significant**.

CVP intend to interpret the scrub management requirements set by the regulators in order to increase the area of Balkan-mountain hay meadows, a habitat of conservation value. The regulator requires that shrub and weed vegetation must be removed within a radius of 200 m from the turbines, by mowing or grazing, to a height of 20cm. The main reason for this requirement appears to be to prevent the growth of scrub that might attract insects, and then bats, to the turbines. Whilst much of the land within the 200m radius is not owned by CVP, the biodiversity management plan will consider how the land owned by CVP can be grazed in order to promote growth of Balkan-mountain hay meadow. Hopefully, this will lead to the restoration and maintenance of some of the Balkan-mountain hay meadows at the site. This impact on habitats as such is assessed as **positive moderate regional**, and **significant positive**. The habitat gains for flora and fauna, including bids and bats is expected to be positive but this must be assessed and confirmed following completion of the post-construction monitoring programme.

11.2 Socio-economic

Socio-economic impacts related to the construction phase are all assessed as having **minor significance**. Negative impacts include those in relation to land use, as up to 70 ha land will be occupied during construction, although close to 50% of it will be available for use again after construction is completed. Other negative impacts include possible economic displacement of users of land and person's whose tourism-based livelihoods can be impacted by increased project traffic, as well as damages to road surfaces. All other impacts are **positive** and they are in relation to compensation for old and mainly unused structures and the creation of employment and procurement opportunities, causing further positive impacts on local livelihoods, as well as in relation to the upgrading of access tracks, enabling local land owners to access their land more easily. The positive impacts are mostly short term and of a local character.

Following proposed mitigation, the residual impact rating for the key construction related impacts identified are:

- Reduced amount of land for use by individual users, up to 70 ha in total. - Negligible adverse.
- Loss of 7 structures of four households - Negligible beneficial.
- Employment opportunities for local residents and procurement opportunities for local companies - No change.
- Involuntary economic displacement of users of land - Minor beneficial.
- Increased livelihoods of local households - No change.
- Impacts on tourism activities, further causing loss of livelihoods in the Bor lake and spa area - Negligible adverse.
- Enhanced land use for local land owners as a result of improved access tracks - Negligible beneficial.
- Damages to road surfaces on roads used by local residents - Negligible adverse.

Following proposed mitigation, the residual impact rating for the key operations phase impacts identified are:

- Land rehabilitated and available for use to individual users - No change.
- Employment opportunities for local residents and procurement opportunities for local companies - No change.
- Involuntary economic displacement of users of land - Negligible beneficial.
- Revenue generation for local government and communities - Minor to moderate beneficial.
- Support for local initiatives and development - Moderate beneficial.
- Regular maintenance of access tracks to enhance land use by local land owners - No change.

11.3 Landscape and Visual

The construction works would have a negative, but short-term, impact that would primarily affect the people living, working or visiting the local area. Due to the intervening landform and vegetation, the effects on the landscape character would be **moderate** (within 500m of each turbine) **to minor adverse** (as the distance from the site increases). The visual effects during construction would be **major to moderate** for local residents and visitors in the close site vicinity and minor for all other residents, local road users, people working in the open area and people involved in recreation.

The consideration of visual impact for wind turbines can be very subjective; people may like them, dislike them, or be indifferent to them. However, for the purposes of the ESIA it has been assumed that the observers will actively dislike them. With this in mind, the ESIA has concluded that the scale and topography of the local landscape is considered able to accommodate the proposed WPP. The turbines will be very noticeable at a distance of up to about 2km where they would dominate the landscape, creating **major to moderate adverse** impact significance. As the distance from the site increases, the turbines would appear in association with the broad-scale landform, reducing the impact significance to **minor adverse**.

The significant visual effects would be localised and confined to an area of up to 5km. The wind turbines will be clearly visible and prominent in the views of about twelve weekend and residential houses to the north-east and south-west of the site and to walkers in the mountain. The impact is considered to be **major adverse** impact significance. Beyond 5km of the site the views would be limited and intermittent due to the intervening landform and woodland, resulting in **minor to negligible adverse** visual effect.

Following proposed mitigation, the residual impact rating for the key impacts identified are:

- Impact on the medium sensitive landscape character and fabric during construction - Minor Adverse.
- Visual impact on local residents, road users, people working in the area and people involved in recreation during construction, including highly sensitive residential receptors in the vicinity of the site (NE, SW) - Moderate to minor adverse.
- Impact on the landscape character (medium sensitive receptor) - Moderate Adverse.
- Impact on visual receptors (highly sensitive) in the north-east and south-west, within 2km of the site - Moderate to Minor Adverse.

11.4 Shadow Flicker

The shadow flicker assessment concluded that the initially proposed 32 WTGs could exceed the recommended threshold of 30 hours per year at 15 properties in total, of which one is a residential house and 14 are weekend houses occupied in summer months.

Out of the 14 weekend houses, 3 are situated within the mandatory setback distance of the turbines. CVP have agreed with the owners of the 3 properties within the setback zone that they (the owners) will demolish these houses. In return, CVP have contracted to fully compensate the owners for this loss. As CVP have optimised the WPP layout to exclude the turbine string IV, the shadow flicker effect on the receptors in the north-east will be completely avoided. In that case 4 weekend houses in total would be affected, all in the south-west.

The assessment was based on a conservative estimate and no account was taken of existing screening features and limited weekend house occupancy. It is therefore considered that the actual amount of shadow flickering is likely to be much less.

For the affected residential house and weekend houses, the shadow flicker impact is considered to be **significant**.

For the affected agricultural buildings as receptors of low to negligible sensitivity, the impact is considered to be **not significant**.

Following proposed mitigation, it is expected that:

- Shadow flicker effects at one residential and 14 weekend houses in the vicinity of the proposed development site - Negligible Adverse.

11.5 Ice throw

The ESIA has concluded that the ice throw hazard zones could be up to 350m from the turbines. There are no residential properties within these ice throw hazard zones. However, there is a 900m-long section of the public road, proposed access tracks between the turbines and a car park near the substation compound.

The likely presence of pedestrians and vehicles in Crni Vrh during the icing period is considered to be limited as, weather during icing periods will be very unpleasant for pedestrians and vehicle drivers. CVP are considering the use of warning signage on the section of highway during icing conditions. The calculated ice throw risk levels are tolerable on the condition that risk reduction measures are implemented.

Following proposed mitigation, the residual impact rating for the key impacts identified are:

- Risk of fatality for general public or the WPP personnel due to turbine ice throw or ice fall - No Change.

11.6 Traffic and Transport

The construction of the proposed Crni Vrh WPP would contribute to a significant increase (1 to 3 times) in HGVs movements along the 5km-long section of the road No. 161 between Brestovac Spa and Bor Reservoir. The potential impact on traffic and transportation would be temporary and short-term, with medium magnitude of severance during summer months and moderate magnitude of driver delay. This would result in **moderate adverse** impact on visitors and residents in the area and **moderate adverse** impact significance on drivers.

The transport of large wind turbine components (blades, tower sections, nacelle) is subject to regulation on safe abnormal loads transport and requires mandatory involvement of police escort with or without successive stopping of traffic (depending on load dimensions). Given the strict procedure that has to be implemented, the potential impact of abnormal loads transport is not considered to be a significant traffic safety risk.

Residential areas are highly sensitive receptors in terms of the traffic safety. Along the road No. 161 which would be used for the most part of the construction traffic, there is one potentially sensitive section, 5km long. The road runs next to two summer house settlements – Brestovac Spa and Bor Reservoir (see **Error! R eference source not found.**). Additional HGV traffic (especially in summer) may increase the risk of accidents for the local community.

The road is narrow (6m) but has many blind bends and a speed limit of 80km/h. There are no pedestrian crossings or traffic lights that would facilitate the road crossing. During the summer season, there is an increased tourist and visitor activity in the two settlements and potential frequent crossings of the road. The increased traffic flow during the construction has the potential to produce a medium magnitude effect with **moderate adverse** significance impact.

The winding character of the road No. 161 does not provide many suitable opportunities to overtake HGVs. The entire road stretch between the spa and reservoir is marked with a single solid white line. This can lead to driver frustration and taking of unnecessary risks, potentially affecting both driver and pedestrian safety. The magnitude of effect would be medium (given the low traffic level) and the impact significance is assessed to be **moderate adverse**.

The road section within the development site has a very low traffic volume which some drivers take advantage of to speed. Numerous bends do not provide many opportunities for overtaking. During the construction phase and slow HGV traffic, some drivers might be tempted to overtake unsafely. This would increase the road safety risk to medium and result in **moderate adverse** impact significance.

Motorcyclists are present on the road No. 161. A traditional 2-day Motorcycle Meet takes place at Bor Reservoir each August, attracting both local and regional motorcyclists. The potential effect is assessed to be of a medium magnitude resulting in **moderate adverse** impact.

Following proposed mitigation, the residual impact rating for the key impacts identified are:

- Impact on community severance and driver delay along the road No. 161 between Brestovac Spa and Bor Reservoir (medium-sensitive communities), especially in summer months during tourist season - Minor adverse.
- Increased traffic of maintenance and repair vehicles along low-sensitive local roads during the windfarm operation - Negligible adverse.

11.7 Operational Noise

The assessment has indicated that two properties will exceed the Serbian night-time noise limits. However even if mitigation were applied to these locations so that the night-time limit was achieved, noise levels would still exceed the IFC noise limit which is set as the threshold for an impact of moderate significance. Discussion in regard to compensating these residents are on-going. The owner of one property has agreed to accept financial compensation for this potential disturbance. The owner is expected to install improved sound insulation. The owner of the second property has preferred to wait until the WPP is constructed and noise impact can be confirmed.

Note also that an impact of moderate significance is also predicted at two other properties even though the Serbian limits can be met at these locations.

Following proposed mitigation, the residual impact rating for the key impacts identified are:

- Without mitigation the WPP would exceed noise limits at several residential locations.

11.8 Forest Fire Risk

The development site is situated within an area of wildfire risk. The fire risk during the construction activity can result in **moderate to major adverse** impact and additional management and mitigation measures would be necessary, besides the routine (‘best practice’) fire prevention during construction.

Following proposed mitigation, the residual impact rating for the key impacts identified are:

- Increased fire/ wildfire risk during construction, especially during prolonged dry periods in summer - Negligible Adverse.
- Damage of the WPP infrastructure due to wildfire or spreading of fire from the WPP infrastructure to nearby areas, causing a forest fire - No change.

12 Stakeholder Engagement Plan

A Stakeholder Engagement Plan ("SEP") was developed by CVP with assistance from the ESIA consultants for the Crni Vrh WPP project during the scoping stage and the latest updated version is available to interested stakeholders on the CVP website (http://www.cvpower.rs/) for review and questions or comments.

The purpose of the SEP was to identify key stakeholders so that they can contribute their views and provide relevant information to the ESIA. A summary of these meetings is presented in the ESIA and the SEP.

The SEP will be reviewed and updated on a regular basis. The next revision is planned for after the completion of the draft ESIA. The SEP will then include further activities which will be implemented by CVP prior to and during construction, as well as the operation stage.

The SEP includes the following information:

- Public consultation and information disclosure requirements according to national legislation and international requirements;
- Identification of stakeholders and other affected parties;
- Overview of previous engagement activities carried out for the project;
- Future stakeholder engagement programme including methods of engagement and resources; and
- A community grievance mechanism that can be used by stakeholders to record and manage complaints, concerns, queries and comments.

The main identified stakeholders for the Crni Vrh WPP project include residents of affected municipalities (Žagubica and Bor), including particularly villages surrounding the project site, people affected by project related land acquisition or those using structures within noise sensitive locations, active hunting organisations and representatives of relevant municipal departments and institutions, as well as other statutory stakeholders.

Document End