Planuojamos ūkinės veiklos organizatorius
Organizer of the proposed economic activity

UAB „Biržų vėjas“

Proposed economic activity:

CONSTRUCTION AND OPERATION OF A WIND FARM OF UP TO 35 WIND TURBINES PLANNED BY BIRŽŲ VĖJAS, UAB IN NEMUNĖLIO RADVILIŠKIS AND PAROVĖJA WARDS OF BIRŽAI DISTRICT MUNICIPALITY IN PANEVĖŽYS COUNTY

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THE PEA IS PRESUMED AS BEING IN THE OVERRIDING PUBLIC INTEREST AND IN THE INTEREST OF PUBLIC SAFETY

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ABBREVIATIONS USED IN THE TEXT

Abbreviation	Meaning of the abbreviation
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EU	European Union
GDPR	General Data Protection Regulation
GHG	Greenhouse gas
GIS	Geographical Information System
LHS	Lithuanian Hydrometeorological Service
MoC	Ministry of Culture
MoE	Ministry of Environment of the Republic of Lithuania
MoH	Ministry of Health of the Republic of Lithuania
MoI	Ministry of the Interior of the Republic of Lithuania
NF	Natural framework
NPHC	National Public Health Centre under the MoH
PEA	Proposed economic activity
PHIA	Public Health Impact Assessment
RES	Renewable energy sources
RL	Republic of Lithuania
RLPC	River, Lake and Pond Cadastre of the Republic of Lithuania
SAC	Special Area of Conservation
SPZ	Sanitary protection zone
SRIS	Protected Species Information System
STAA	State Protected Areas Authority under the MoE
WHO	World Health Organisation
WindPRO	Mathematical model designed for the modelling of noise and shadow flicker caused by wind turbines
WTor WPP	Wind turbine or Wind power plant
ŽGR	Register of the Underground Sphere

EXECUTIVE SUMMARY OF THE EIA REPORT

Biržų vėjas, UAB intends to construct and operate a wind farm of up to 35 WTs in the territories of the Nemunėlio Radviliškis and Parovėja Wards of the Biržai District Municipality in the Panevėžys County. The proposed activity would include the construction of grounds and access roads for the servicing of the WTs, other infrastructure required for the PEA (an underground power cable network, a transformer substation) and the construction and operation of 35 WTs

The activity proposed by Biržų vėjas, UAB – the construction and operation of a wind farm of up to 35 WTs in the territories of Nemunėlio Radviliškis and Parovėja Wards of Biržai District Municipality is on the list of activities provide in Annex 1 to the Republic of Lithuania Law on the Environmental Impact Assessment of Proposed Economic Activities (the 'EIA Law') for which an assessment of their impact on the environment must be made.

The wind farm activity is presumed as being in the overriding public interest and in the interest of public safety

Biržų vėjas, UAB and Sweco Lietuva, UAB concluded an agreement for the EIA of the PEA: under the agreement, Sweco Lietuva, UAB undertook to prepare a notice of commencement of the EIA, prepare the EIA Report, obtain approvals on the prepared documents from the EIA stakeholders, inform the public about the documents, and submit them to the EPA for consideration and decision on the PEA feasibility.

In July 2022, Sweco Lietuva, UAB prepared the Notice of Commencement of the EIA, presented it for public consultation and submitted to the EIA stakeholders and the EPA according to set procedures, and received comments therefrom.

On completion of the EIA for the PEA, in June 2023, the EIA Report on the Construction and Operation of a Wind Farm of up to 35 WTs Planned by Biržų vėjas, UAB in the Territories of the Nemunėlio Radviliškis and Parovėja Wards of the Biržai District Municipality in the Panevėžys County (the 'EIA Report') was prepared.

No WT location alternatives were identified in the EIA Report, however, a number of options of the WT technical parameters (A, B and C) are considered. Potential impact of selecting each of these options upon the environment and public health is assessed and compared including a comparison with Option 0.

In March 2022 – February 2023, researchers of Media ir aplinkos projektai, VšĮ carried out in situ observations of hatching, migrating and flocking birds as well as bats in the PEA territory and its environs. Results and conclusions of the observations were used in making the assessments and preparing the EIA Report; some WT locations were adjusted on receipt of these results and conclusions at an early stage. Having regard to the initial assessment results as well as comments received from the EIA stakeholders in the EIA Report approval process, the PEA Organiser decided to abandon four WTs (N1, N6, N11, N17); also, in order to protect the black stork and the lesser spotted eagle considering the ornithologists' comments to the effect that WTs N31 and N32 would be too close to a Natura 2000 site - SPA Biržų Wood, later the PEA Organiser abandoned

planning of WTs N31 and N32, and planning in total up to 29 WTs. The EIA Report has been adjusted according to these changes.

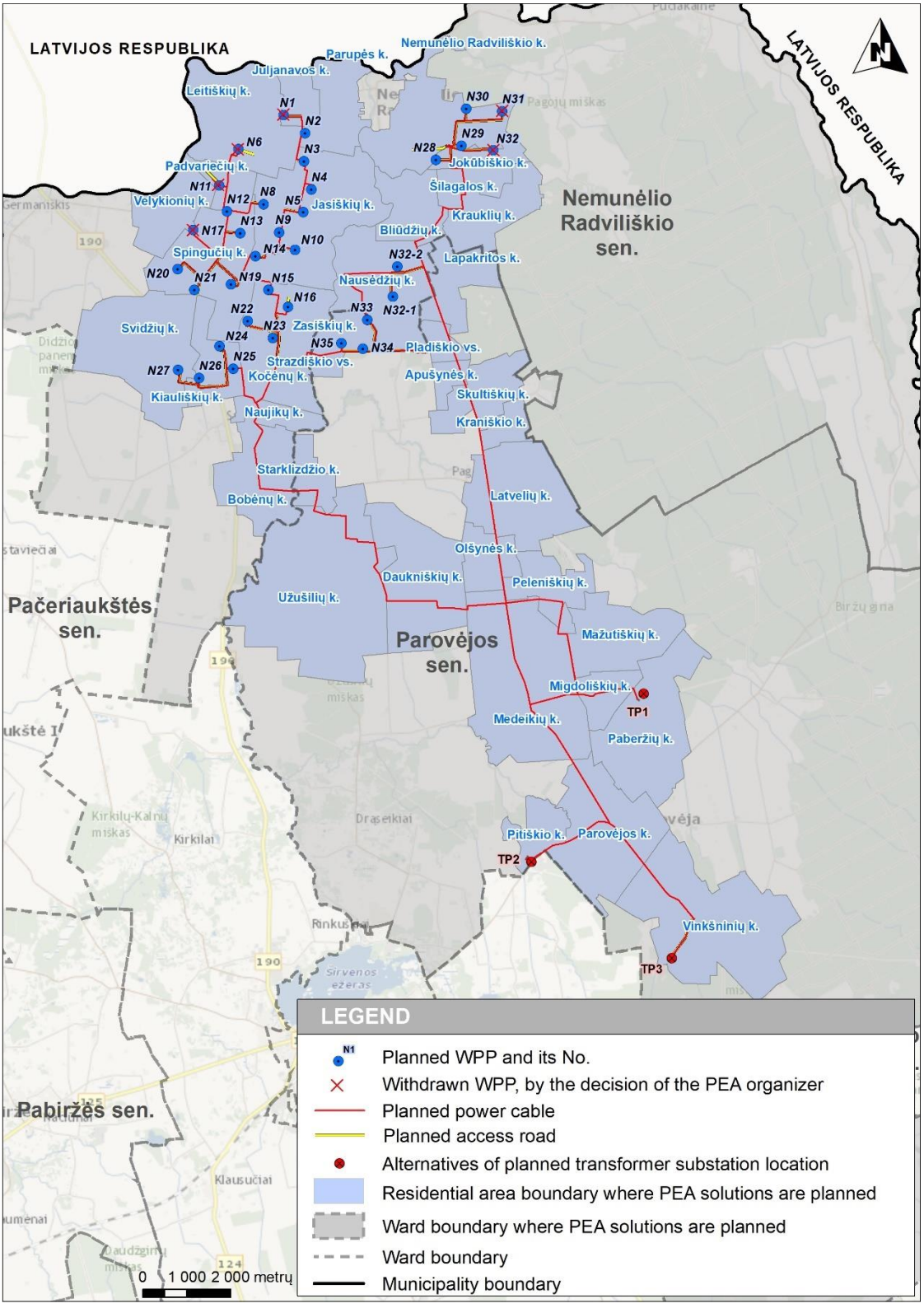

Figure 1. Geographic and administrative situation of the PEA installations

Objects and technology of planned economic activity

Up to 29 WTs are planned to be constructed and operated in privately owned land plots of Nemunėlio Radviliškis and Parovėja wards of the municipality, with the construction of the necessary infrastructure (a transformer substation, underground power cables, service grounds, access roads etc.) (see Figure 1.).

Planuojamų VE modeliai bei jų techniniai parametrai PŪV organizatoriaus buvo išnagrinėti ankstesniuose PŪV planavimo etapuose ir apsispręsta vertinimui pasirinkti trijų tipų VE modelius (1 lentelė). Tolimesniame vertinimo etape šie sprendiniai vertintini kaip galimos VE technologijos ir techninių parametrų alternatyvos A, B ir C. Maksimalios alternatyvos C sprendiniais planuojamos VE, kurių kiekvienos galia būtų iki 7,5 MW, rotoriaus su mentėmis skersmuo – iki 180 m, stiebo aukštis – iki 180 m, VE aukštis matuojant iki aukščiausio konstrukcijų taško – iki 270 m, triukšmo lygis – iki 109,0 dBA. Bendra planuojamo VE parko galia neviršys suminio 217,50 MW galingumo.

Table 1. Technical parameters of the WTs being planned, by technical alternatives

WT parameters	**WT manufacturer and model***		
	A	B	C
	Enercon, E-160 EP5	Vestas, V172-7,2	Prospective WT
Power per WT, MW	Up to 5,56	Up to 7,2	Up to 7,5
Diameter of the rotor with blades, m	Up to 160	Up to 172	Up to 180
Number of blades	3	3	3
Tower height, m	Up to 120	Up to 166	Up to 180
Overall WT height with raised blade (highest point of the structure), m	Up to 200	Up to 252	Up to 270
Noise level as declared by the manufacturer, dBA	106,8	106,9	109,0
Total number of WTs	29	29	29
Overall WT power, MW	Up to 161,24	Up to 208,8,2	Up to 217,5

* - Should the supply of WT models in the market change, other models are also possible, with parameters up to: overall WT height – up to 270 m, diameter of the rotor with blades – up to 180 m, tower height - up to 180 m, power per WT – up to 7.5 MW, emitted noise level – up to 109.0 dBA. Such technological WT options must not exceed the maximum impact as determined by this EIA. The PEA Organiser, having assessed the WT models and their technical parameters in previous PEA planning stages (6 models in all: Siemens SG6.6-170, Enercon E-160 EP5, Enercon E-175 EP, Vestas V4172-7,2, Nordex N175/6.X, prospective WT), has decided on an assessment of the WT models of three characteristic types (smallest and lowest capacity, medium height and capacity, tallest and highest capacity) (Table 1).

Three location options for the transformer substation are considered and assessed in the EIA Report: T1 (priority option) – in Paberžiai village, Parovėja ward, T2 – Pitiškiai village, Parovėja ward, and T3 – Vinkšniniai village, Parovėja ward (Figure 1).

In the PEA implementation, maximum use of existing local roads (or sections thereof) is intended, upon reinforcement and/or renovation is necessary; where there is no access to the planned WT site – sections of an access road will be built. It is estimated that approx. 18.5 km roads of access

to the WTs and the TS will have to be reconstructed/built in Options TP1 and TP2, or approx. 20.5 km in Option TP3.

The PEA requires installation of underground power cables between the WTs and the TS. It is estimated that in the case of installation of transformer substation T1, approx. 64.1 km of cables will be required, in the case of T2 – approx. 63.2 km, and in the case of T3 – approx. 66.2 km.

The PEA process consists of two main stages:

- generation of electricity by the WT; and
- supply/transmission of the electricity to the power transmission system.

The WT being planned will generate 33 kV electricity. The electricity produced by the WTs will be transmitted, through an underground electrical cable, to the TS being planned, where the electricity will be transformed into 110 kV or 330 kV and afterwards delivered to the electricity transmission grid.

A basic diagram of a WT and a general view of WTs are provided in Figures 2.

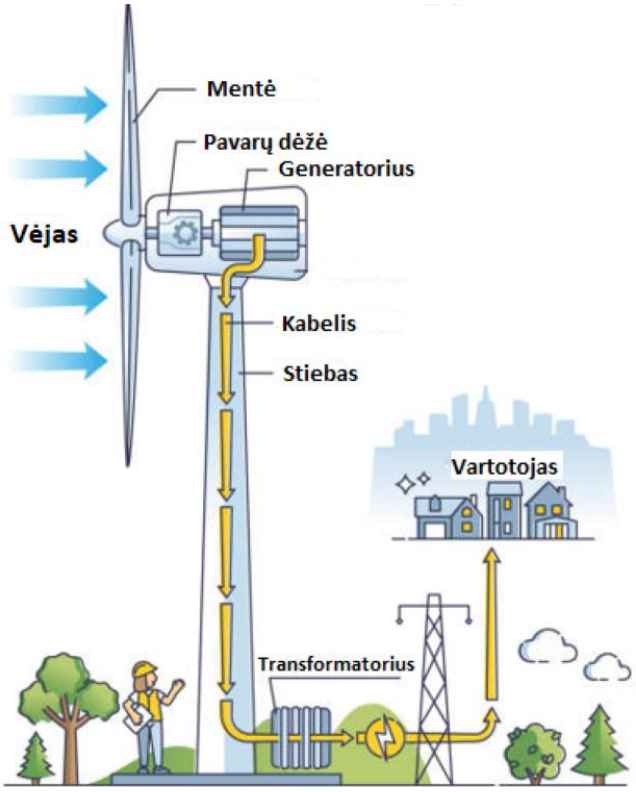

Figure 2. A basic diagram of the wind turbine technology

It has been established, during preparation of the EIA Report for the PEA, that::

The PEA location has been selected in accordance with the solutions contained in local and higher-level general and special territorial planning documents (TPDs). In the area selected for

the WTs, the PEA is permissible having regard to the economic activities permitted according to the aforesaid TPDs. The PEA is not contrary to the TPDs in effect. According to the map approved by Order of the Chief Commander of the Lithuanian Armed Forces No V-217 of 15 February 2016 'Regarding approval of the Map of Territories of the Republic of Lithuania in Which Design and Construction of Wind Turbines (Tall Structures) Can Be Restricted', all the WTs being planned fall within territories in which the WT locations will be approved provided that the producer of energy from RES and the Lithuanian Armed Forces will conclude an agreement on compensation for part of investments and other expenditure for the national security functions'.

Impact on water. Four sites of the WTs being planned fall within safety zones of surface water bodies; none of the WT sites fall within shore safety belts of surface water bodies. During the construction of the PEA facilities (laying of underground power cables and building of access roads to the WTs and the TS), surface water bodies will be crossed at 37 places depending on the selection of the TS location. Power cables will be laid by the trenchless method beneath the bottom of surface water bodies. No underground or surface water resources will be used in the PEA, and no generation of industrial or domestic wastewater is expected. During the periods of construction and operation, non-polluting surface runoff will occur; it will move away across the ground or will soak into the ground. No dangerous chemical substances will be used and stored during the PEA implementation.

During the periods of construction and operation of the PEA installations, no significant negative impact on surface waters is expected irrespective of the options selected, provided that identified measures to avoid and reduce impact are implemented. Potential impact o the PEA on surface water bodies is considered to be a direct impact (at places of intersections with water bodies and places where land reclamation systems would be damaged), however, the impact will be temporary (during construction), of little importance in the construction phase, and insignificant in the operation phase. The impact on surface water bodies would be similar in all the PEA options.

Impact on ambient air and climate. Wind energy resources in the territory being planned are sufficient for the electricity generation in wind farms. Generation of electricity from renewable wind energy will have a significant positive impact on the reduction of greenhouse gas emissions. In all its phases, the PEA will not generate significant air pollution, and no negative impact on ambient air is anticipated.

Potential impact of the PEA on ambient air and climate is considered to be direct, temporary, negative and insignificant during the construction period (due to pollutant emissions from the vehicles and machinery used in the construction period), and indirect, long-term and significantly positive – in the operation period (electricity resources produced satisfy part of the demand for these resources and reduce pollution and greenhouse gas emissions from other installations for electricity generation and other economic activities that use fossil fuel). In this respect, the greatest positive impact on ambient air and climate would be produced by implementation of Option C of the PEA.

Impact on soil. It is estimated that total area of excavated/removed/susceptible soil layer on the WT construction sites may be between 38.2 and 50.0 ha (approx. 9.3 ha – on WT construction, road building and cable laying sites, approx. 33.3 ha – in the case of selecting T1 transformer

substation, approx. 33.1 ha – in the case of T2 transformer substation, and approx. 35.7 ha in the case of T3 transformer substation); soil removal depth up to 0.2-0.3 m. On completion of construction of the WTs and installation of requisite infrastructure, the removed soil will be used for the site management works in the WT areas and access road areas. Construction and operation of the PEA will not produce a significant negative impact on soil. Certain temporary physical impact on soil can be expected only in the construction phase. In an approx. 18 ha area, built up with structures and roads, soil layer will be removed for the entire period of the PEA operation.

Irrespective of the selected option, no significant impact on soil is anticipated during construction and operation of the PEA facilities provided that measures to avoid and reduce impact are implemented as stated below. Potential PEA impact on soil is characterised as direct impact (at places where PEA solutions will be implemented and soil layer will be removed/damaged), short-term and temporary in part of the area (only during construction), long-term in part of the built-up area (throughout the operation phase), adverse and of little significance in the construction phase and insignificant in the operation phase. Impact on soil would be similar in all the options.

Impact on the underground sphere. The WTs being planned (high-rise structures) would be installed in area adjacent to the karstic region of North Lithuania and characterised by complicated conditions geologically-hydrogeologically and geotechnically. As the WT foundations will be installed at the depth of up to forty metres, there is a risk of damage to/uncovering of the groundwater layer and interlayer artesian aquifers as well as flooding of the construction site and its nearest environs. Therefore, prior to starting the works, detailed investigations of local geological and hydrogeological conditions are needed in the structures' technical design phase, and optimal solutions for lowering the water level and insulation of the aquifers have to be selected. The PEA facilities do not fall within areas of geotopes or potential pollution sources.

The PEA will produce a direct impact on the regions beneath the land surface (earthworks on 35 sites will reach deep underground layers) that will include the soil layer; the impact will be long-term (in part of the territory, structure of the upper geological layer will be changed permanently), of low significance, and negative in the construction phase (the impact is not of a large scope and without significant negative effects provided that the measures to avoid and reduce the negative impact), and insignificant in the operation phase. The impact will be similar in all the PEA options.

Impact on landscape. The WTs being planned and the infrastructure facilities required for their operation do not fall within areas of visual aesthetic potential under special protection and do not contradict the regulations of the National Landscape Management Plan. A valuable landscape area nearest to the PEA facilities is at the distance of 36.7 km from the nearest WT (N27), and the nearest point for overviewing most valuable landscape panoramas is at the distance of 39.1 km from the nearest WT being planned, i. e. the distance is longer than the WT tower height x 10 (180 m x 10 = 1800 m) as stated in Article 49(18) of the RL Law on Energy from Renewable Sources, based on which the impact of the PEA on landscape is considered to be insignificant.

Impact on biodiversity. No significant negative impact on flora in the PEA area is anticipated. There are no protected natural plants at the locations where construction of the WT sis being planned.

Seven bat species have been identified in the PEA area and its environs on completion of annual bat observations. Locations of WTs N19, N22, N24, N30, N31 and N32 are within the distance of 200 m (+ blade length)from the forest; locations of WTs N26, N27, N28, N29, N32 and N32-1 being planned are within the distance of 200 m (+ blade length) from the water bodies, i. e. potential bat habitats. These WTs can produce a negative impact on bats, therefore, it is necessary to apply the measures to avoid, reduce and/or compensate the negative impact as stated in the EIA Report.

According to the reports of investigations conducted in the PEA and adjacent areas (and information in databases), 106 bird species were observed. Based on conclusions on ornithological observations of Media ir aplinkos projektai, VšĮ's experts, operation of some of the WTs in the PEA area may have an impact on life of birds of prey (such as the lesser spotted eagle and the hobby) and the black stork, therefore, it is necessary to apply the measures to avoid, reduce and/or compensate for the negative impact as stated in the EIA Report.

As mentioned before, having regard to ornithologists' recommendations for the protection of the black stork and the lesser spotted eagle, the PEA Organiser has abandoned planning of the WTs N31 and N32.

Having regard to the experts' recommendations and comments and proposals received from the State Protected Areas Authority under the Ministry of Environment concerning SPA Biržai Wood, measures to avoid, reduce and/or compensate for the PEA's negative impact on birds and bats are planned as described in the EIA Report.

Provided that measures to avoid, reduce and/or compensate for the aggregate impact of the two wind farms (a wind farm of up to 37 WTs planned by Biržų vėjas, UAB in Parovėja and Nemunėlio Radviliškis wards in Biržai District Municipality and three WTs planned by Bionalis UAB in Nemunėlio Radviliškis ward in Biržai District Municipality) are implemented, the aggregate negative impact upon the black stork, the lesser spotted eagle and other birds would be insignificant.

Sites of protected fauna and flora species as recorded in the SRIS must not be damaged during the installation of the engineering infrastructure required for the WT operation. Only temporary local disturbance of animals' life is allowed during construction works (after the source of disturbance ceases to exist, the animals usually return to the previous place of living). Provided that experts' recommendations are complied with and all the planned measures to avoid and reduce potential negative impact are implemented during the PEA facilities' construction and operation, no significant negative impact on biodiversity is anticipated.

Impact on protected nature areas. The WTs being planned and requisite engineering infrastructure do not fall within and do not border protected areas and European protected areas network Natura 2000 sites and their safety zones, and do not fall within any forests and sites of Community importance. The PEA will not produce any significant negative impact on protected areas, Natura 2000 sites and their safety zones, and areas of Community importance irrespective of the PEA option selected.

Impact on material assets. The WTs and TS being planned do not fall within residential, recreational or public territories. In all the PEA technical options, the area of impact of the PEA-

generated noise that exceeds set limits covers one residential area (land plots with buildings), therefore, measures, described in the EIA Report, to avoid and/or reduce the negative impact must be implemented. One of such measures is to buy the relevant residential buildings from the owners, demolish them and deregister from the Register of Immovable Property, and change the land use. There are no other important material assets in the territory concerned, apart from the existing land reclamation system, electricity networks, and district and local roads. On assessment of all WT technical options, it has been concluded that, subject to implementation of the preventive and compensatory measures envisaged, none of the options would produce a significant negative impact on material assets in both phases of the PEA, i. e. construction and operation of WTs and relevant infrastructure, in all the options considered.

Impact on immovable cultural heritage. There are no registered cultural heritage sites in the land plots required for the WTs and related infrastructure being planned and these land plots do not fall within the safety zones of the cultural heritage sites and localities (the subzones of protection against physical impact and the visual protection subzone). No significant negative impact on the cultural heritage sites is anticipated in the PEA construction and operation phases irrespective of the PEA option selected.

Impact on public health. The EIA involved a qualitative and quantitative evaluation of the physical factors generated by the PEA: acoustic noise, low-frequency sound (infrasound), shadow flicker, electromagnetic field and vibration. Socio-economic and psychosocial factors were considered.

On completion of the modelling of the noise propagation from all the WTs being planned by means of WindPro (version 3.6-4.0) it has been established that the limit value of the noise emitted by the WT being planned would not exceed the limit values specified in HN 33:2011. If the specified noise reduction measures are not implemented, construction of WT N32-1 is not permissible in all the PEA options. No negative impact by shadow flicker caused by the PA and other risk factors is anticipated, in all the PEA options, provided that the specified impact avoidance and reduction measure is implemented.

Transboundary impact. The PEA area is situated in the northern part of the territory of Lithuania, in the Biržai District Municipality of the Panevėžys County. The shortest distance from the PEA facilities to the territory of the Republic of Latvia would be about 1.38 km and to the Republic of Belarus about 140 km (Figure 5.1). A larger settlement (Skaistkalne) the territory of the Republic of Latvia closest to the PEA facilities is at the distance of about 2.9 km (from WT N20), and the closest residential building of about 1.67 km. Protected natural area (and a Natura 2000 site) in the territory of the Republic of Latvia is a natural monument/geological formation *Skaistkalnes karsta kritenes* at the distance of about 1.89 km from WT N12 being planned (Figure 4).

On completion of the EIA it has been established that consequences, either direct or indirect, of the PEA implementation for various elements of the environment (ambient air, surface water, underground sphere, soil, landscape, protected areas, biodiversity) would only be possible within the distance from dozens of metres to a few kilometres around the PEA area.

Results of modelling of the noise and shadow flicker caused by the WTs show that the area of potential impact where limit values can be exceeded does not include the territory of the Republic

of Latvia and does not produce a negative impact on its residential and public areas, in all the PEA technical options.

The WTs being planned will be seen from the territory of the Republic of Latvia, depending on the observation point, within the distance of up to few kilometres.

The assessment has shown that, subject to implementation of the measures to avoid and reduce the negative impact produced by the PEA, no significant negative impact on the neighbouring states, their natural and social environment, and their residents is expected.

Upon submission of the Notice of Commencement of the EIA to the EPA, the Ministry of Environment considered the information received and informed its decision, by letter No D8 (E)-5563 of 28 October 2022, that transboundary impact procedures should be applied to the PEA.

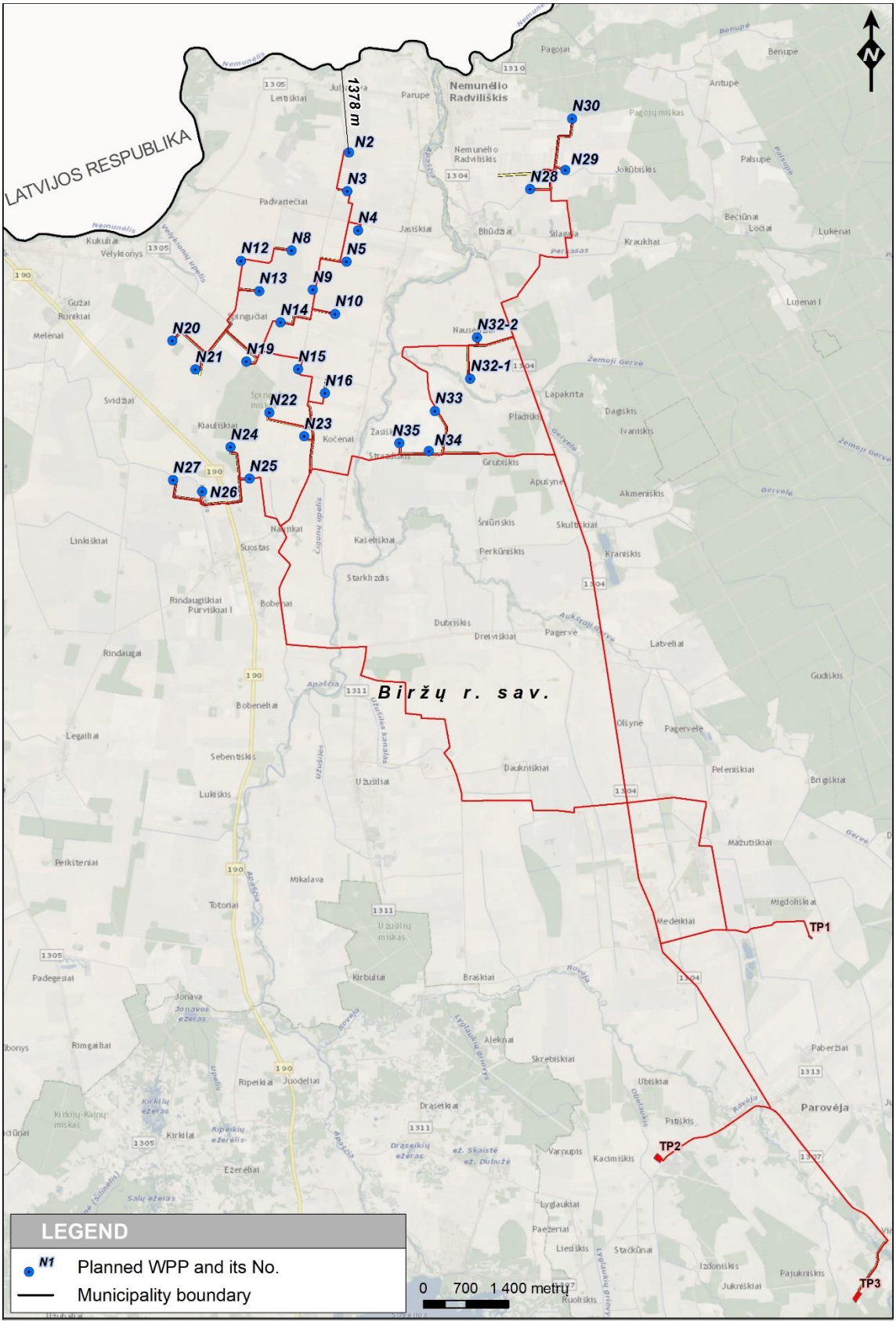

Figure 3. PEA location in relation to the territory of the closest foreign state

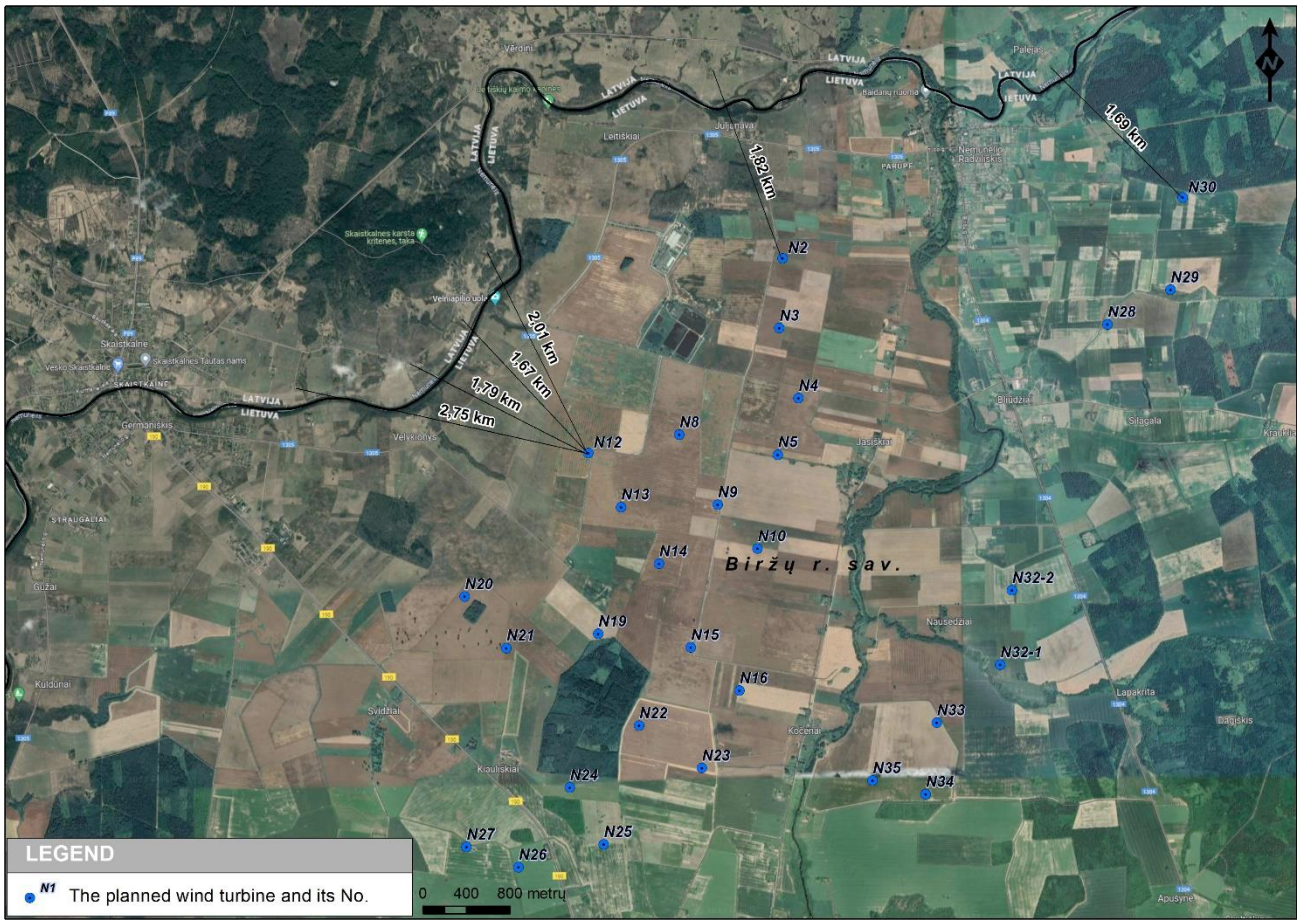

Figure 4. PEA facilities in relation to residential areas in the territory of the closest foreign state

Conclusion of the environmental impact assessment of the planned economic activity

Having regard to the preliminary assessment results and comments received from the EIA stakeholders, the PEA Organiser abandoned planning of four WTs (N1, N6, N11, N17) out of 35 WTs. On completion of the EIA, it is proposed that construction of two more WTs at selected locations should be abandoned (N31 and N32). Considering conclusions of this EIA Report, construction and operation of 29 WTs is proposed in any PEA option. If planning of the specified WTs is abandoned, the risk of their potential impact on the environment and public health would be eliminated from this EIA Report.

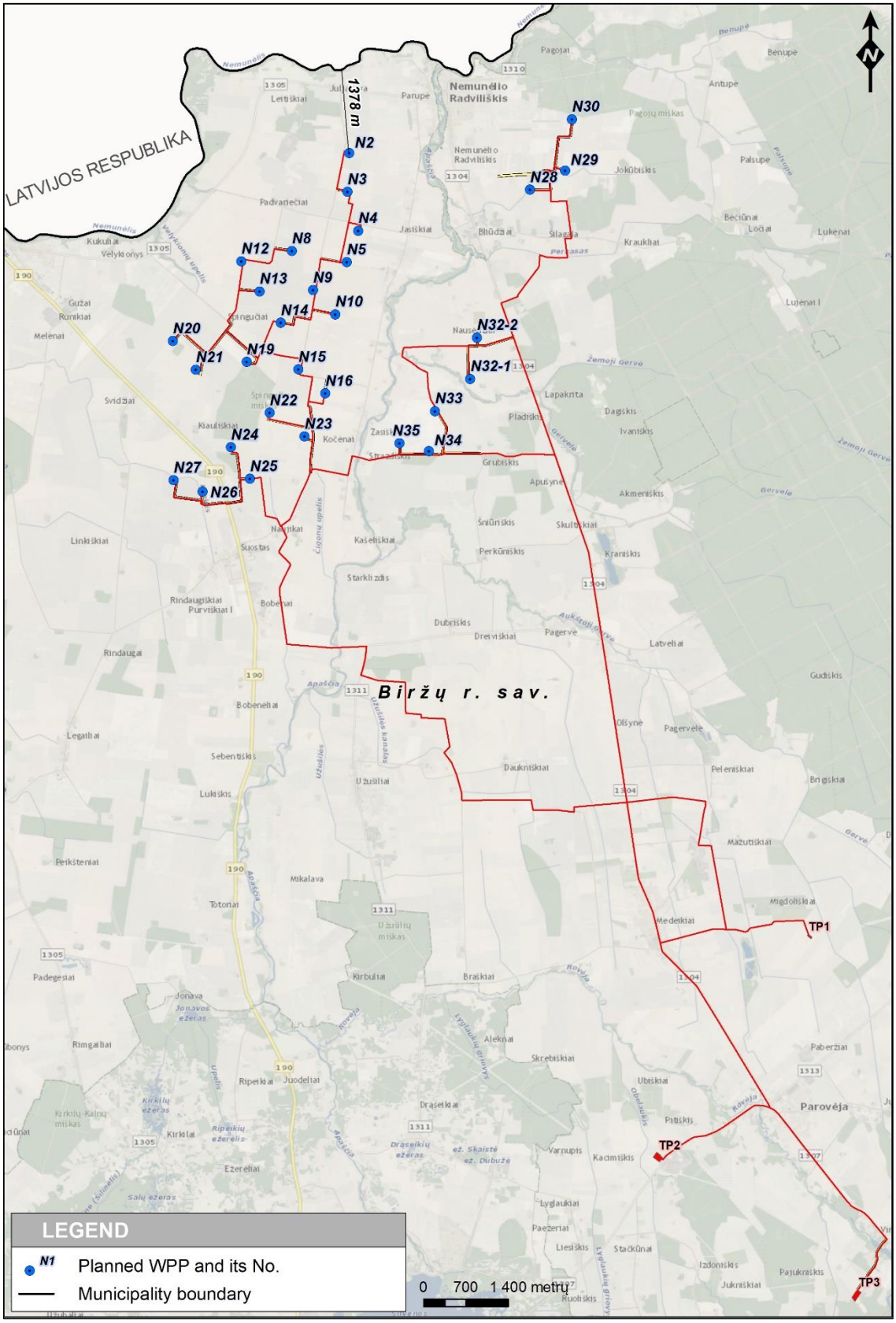

Figure 5. Recommended scope of PEA objects