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SUMMARY OF THE EIA REPORT FOR PROJECT “WINDFARM OF UP TO 6 WIND TURBINES IN AKMENĖ DISTRICT MUNICIPALITY, KRUOPIŲ ELDERSHIP, C1 ZONE”

In response to the request for participation in the transboundary Environmental Impact Assessment for project “Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone”, expressed in letter of Environment State Bureau of the Republic of Latvia dated October 19, 2020 (No 5-01/961), Ministry of Environment of the Republic of Lithuania hereby presents an extended summary of the EIA report (in English). The document is also available online: http://am.lrv.lt EN Activities Environmental Impact Assessment of the Proposed Economic Activity Environmental Impact Assessment in a Transboundary Context Proposed construction of wind power plants in Akmenė district municipality, Kruopiai ward C1 zone (ON-GOING TRANSBOUNDARY EIA).

In order to ensure an open and transparent EIA and decision making process, we kindly ask you to provide the enclosed information to the Latvian public and relevant authorities.

We are looking forward to your comments or proposals and kindly ask to inform us about the preferred method of further consultations by the 1st of July, 2022.

Enclosed: Summary of the EIA report for project “Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C zone” (in English).

Yours sincerely,

Head of Pollution Prevention Policy Group
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WINDFARM AKMENĖ TWO, UAB, WINDFARM OF UP TO 6 WIND TURBINES IN AKMENĖ DISTRICT MUNICIPALITY, KRUOPIŲ ELDERSHIP, C1 ZONE

SUMMARY OF ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PEA organizer (customer)	Windfarm Akmenė Two, UAB
EIA documents compiler	Nomine Consult, UAB

Vilnius 2022

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NAME OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PLANNED ECONOMIC ACTIVITY	*WINDFARM AKMENĖ TWO, UAB, WINDFARM OF UP TO 6 WIND TURBINES IN AKMENĖ DISTRICT MUNICIPALITY, KRUOPIŲ ELDERSHIP, C1 ZONE*
LOCATION OF PLANNED ECONOMIC ACTIVITY	Akmenė district municipality, Kruopių eldership, village Bambalų
VERSION	01
YEAR	2022
PLANNED ECONOMIC ACTIVITY ORGANIZER (CUSTOMER)	Windfarm Akmenė Two, UAB, Gedimino pr. 9, LT-01103 Vilnius, www.uab-windfarm.com, contact@uab-windfarm.com, +370 614 58636

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Contents

Abbreviations

EPA	Environmental Protection Agency
RES	Renewable energy sources
AIHP	Area important for habitat protection
GP	General plan
LR	Republic of Lithuania
AIPB	Areas important for the protection of birds
EIA	Environmental impact assessment
PEA	Planned economic activity
SPZ	Sanitary protection zone
WT	Wind turbine

Introduction

Planned economic activity (hereinafter – the PEA) – Windfarm Akmenė Two, UAB, windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone[1].

PEA location – Akmenė district municipality, Kruopių eldership, village Bambalų

PEA organizer – Windfarm Akmenė Two, UAB.

In 2018, the Seimas of the Republic of Lithuania updated the National Energy Independence Strategy (hereinafter - the Energy Strategy), which stipulates that in order to significantly strengthen the independence of Lithuanian energy and reduce greenhouse gas emissions, the share of renewable energy sources (hereinafter - RES) in the electricity consumption balance must reach up to 30 percent in 2020, up to 45 percent in 2030, and up to 100 percent in 2050.

The Energy Strategy stipulates that the development of renewable energy sources in Lithuania must be carried out (i) using the latest and most efficient technologies and (ii) under market conditions (without state subsidies), i.e. in accordance with (i) the principle of gradual integration of renewable energy sources into the market - "the most cost-effective technologies must be developed, taking into account the maturity of the technologies and considering the tendencies of their near-term progress" and (ii) the principles of affordability and transparency - "the design of the scheme for the promotion of renewable energy sources must be based on the market principle, minimize distortions and ensure a minimum financial burden on consumers, clarity and a non-discriminatory competitive environment"[2].

Windfarm Akmenė Two, UAB, as it is enshrined in the Energy Strategy, plans to build a wind farm based on the latest technologies in Akmenė district municipality, Kruopių eldership, village Bambalų.

This Environmental Impact Assessment (hereinafter – EIA) is carried out in accordance with the Law on Environmental Impact Assessment of Planned Economic Activity No. I-1495 of 15-08-1996 (hereinafter – the EIA Law) and other legal acts of the Republic of Lithuania (wordings of legal acts relevant during the preparation of EIA are applied) and the letter No. (30.2) -A4E-11777 of the Environmental Protection Agency of 16-12-2020 “On the Approval of the Environmental Impact Assessment Program”.

According to the EIA Law, the goals of the EIA are:

[1] Enumeration of zones according to the special plan for the location of wind farms in the territory of Akmenė district municipality approved by the decision T-214 of the Council of Akmenė district municipality of 21-10-2011.
[2] Chapter V of Energy strategy, p. 23

1. to identify, describe and assess the possible direct and indirect impact of the PEA on the elements of the environment, material values, immovable cultural values and the interaction between these elements;
2. to identify, describe and assess the possible direct and indirect effects of biological, chemical and physical agents on public health, as well as on the interaction between environmental elements and public health;
3. to identify the possible impact of the PEA on the elements of the environment and public health due to the risk of vulnerability of the planned economic activity due to extreme events and/or possible emergency situations;
4. to identify measures which are envisaged to prevent, reduce or, if possible, offset any significant adverse effects on the environment and public health which are likely to occur;
5. to identify whether the PEA, taking into account its nature, location and/or impact on the environment, complies with the requirements of environmental protection, public health, protection of immovable cultural heritage, fire and civil safety legislation.

According to the EIA Law and the EIA Program Coordination Documents, the following are the subjects of the environmental impact assessment processes:

- Akmenė district municipality administration;
- Šiauliai Department of the National Public Health Center under the Ministry of Health;
- Šiauliai Fire and Rescue Board of the Fire Protection and Rescue Department under the Ministry of the Interior;
- State Service for Protected Areas under the Ministry of Environment.

The responsible authority that will make a decision on the possibilities of the planned economic activity is the Environmental Protection Agency.

The public shall be informed about the environmental impact assessment process in accordance with the Order No. D1-885 of the Minister of Environment of the Republic of Lithuania of 31 October 2017 “On Approval of the Description of the Procedure for the Environmental Impact Assessment of the Planned Economic Activity”.

1. Information on the planned economic activity

Planned economic activity (hereinafter – the PEA) – Windfarm Akmenė Two, UAB, windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone [3].

PEA location – Akmenė district municipality, Kruopių eldership, village Bambalų

PEA organizer – Windfarm Akmenė Two, UAB.

This Environmental Impact Assessment (hereinafter - EIA) is carried out in accordance with the Law on Environmental Impact Assessment of Planned Economic Activities No. I-1495 of 15-08-1996 (hereinafter - the EIA Law) and other legal acts of the Republic of Lithuania (legal acts relevant during the preparation of the EIA are applied).

It is planned to build the following types of wind turbines on the wind farm (see the table below).

Table 1. PEA WT and their technical characteristics[4]

Manufacturer	**Technical characteristics of wind turbines**					
	Siemens Gamesa	**Vestas**			**General Electric**	**Nordex**
Model	**SG 6.0-170**	**V162-6.2**	**V162-6.8**	**V162-7.2**	**GE 6.1-158**	**Delta 4000 - N163 6.8**
Nominal power (MW)[5]	6,2	6,2	6,8	7,2	6,1	6,8
Tower height (m)	155	149, 159	149, 159	149, 159	161	159
Rotor diameter (m)	170	162	162	162	158	163
Total height (m)[6]	240	230, 240	230, 240	230, 240	240	240,5
Noise level emitted (dB)	106,0	104,8	104,5	105,5	107,0	106,4

The parameters of the WT models planned to be built vary within these limits:

- Tower height – 149-161 m;
- Rotor diameter – 158-170 m;

[3] Enumeration of zones according to the special plan for the location of wind farms in the territory of Akmenė district municipality approved by the decision T-214 of the Council of Akmenė district municipality of 21-10-2011.
[4] During the implementation of the project, other alternatives to WT models are possible, the noise or shading pollution of which outside the SPAs specified in the EIA report will not exceed the permissible values. Also During the preparation of the Technical Project, WT models can be replaced by other models without increasing the maximum parameters of WT height, rotor diameter and noise level specified in the EIA documents.
[5] Preliminary indicator, which may be revised during the preparation of the Technical Design.
[6] The total height is calculated as the sum of the tower height (m) and the ½ rotor diameter (m).

- Total height of WT – 230-240,5 m;
- Noise level emitted – 104,5-107 dB

During the PEA, WTs will be brought to the construction site, unloaded and installed with the help of special cranes. Depending on the weight of the WT and safety requirements, steel bars and special concrete for foundations will be used during the construction. Once the foundations have been formed, WT towers, rotors and blades will be installed.

During and after the implementation of the PEA local roads are planned to be used to access the WTs. The access roads that will be available during the construction of the WTs will be coordinated with the Ministry of Transport and Communications or its subordinate institutions and Akmenė District Municipality and interested communities before the implementation of the PEA. It is planned that the condition of the roads that will be used to implement the PEA solutions will be assessed and recorded on visual material (photographs and / or video) in order to repair or compensate for the damage caused after the construction. It should be noted that the roads will not change the capacity of the existing drainage ditches.

The electricity generated by WTs will be connected to the connection point specified in the connection conditions of the electricity network operator by underground electric cable lines. Underground power cables can be laid through public (in agreement with the National Land Service) or private (having obtained a consent) plots of land. Underground power transmission lines are expected to run along existing forest roads or quarter lines.

During the construction and operation, the land plots, which will be used by WTs, will be leased/redeemed in installments and the main purpose of the use of the plot will be changed to “Other” (territories of communication and engineering communications service objects). Land plots for which the purpose of use will be changed from agricultural land to the land for other purposes will be formed on 1.5 ha. This area will be used both for the construction of wind turbines, for their maintenance and at the expiry of the turbine’s life, for the dismantling of it. Under the agreement with the landowners, after the cessation of activities, the plot will be merged and the land will be returned to the original status that was in force before the change of the purpose of land use.

It is planned to connect wind turbines to the transmission network by building a new transformer substation (local coordinates LKS-94: 6233247, 437559). The technical parameters and data of the new transformer substation will be updated during the preparation of the Technical Design. If necessary, the transformer substation can be moved to adjacent plots near the overhead line, the owners of which do not object to its construction.

Chemicals and raw materials will not be used during the PEA. Wind energy will be used during the operation of the wind farm. Wind energy will be converted into electricity during the PEA, which will be transmitted to electricity transmission networks. Wind energy is a renewable energy source, and the development of wind farms in Lithuania is a task of national importance.

1.1. Location of the planned economic activity

PEA location – Akmenė district municipality, Kruopių eldership, village Bambalų. A map of the area where the economic activity is planned with the adjacencies is shown in the figure below.

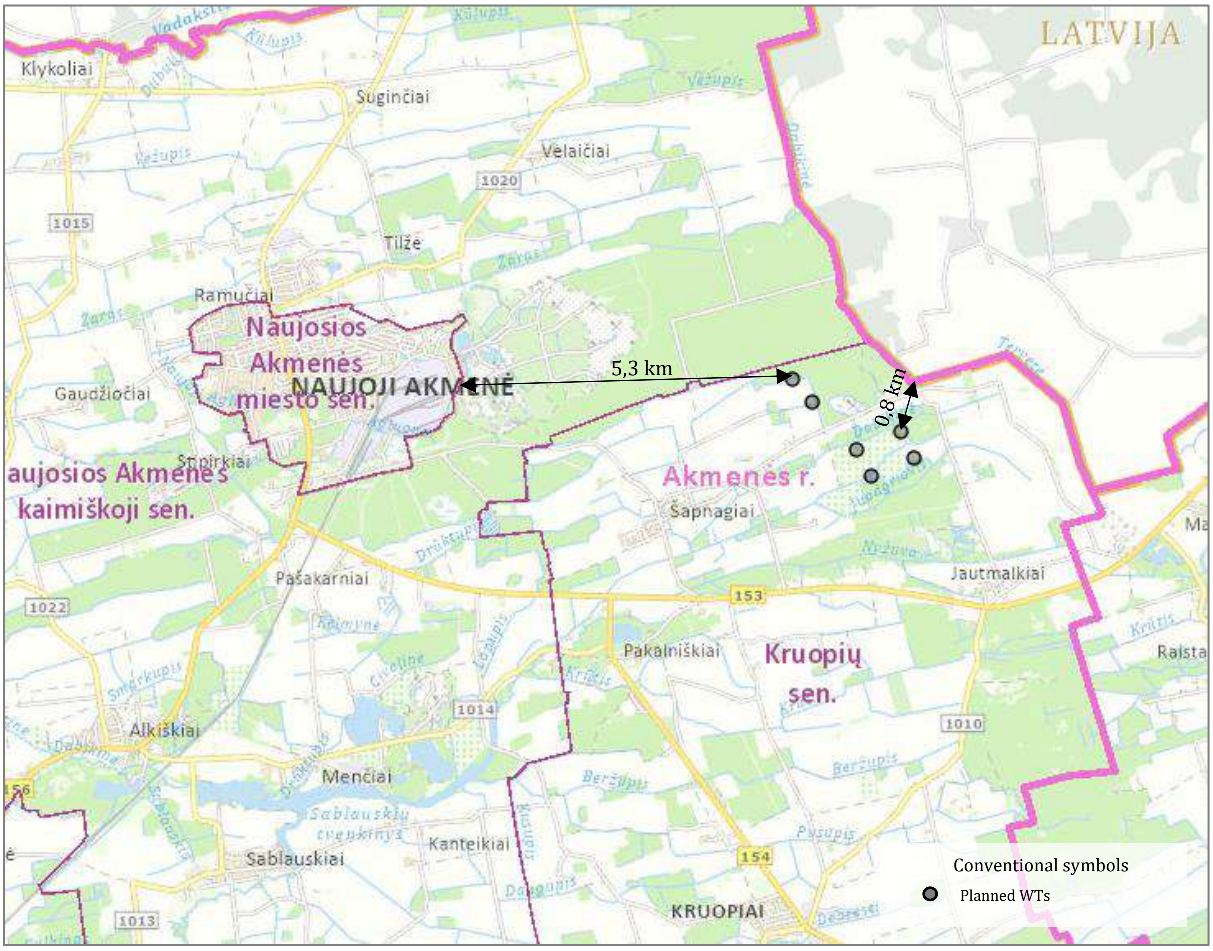


Fig. 1. Map of the area where the economic activity is planned with the adjacencies

The PEA territories are approximately 5.3 km away from Naujoji Akmenė, the nearest WFs are 0.8 km away from the Lithuanian-Latvian border, and about 2.2 km away from the village Šapnagiai[7].

The numbering, location coordinates [8] (LKS-94) and address of the planned WFs are given in the table below.

Table 2. Enumeration and locations of the WT of the PEA

WT No.	Coordinates (LKS-94)		Address
34	440449	6241981	Akmenė district municipality, Kruopių eldership, village Bambalų
35	440792	6242597	
36	440096	6242301	

[7] When measuring the distance to the village Šapnagiai, the nearest living environments are evaluated according to the visual average.

[8] The coordinates of the specified WT location are understood as any WT foundation location.

WT No.	Coordinates (LKS-94)		Address
37	441041	6242183	
38	439317	6242928	
39	439169	6243391	

Note: The location of the WT may change up to 30 m, if during the preparation of the Technical Design it is established that the foundation of the WT cannot be installed in the places provided in the table.

The WT Park is planned to be built and operated on the plots of Bambalai village in Kruopiai eldership, their purpose of use is agricultural; ownership of plots - private.

The layout scheme of WT is shown in the figure below.

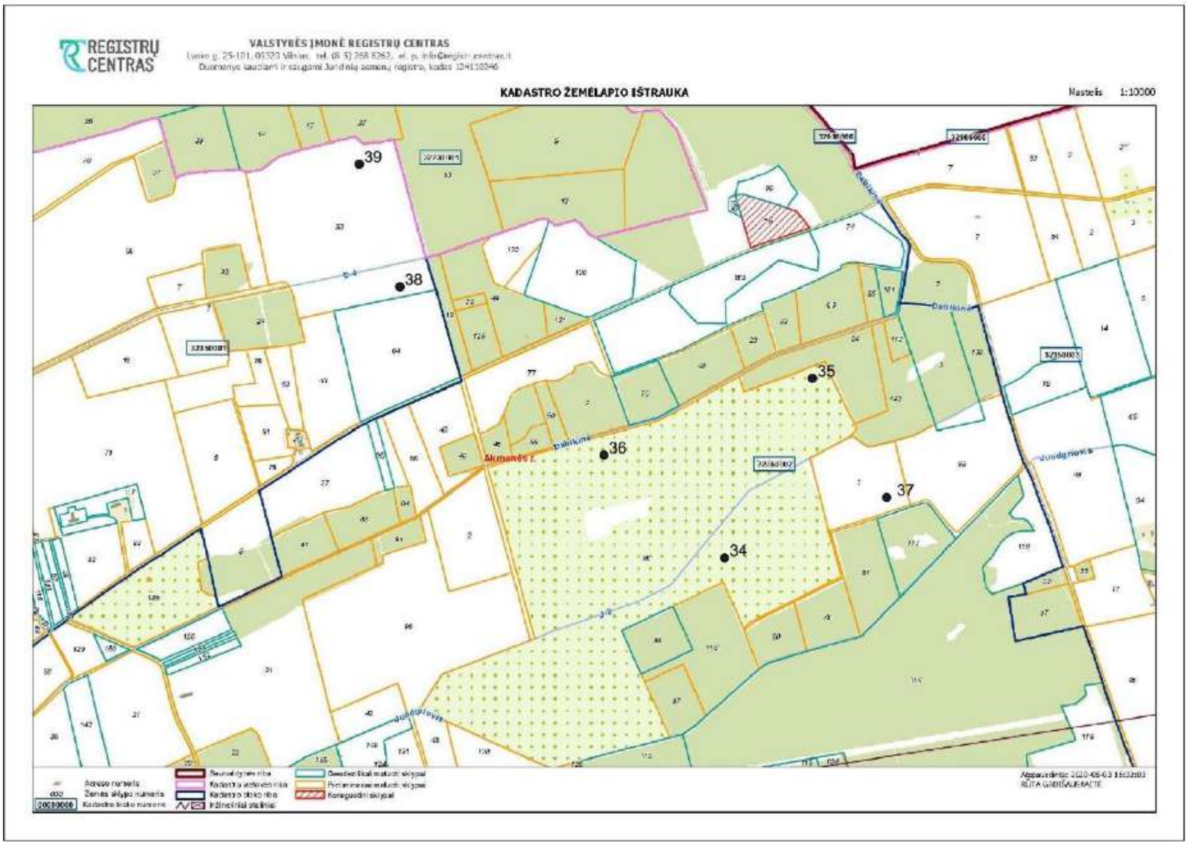


Fig. 2. Situation scheme of the PEA

During the preparation of the EIA documents, the PEA territory was selected taking into account the special plan (hereinafter - SP) for the location of wind farms in the territory of Akmenė district municipality approved by the decision No.T-214 of the Akmenė district municipality council of 21-10-2011. According to the SP, the PEA area falls within the layout areas of the C-1 WT group. Akmenė District Municipal Council by Decision No. T-145 of 28-06-2021 "On the Approval of the Amendment to the General Plan of the Territory of Akmenė District Municipality" (hereinafter - GP) approves the "Scheme for Determination of Wind Farm Territories", according to which the PEA enters potential areas for WT installation. The PEA does not contradict the decisions of the GP (see the figure below).

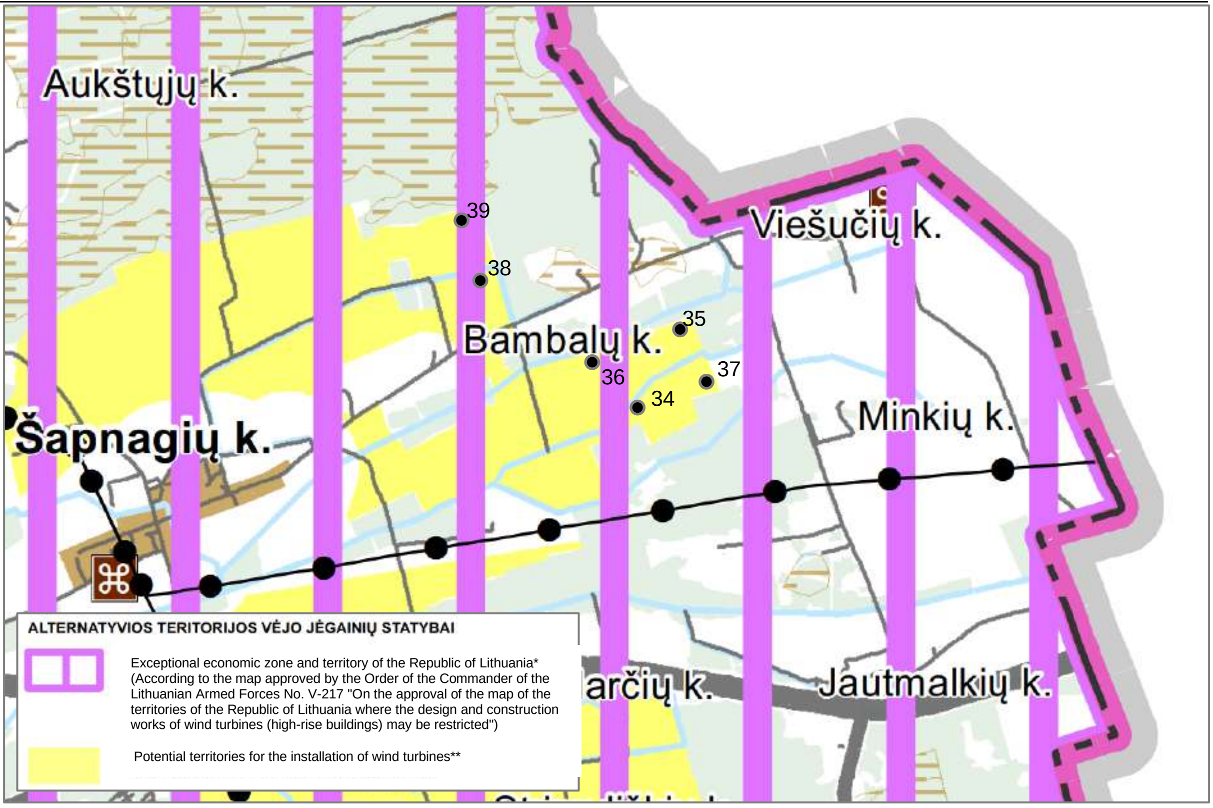


Fig. 3. Extract from the GP "Scheme for the designation of wind farm areas"

The general plan states that "The installation of wind turbines is not recommended in the vicinity of compactly built-up areas (at a distance of 500 m)." It should be noted that the mentioned distance is maintained with the reserve, because the nearest compactly built-up residential area is the village Šapnagiai, which is about 2.2 km away from the PEA site.

1.1.1. Neighborhoods of the planned economic activity

On the northern side of the planned wind farm there is a state forest - Lydmiškis. The eastern and southern boundaries of the area are surrounded by smaller wooded areas, while the western part is dominated by the areas of arable agricultural purpose. There are no protected areas in the PEA territory (state reserves, national or regional parks, nature reserves, biosphere reserves). The nearest natural heritage object is Raistu Linden, which is located about 5 km away from the nearest WT territory of the PEA. The nearest protected area in the adjacent territory is Žagarė Regional Park (about 8 km from the nearest WT territory of the PEA).

The nearest compact construction area is Šapnagiai village, which is about 2.2 km away from the PEA. According to the data of 2022, the population of Šapnagiai village reached 118. The territory of the planned wind farm is approximately 5.3 km east of Naujoji Akmenė, and 0.8 km west-southwest of the Lithuanian-Latvian border.

According to publicly available information, there are more wind farms planned in Akmenė district municipality, which according to the decisions of territorial planning documents do not contradict the development of wind farms: UAB Windfarm Akmenė One, UAB Windfarm Akmenė Two, UAB Vėjo parkai, UAB Saulės vėjo energija, UAB

Ekoinvesta, UAB Santix WF, UAB Vėjo miestas WF are planned and existing UAB Ekoinversta and UAB Vėjo technologijų projektai Wind farms. The layout of the planned and existing wind farms is shown in the figure below.

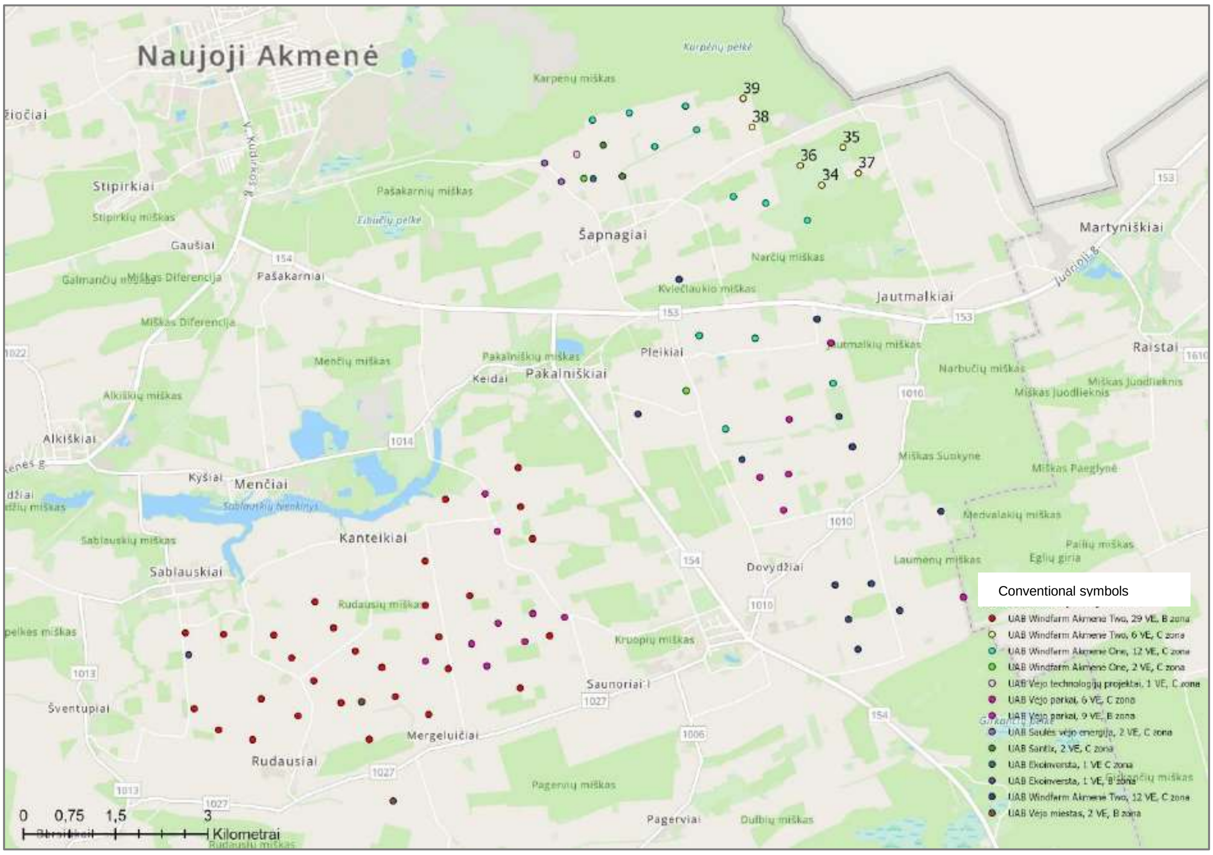


Fig. 4. Existing and planned wind farms in Akmenė district municipality

There are no public facilities: schools, hospitals, kindergartens on the adjacent surrounding land plots.

7.6 km southwest from the nearest WT 34 there is Akmenė district Kruopiai basic school, at the address Papilės g. 14, Kruopiai; 7.7-9.2 km west from the WT 39 there is Naujoji Akmenė Music School, at the address Akmenė district municipality, Naujoji Akmenė town, P. Jodelės g. 6, Naujoji Akmenė "Saulėtekis" progymnasium, at the address V. Kudirkos g. 11, Naujoji Akmenė, Naujoji Akmenė kindergarten "Atžalynas", at the address Akmenė district municipality, Naujoji Akmenė town, Respublikos g. 4, Akmenė District Youth and Adult Education Center, at the address Vytauto g. 3, Naujoji Akmenė, Naujoji Akmenė kindergarten "Žvaigždutė", at the address Respublikos g. 22, Naujoji Akmenė, Naujoji Akmenė kindergarten "Buratinas", at the address Akmenė district municipality, Naujoji Akmenė town, Ramučių g. 1, Naujoji Akmenė Ramučiai Gymnasium, at the address Ramučių g. 5, Naujoji Akmenė.

Nearest health care institutions: 9.0 km west of the WT 39 territory is the Akmenė District Primary Health Care Center, UAB Antano Lizdenio Health center, Naujoji Akmenė, Akmenė District Mental Health Center, at the address Žemaitijos g. 6, Naujoji Akmenė.

The nearest residential buildings in relation to the PEA site are listed in the table and figure below.

Table 3. The nearest residential buildings in relation to the PEA site

Marking of the residential environment	Address	Distance to the nearest planned WT
B	Akmenė district municipality, Kruopių eldership, village Šapnagių.	2,1 km, south from WT 38
C	Akmenė district municipality, Kruopių eldership, village Bambalų 1	1,3 km, south-west from WT 34
Z	Akmenė district municipality, Kruopių eldership, village Bambalų 2	0,6 km, north from WT 38

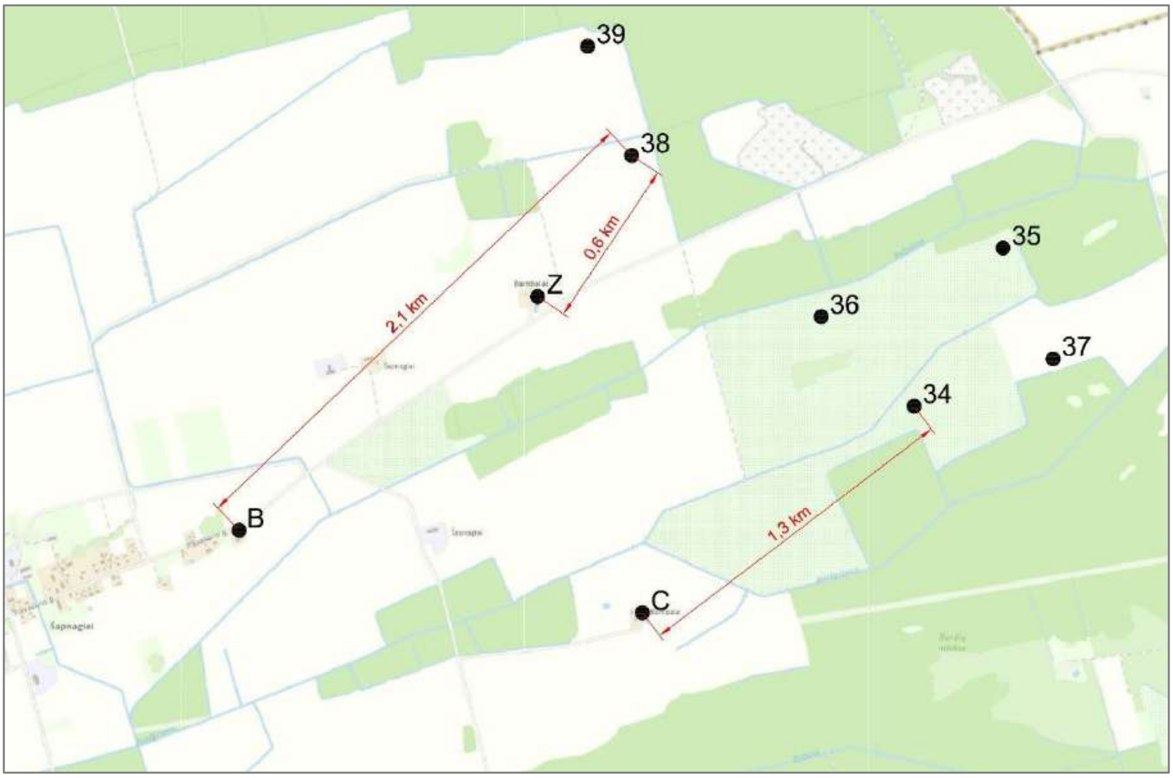


Fig. 5. Nearest residential buildings and distance to PEA WT

1.2. Physical and technical characteristics of the planned economic activity

1.2.1. Activity stages, build up area, infrastructure

The EIA procedure is carried out before the design solutions preparation stage. Specific technological solutions will be selected and specified during the design. Preliminary PEA design and construction period: 2022-2023.

It is intended that local roads will be used to access the WTs during and after the implementation of the PEA. The access roads that will be available during the construction of the WTs will be coordinated with the Ministry of Transport and Communications or its subordinate institutions and the Akmenė district municipality and interested communities before the implementation of the PEA. It is planned that the condition of the roads that will be used to implement the PEA solutions will be assessed and recorded on visual material (photographs and/or video) in order to repair or compensate for the damage caused after the construction.

The electricity generated by WTs will be connected to the connection point specified in the connection conditions of the electricity network operator by underground electric cable lines. Underground power cables can be laid through public (in agreement with the National Land Service) or private (having obtained a consent) plots of land. Underground power transmission lines are expected to run along existing forest roads or quarter lines.

1.2.2. Planned economic activity alternatives

At this stage of the PEA, specific technological alternatives of the wind turbines have already been evaluated, selected and named, taking into account the models offered on the market of wind power producers, delivery possibilities, and compliance of the models with the climatic conditions of Akmenė district. The EIA procedure assesses the potential environmental impact of the selected technological alternatives by assessing the maximum (worst case scenario) criterion and comparing it with option 0 when the PEA is not implemented.

The following alternatives are evaluated and analyzed:

- Types of WTs Wind farm of 6 WTs in Akmenė district municipality, Kruopiai eldership, village Bambalų:
  - Rotor diameter of one wind turbine – 170 m, tower height – 155 m, total height – 240 m, noise emission – 106,0 dB(A);
  - Rotor diameter of one wind turbine – 162 m, tower height – 149, 159 m, total height – 230, 240 m, noise emission – 104,8 dB(A);
  - Rotor diameter of one wind turbine – 162 m, bokšto aukštis – 149, 159 m, total height – 230, 240 m, noise emission – 104,5 dB(A);
  - Rotor diameter of one wind turbine – 162 m, tower height – 149, 159 m, total height – 230, 240 m, noise emission – 105,5 dB(A);
  - Rotor diameter of one wind turbine – 158 m, tower height – 161 m, total height – 240 m, noise emission – 107,0 dB(A);
  - Rotor diameter of one wind turbine – 163 m, tower height – 159 m, total height – 240,5 m, noise emission – 106,4 dB(A).
- 0 alternative – PEA is not developed and implemented; the current condition is described according to the situation in 2021-2022.

Taking into account the decisions of state institutions and in order to minimize the impact on the landscape, but maintaining the strategic goals set in the Energy Strategy to use the latest technologies and develop the wind farm without state and electricity consumer subsidies/support, it was decided that the height of the WT will be limited in the selected development area of the wind farm, therefore the height of the WT will not exceed 241 m.

In order to compare the project implementation alternative with the “0 activity alternative”, the analysis of the alternatives is carried out, based on the methodology provided by the European Environment Agency (EEA) and a multi-criteria analysis - the Leopold matrix. The multi-criteria analysis assesses the potentially significant direct, indirect, short-term, medium-term, long-term, permanent, temporary, positive and negative impacts on the components of the environment. The results of the analysis are presented in Section 2.10.

1.2.3. Technological processes

The technological process of the PEA consists of:

- electricity generation;
- transmission of generated electricity to existing electricity transmission networks.

The basic scheme of the technological process of wind turbines is presented in the figure below.

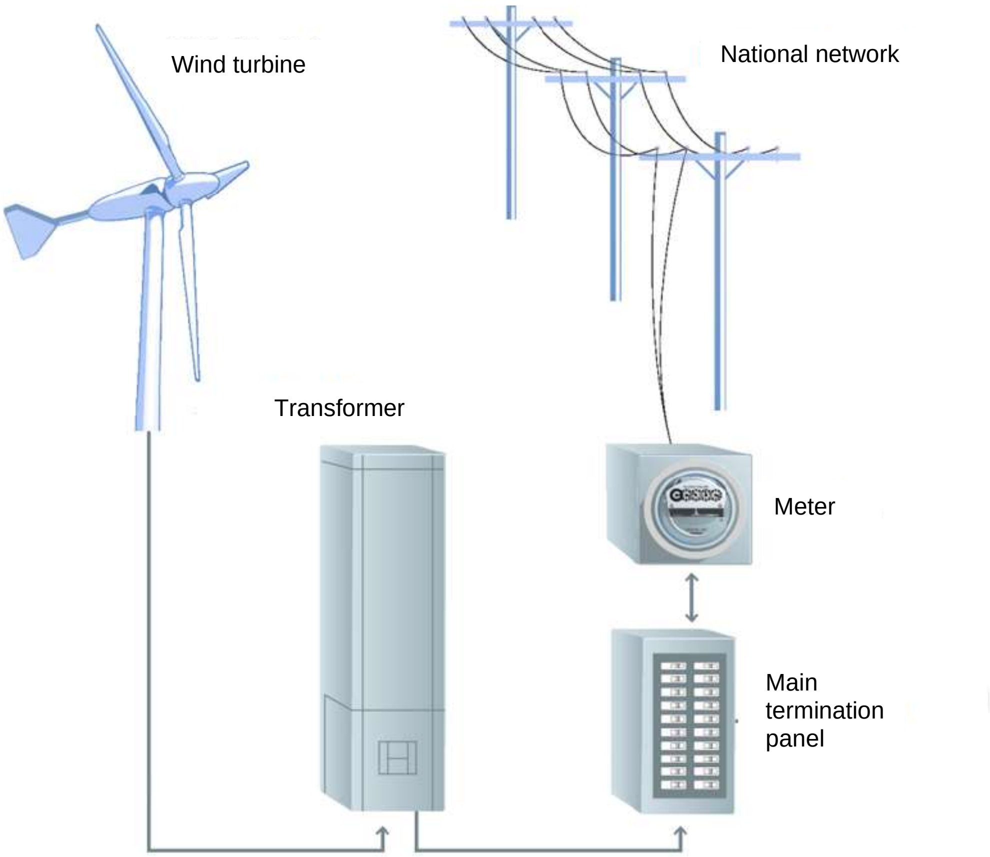


Fig. 6. Basic scheme of technological process[9]

The main components of a wind turbine are:

- foundation;
- tower;
- stator, rotor with generator;

[9] E., Anderson; M., Antkowiak; R., Butt; R., Robichaud. 2011. Broad Overview of Energy Efficiency and Renewable Energy Opportunities for Department of Defense Installations.

- blades.

The foundation (foundation diameter is about 27-30 m) is the supporting element of the tower. It ensures the stability of the wind turbine, withstands all the loads of the wind turbine. The height of the foundation from the ground is about 1-2 m.

The blades and the main wind cell are mounted on top of the tower. The tower is designed so that the rotor blades are kept at the desired distance from the ground depending on the wind speed. The equipment and hoist required for the maintenance of the wind turbine are installed inside the tower. The towers are made of solid connecting steel pipes or structural - welded in blocks of steel parts.

The stator of a wind farm consists of a rotor and a generator. The energy of the wind gust begins to rotate the rotor blades and thus energy is generated in the stator windings. The rotor is connected by one gear to the generator. The construction of the blades has good aerodynamic features and resistance to external factors.

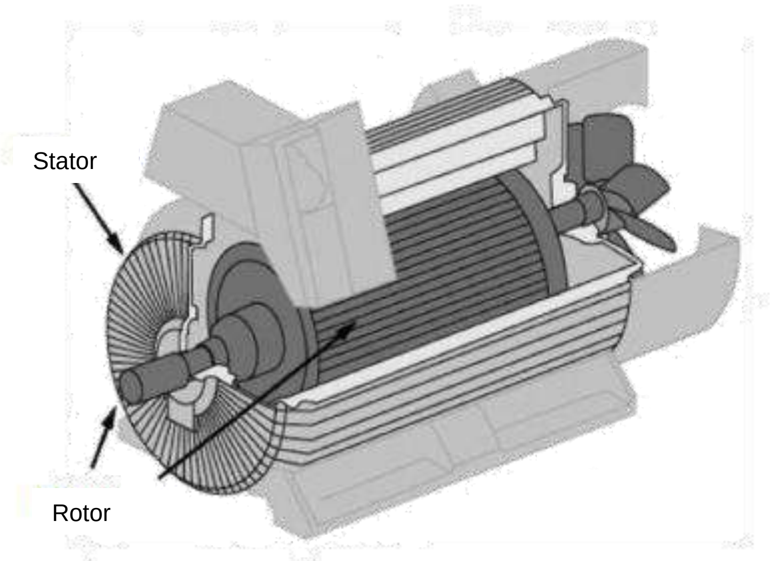


Fig. 7. Generator cross-section[10]

The wind farm is equipped with control and safety systems (braking and lightning protection).

The rotor starts to rotate when the wind speed reaches 2.5-3.0 m/s and must be stopped when the wind speed reaches about 25 m/s (depending on the wind turbine model).

The wind turbine is stopped by turning the rotor blades to the appropriate position and at such an angle that the resulting gusts of wind do not allow them to rotate. The rotor can only be stopped completely when it is idling - the rotation shaft is subjected to additional loads (with the mechanical brakes applied). The rotor is only stopped

[10] Nelson, V. 2009. Wind energy: Renewable Energy and the Environment. CRC Press: 140 p.

completely in an emergency or in the event of a repair. When the wind turbine is switched off, the rotor is not completely stopped - it rotates freely at low speed.

If it is necessary to stop the rotor completely, it is always stopped by first turning the blades and using aerodynamic resistance, and only then with the help of mechanical brakes.

In order to protect the wind farm during lightning, it is equipped with effective protection against lightning discharges. The ends and corners of the blades are covered with an aluminum profile connected to an aluminum ring. The aluminum ring is installed where the impellers are attached to the rotor. Aluminum profiles absorb lightning discharge and direct it downwards to the foundation where the earthing devices are installed.

The wind turbine is controlled remotely by a microprocessor. It receives the information transmitted by the sensors (wind speed, direction, etc.) and determines all the necessary commands for the wind turbine control elements. During the operation of the turbine, the system measures the incoming loads and adjusts the rotor speed and the angle of rotation of the blades accordingly, taking into account the changing wind conditions. The wind turbine is launched when the required wind speed is reached and maintained for a sufficient time, and when the wind speed exceeds the nominal value, the angle of rotation of the blades is changed and the rotation speed is reduced with the help of aerodynamic forces. All safety-related functions (rotor speed, temperature, loads, vibration) are monitored via electronic information systems. In the event of a failure of this system, a mechanical safety system is activated. If the system registers a problem that could cause an accident, the wind turbine is shut down immediately.

The wind turbine is also equipped with a signal lighting system to warn aircraft of a possible obstacle at night or in poor visibility.

Such a fully automated wind turbine management system guarantees the safety and efficiency of the wind turbine.

1.2.4. Data on production, the use of energy, raw materials, and chemical substances

Only inexhaustible wind power will be used during the implementation of the planned economic activity. The use of raw materials, chemical substances and preparations (mixtures), including hazardous substances and preparations, radioactive substances, hazardous and non-hazardous waste is not foreseen.

1.2.5. Data on waste

The generation of hazardous, non-hazardous and radioactive waste is not expected during the operation of the planned economic activity. Small amounts of non-hazardous waste (metal and mixed construction waste) may be generated during the construction of the WF. This waste will be stored in special containers and transported for further treatment under contracts with waste managers. The generated waste will be managed in accordance with the requirements specified in the Order No. 217 of the Minister of Environment of the Republic of Lithuania of 14 July 1999 “On the Approval of the Waste Management Rules”.

2. Impact of the planned economic activity on environmental components and measures to reduce the impact on the environment

2.1. Water

2.1.1. Current condition

According to the cadaster of rivers, lakes and ponds of the Republic of Lithuania, there are several small streams in the territory of the WF of the PEA: Dabikinė, Juodriovis, D-4 and J-2. Coastal protection zones and zones for surface water bodies have been established for these streams.

The distances from the planned WTs to the nearest reservoirs (assessed types: 1 and 2) are given in the table and in the figure below.

Table 4. Distances from the WTs of the PEA to the nearest water bodies

Name of river, type	No. of wind turbine	Distance, m
Dabikė, 1	36	125
	35	140
Juodgriovis, 1	37	280
D-4, 1	39	390
	38	90
J-2, 1	34	65
	37	190

Pursuant to the requirements of the Law on Special Conditions of Land Use of the Republic of Lithuania No. XIII-2166 of 6 June 2019, no works intended by the PEA are planned in the protection zones of surface water bodies.

Underground power cables to connect wind farms to the grid are intended to cross rivers or canals in several places (the impact is assessed in Chapter 2.5). Underground power cables in these areas will be laid by directional drilling in accordance with the requirements of the legislation and with the least possible impact on the environment. New river/canal culverts can be installed if required. The location of the WTs in relation to the water bodies is shown in the Figure below.

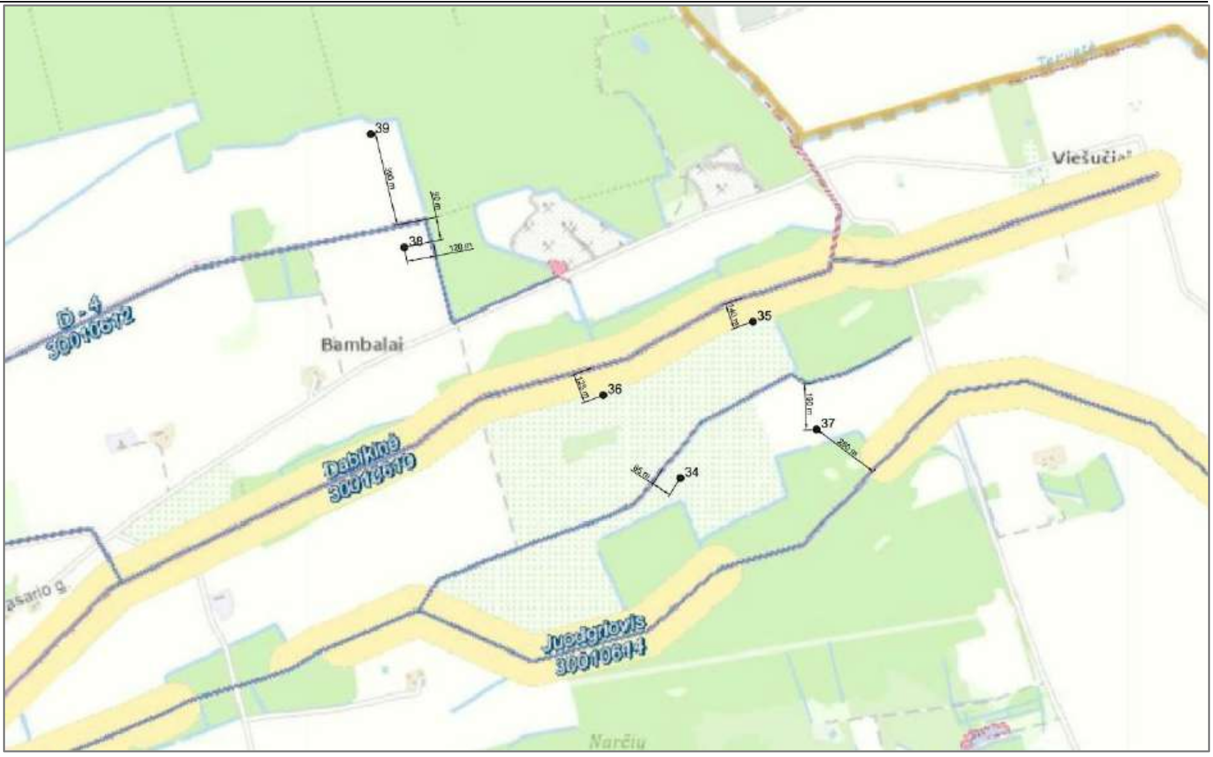


Fig. 8. Cadaster of Lithuanian rivers, lakes and ponds (https://uetk.am.lt/)

According to the Flood Threat and Risk Map, the area of WTs of the PEA is not included in this environmentally sensitive area. According to the State Geological Information System (GEOLIS), the area of WTs of the PEA does not fall within the karstic region.

According to the map of groundwater wells of the Lithuanian Geological Survey, the nearest wellfield is:

- Šapnagiai (Akmenė district) wellfield, about 3 km from the PEA, whose register No. 4158, type of resources - drinking fresh water, coordinates of the wellfield (LKS-94): 6241451, 437153.

2.1.2. Expected significant impact

No domestic or industrial wastewater will be generated during the implementation of the PEA wind farm.

It is expected that surface (rain) water from the WT service sites will be discharged to adjacent surfaces (unorganized). The PEA territory is reclaimed by general use reclamation systems. It is planned to preserve the existing reclamation systems and equipment, the other part of the systems is planned to be reconstructed/restored, while preparing the part of the project of the reclamation structures damaged or being reconstructed due to the works being carried out in the stage of Technical Project preparation. It is expected that the owners of the surrounding drained lands will not be affected after the preparation and implementation of the projects for the reconstruction of the reclamation structures. The hydrological regime of the areas in the vicinity of the WF will not change significantly, as these areas are already drained.

None of the WTs falls within the protection zones and zones of surface water coasts..

The construction/installation works of the wind turbines and the engineering infrastructure required for their operation will be carried out without violating the hydrological regime of the adjacent surface water bodies. Where underground power cables will be laid through rivers/canals, they will be laid by directional drilling in accordance with legal requirements and with the least possible impact on the environment. At the places where the newly planned access road to the WT will cross surface water bodies, a passage will be installed at the crossing of the river/canal bed.

Taking into account the current situation described above and the generation/treatment of wastewater, it is assessed that no significant negative impact on the environment is expected due to the implementation of the PEA.

2.1.3. Measures to reduce significant negative impact

In places where underground power cables will be laid through rivers/canals, they will be laid by directional drilling in accordance with legal requirements and with the least possible impact on the environment. At the places where the newly planned access road to the WTs will cross surface water bodies, a passage will be installed at the crossing of the river/canal bed. Based on the planned solutions, no significant negative effects on surface water and groundwater are expected. No other measures to reduce the negative effects on water are provided.

2.2. Ambient air

2.2.1. Current condition

According to the latest data provided by the Environmental Protection Agency (EPA) on the website https://aaa.lrv.lt/lt/veiklos-sritys/oras, there is an air quality research (AQR) station in Naujoji Akmenė, in which air pollution by particulate matter and sulfur dioxide is measured. AQR station – Naujoji Akmenė (coordinates 430147, 6243444 (LKS)) is about 6.5 km away from the PEA territory. According to the data provided by the EPA, the average annual concentration of particulate matter (PM_{10}) is 23.4 µg / m^3, and that of sulfur dioxide (SO_2) is 8.9 µg / m^3. Values of average annual concentrations of ambient air pollutants in relatively clean rural areas of Šiauliai region in 2020 the following concentrations were determined[11]: particulate matter (PM_{10}) concentration is 12,6 µg/m^3, particulate matter ($PM_{2,5}$) – 8,6 µg/m^3, nitrogen dioxide (NO_2) – 3,6 µg/m^3, sulfur dioxide (SO_2) – 2,9 µg/m^3, carbon monoxide (CO) – 190 µg/m^3.

[11] Online access: https://failai.gamta.lt/files/Santykinai_svarios_kaimo_fonines_konc_2020.pdf

2.2.1. Expected significant impact

During the construction and operation of the planned economic activity, chemical pollution may occur only due to the arrival of vehicles with internal combustion engines serving WTs. Following the implementation of the construction of WTs of the PEA, it is expected that a maximum of one vehicle will service 1 wind turbine per day. It is estimated that the amount of pollutants generated from motor vehicles will be insignificant, therefore the chemical pollution of ambient air is not analyzed in detail in the EIA report.

The implementation of the PEA is expected to have an indirect positive impact on the ambient air quality. Wind power is one of the renewable energy sources and its use reduces the consumption of fossil fuels and, at the same time, the emissions of CO_2 and other pollutants into the ambient air. Wind power replaces the fossil fuels that are used to produce electricity. When burned, this fuel emits lots of pollutants: particulate matter, carbon dioxide, sulfur dioxide, nitrogen oxides, heavy metals, etc. Pollutants emitted into the ambient air cause a greenhouse effect, contribute to the climate crisis, cause smog and acid rain, destroying vegetation and oxidizing the soil. Therefore, the use of wind power and the development of wind farms are an important factor in solving environmental problems.

2.3. Climate

Although Lithuania is still considered to be one of the least affected coutries by climate change in the world, the warming climate is already beginning to affect Lithuania's water resources, landscape, ecosystems and biodiversity, ambient air quality, public health, waste management, forestry, agriculture and other areas[12].

The main international instruments governing climate change are the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Seimas of the Republic of Lithuania ratified the UNFCCC in 1995, and in 1998 Lithuania signed the Kyoto Protocol, which was ratified in 2002. The UNFCCC sets a common goal of stabilizing GHG concentrations in the atmosphere without dangerous anthropogenic interactions with the climate system. The Kyoto Protocol is the first step towards this goal.

In 2018, the Seimas of the Republic of Lithuania updated the National Energy Independence Strategy (Energy Strategy), which provides that in order to significantly strengthen Lithuania's energy independence and reduce greenhouse gas emissions (GHG), the share of renewable energy sources (hereinafter - RES) in electricity consumption on the balance sheet should reach 30% in 2020, up to 45% in 2030, and up to 100% in 2050.

GHGs are generated by natural processes and human activities. Emissions result from direct (CO_2, CH_4, N_2O, HFC, SF_6 and NF_3) and indirect (CO, NO_x, NMVOC, SO_2) emissions. Most GHG emissions are reported in CO_2 equivalent, as the various

[12] The amount of greenhouse gases in Lithuania in 2018 and trends 1990-2018. Online access: <http://klimatas.gamta.lt/files/Tendencijos_1990-2018.pdf>.

greenhouse gases are estimated in terms of their global warming potential[13] (determined for each gas separately).

2.3.1. Expected significant impact

The use of RES (e.g. wind power) allows the production of energy while minimizing the impact on the environment. Wind power is one of the renewable energy sources and its use reduces the consumption of fossil fuels and, at the same time, the emissions of CO_2 and other pollutants into the ambient air. Wind turbines do not emit pollutants directly to the environment when generating electricity, but pollution, measured in CO_2 equivalent (CO_2 eq.), occurs during the production, construction, maintenance and end-of-life of WTs, i.e. during the disposal/recycling process.

In order to assess the impact of the planned wind farms on climate change, the amount of CO_2 eq. emitted per amount of energy produced (kWh) is compared. Average CO_2 eq. amount emitted from the production of electricity from different sources is:

- Wind power – 9-18 CO_2 eq./kWh;
- Solar power – 32-90 CO_2 eq./kWh;
- geothermal power – 45-90 CO_2 eq./kWh;
- hydropower – 45-230 CO_2 eq./kWh;
- natural gas – 270-900 CO_2 eq./kWh;
- carbon – 600-1600 CO_2 eq./kWh[14].

Based on the comparable amount of CO2 eq. emitted for the amount of energy produced, it is estimated that the implementation of the PEA will contribute to the indirect positive impact on ambient air quality and climate. In addition, the implementation of the Wind Farm if the PEA will contribute to the share of RES in the electricity consumption balance, which is especially important in order to significantly strengthen Lithuania's energy independence and reduce greenhouse gas emissions.

2.4. Land (its surface and depths), soil

2.4.1. Current condition

The WFs of the PEA are planned to be developed in agricultural areas. According to the State Geological Information System (GEOLIS), there are no geological phenomena and processes in the PEA WF plots. The nearest geotopes: Karpėnai canyon, which is about 4.5 km away from the PEA WF. According to the GEOLIS geomorphological map, moraine, limnoglacial plains predominate in the PEA WF areas. Typical soil types of the PEA territory: wetlands, loamy soils. The soil is dominated by light loam and medium loam.

[13] Global Warming Potential (GWP) is the value of the global warming potential of a GHG relative to its carbon dioxide equivalent; The GWP is calculated from the global warming potential of one kilogram of gas compared to one kilogram of CO_2 over a hundred-year period.

[14] Online access: <https://www.ucsusa.org/resources/benefits-renewable-energy-use#globalwarming>.

2.4.2. Expected significant impact

During the implementation of the PEA, large-scale excavation works will not be performed. Earth moving works will be performed only at the installation sites of WTs. In this part of the plot, a layer of fertile soil will be removed and stored within the site in a designated area. The excavated soil and/or fertile soil layer will later be returned to the area of power cables and transformer management. Power cable installation lines will be leveled, lawns will be restored, and the remaining excavated soil will be distributed in the area, forming WF service sites.

2.4.1. Measures to reduce significant negative impact

It is expected that after the arrangement of the territory, i.e. the leveling of the soil and the return of the fertile layer will not have a negative effect on the soil and land.

2.5. Landscape and biological diversity

2.5.1. Current condition of the landscape

According to the Landscape Assessment and Natural Frame Drawing of the General Plan Change of the Akmenė District Municipality Territory, the analyzed area is classified as a geo-ecological divider (see the figure below) - areas of a weak ecological compensation function. Geoecological divisions - stripes of territories connecting areas of special ecological importance and sensitivity: upstream rivers, watercourses, upland lakes, hill ranges, wetlands, areas of karst distribution and intensive feeding of groundwater. They distinguish large natural geosystems and maintain the overall balance of the natural landscape. Geoecological divisions occupy 12.68% of the total area of the natural framework in Akmenė district.

Pursuant to the Order No. D1-96 of the Minister of Environment of the Republic of Lithuania of 14 February 2007 “On the Approval of the Regulations of the Natural Framework”, the PEA territory included in the natural framework is defined as follows:

- Areas of natural framework with weak geo-ecological potential - moderately forested (40–60%) rural landscape used for intensive agricultural production, areas of non-compactly built-up, scattered or single-farm type villages, drained wetlands, cultivated meadows, pastures or parts thereof which satisfactorily perform ecological compensation functions are identified by territorial planning documents.

The territory of the natural framework, which includes the above-mentioned wind farm, according to the scheme for the determination of the wind farm territories of Akmenė district municipality, is allocated to the construction territories of the wind turbines.

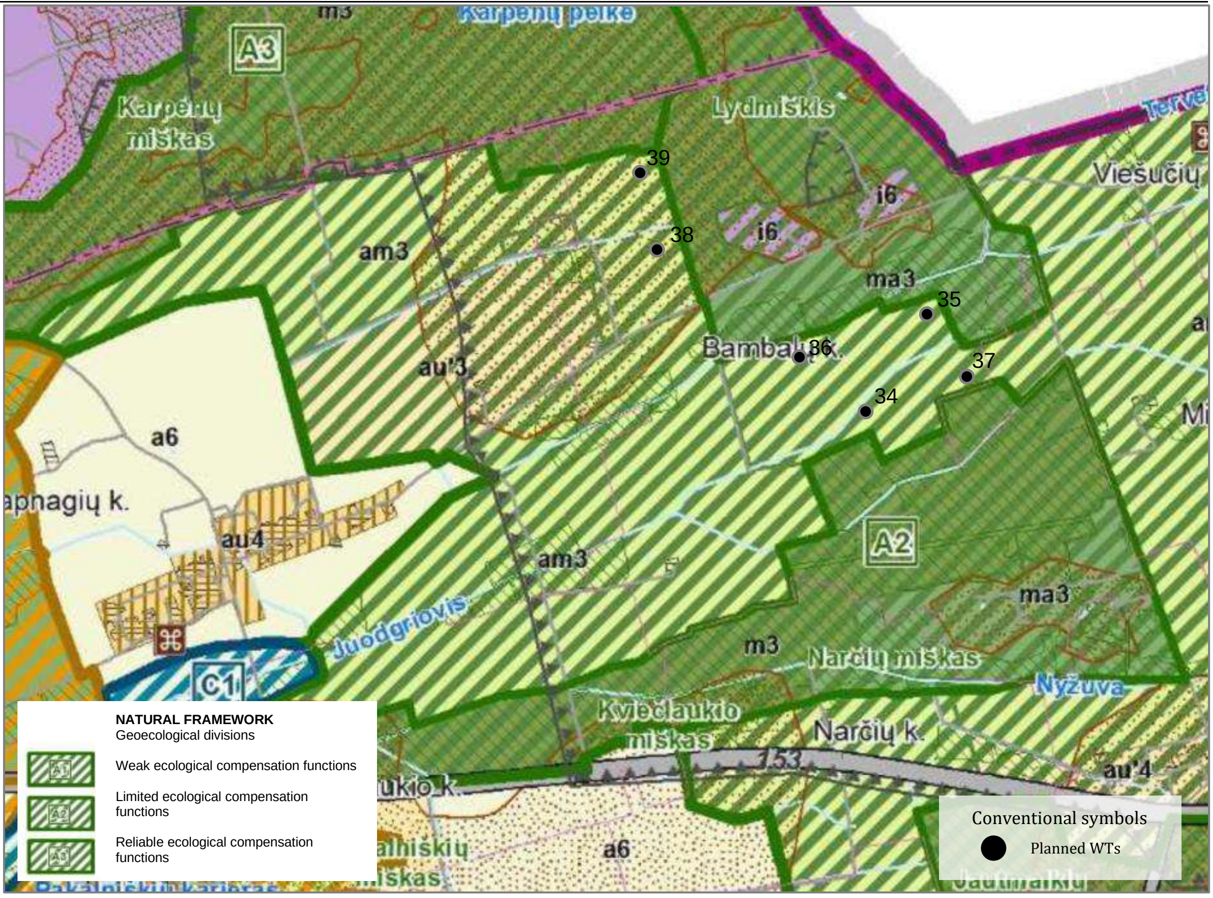


Fig. 9. Extract from the change of the general plan of the territory of Akmenė district municipality Landscape assessment and natural frame drawing [15]

After the implementation of the PEA, the plots into which the WTs will enter will be leased/redeemed for parts and the main use of the plot will be changed to “Other” (territories of communication and engineering communications service objects). According to the said law, the building density of other land plots in the natural framework is limited to 30 percent of the area. These areas must be managed in accordance with the principles of sustainable development. The amount of dependent greenery in the formed plots will meet the requirements provided by legal acts. It should be noted that detailed solutions for land conversion, construction, etc. will be coordinated during the preparation of the technical project.

Appropriate assessment procedures for the impact on the natural landscape and biodiversity shall be carried out when planning economic activities listed in Annex 2 to the Law on Environmental Impact Assessment of Proposed Economic Activities in the territory of the natural framework.

Landscape architect Dr. Jonas Abromas carried out an expert assessment of the impact on the landscape.

The assessment of the impact of wind farms on the landscape has been based on:

- European Landscape Convention;

[15] Online access: https://www.akmene.lt/planavimas/bendrasis-planas/161

- Recommendation CM / Rec (06-02-2008) of the Committee of Ministers of the Council of Europe to 3 Member States on guidelines for the implementation of the European Landscape Convention;
- Description of Lithuanian landscape policies;
- Solutions of the National Landscape Management Plan;
- The Republic of Lithuania study of the diversity of the spatial structure of the landscape and its types;
- Municipal general plans;
- Special plan for the location of wind farms in the territory of Akmenė district municipality and amendment of the general plan for the territory of Akmenė district municipality;
- State Cadastre Database of Protected Areas;
- Database of the Register of Cultural Values;
- Database of the Lithuanian Spatial Information Website
- Etc.

Visual impact of wind turbines on the landscape:

The visibility of wind farms usually covers several types of landscape, so the area of the landscape that is visually affected is important in assessing the visual impact. This identifies the areas of visual impact. The intervals of the visual impact zones of wind farms can usually vary depending on the local relief, the location of the forest massifs, the visual-spatial parameters of the power plants themselves, and other elements of the anthropogenic and natural environment. In all cases, a higher wind turbine with a larger diameter has a greater impact on and changes the local landscape. When viewed from a greater distance, the visual impact decreases accordingly.

Due to the visual-spatial parameters, wind farms become the dominant verticals, change the local landscape, its visual quality, which also affects the quality of the living environment. In order to preserve the regional landscape identity, it is important to assess the potential impact of both existing and planned wind farms on the landscape.

The visual impact of wind farms depends on many characteristics: wind turbine size, color, shape, observation distance, landscape diversity, time of day, and many other factors. Visibility itself usually includes several types of landscape. Therefore, in order to properly assess the visual impact, it is necessary to determine which area of the landscape is visually affected, i.e. it is important to determine the size of the visual impact area of the wind farm. As a result, the identification of the visual impact zone of the wind farm as a visual dominant of the landscape and the assessment of the nature of the impact become particularly relevant.

Intervals of visual impact zones of wind turbines:

1. Domination zone (~ 0-1 km.). The field of view of the wind turbine dominates due to its large scale, changing the image of the immediate environment. The movement of the blades is clear.
2. Zone of partial dominance (~ 1-3 km.). Wind turbines seem large scale and are a significant element of the landscape. However, it does not necessarily dominate the field of observation. The movement of the blades is clearly understood and noticeable.

3. Accent zone (~ 3-7 km.). Wind turbines are clearly visible but no longer visually undesirable. The wind farm is noticeable as an element of the landscape. The movement is noticeable if visibility is good. The wind turbines seem small in the general field of view. Some (due to wind turbines) changes in the landscape are appropriate. Observation is strongly influenced by weather conditions.
4. Subdominant zone (~ 7-10 km.). Wind turbines are less clear, visually reduced in size, but movement is noticeable. As the distance increases, wind turbines become common elements of the landscape.
5. Zone of distant landscape elements (background elements) (> 10 km.). Wind turbines are becoming less significant, in small form. The movement of the blades is only noticeable in good visibility. The overall size of the wind turbines is very small. When viewed from the background element area, visibility is highly dependent on the electrical visual parameters themselves (wind turbine diameter, tower height).

Factors in the visibility of wind turbines in the landscape

The visibility of wind turbines the landscape is determined by many factors that can enhance or reduce the impact. The factors themselves can also be divided as directly dependent on the built wind turbine (spatial parameters, color and materiality), area and time of observation (land use, relief, time of year and day, ancillary infrastructure) and on the observer himself (observation distance, observer dynamism). The following can be distinguished as the most important factors: general spatial parameters of wind turbines, the observation distance and the terrain (see table below).

Table 5. Factors influencing the visibility of WTs in the landscape

Factors influencing visibility	Notes
General spatial parameters of a wind turbine	Existing technologies for the production of wind power towers allow the construction of tall, reliable towers. In Lithuania, most wind turbines with 86 m high towers and 82 m diameter wind blades have been built. The total height of the wind turbine is 120-150 m. Larger-capacity wind turbines (5-7.5 MW) with higher visual parameters are currently being planned and built in foreign countries and Lithuania. The height of the tower is 115-160 m, the diameter of the wind blades is 145-170 m, and the total height is 200-250 m. The visibility of the wind turbine from specific points depends very much on the height of the wind turbine tower and the length of the blades. A visual impression is not only created by the height of the wind turbine but also by the diameter of the wind blades.
Number of wind turbines	A group of wind turbines provide large amounts of electricity. However, just like a single power plant, a park can become dominant because of its height. One of the main reasons why the wind farm becomes very vivid in the landscape is the large area it occupies and the number of power plants. Different locations of wind farms in the power plant itself can also have different visual effects on the landscape.
Color and materiality	The color and materiality of wind turbines also influence the nature and significance of the visual impact. Wind turbines with steel, reinforced concrete-steel construction towers predominate in Lithuania. Several small wind turbines with an openwork tower structure (previously operated in other countries) have also been built. The towers of wind turbines in Lithuania are usually white, grey, green/ white, green / grey. When a tower is painted in two colors, green is the lower part of the tower, which gradually brightens as it rises and turns white or grey. Wind turbines of this color in the rural landscape contrast in part with the green agrarian environment.

Factors influencing visibility	Notes
Supporting infrastructu re	Power substations, access roads, power lines and other infrastructure also increase the visual impact of a wind turbine on the landscape.
Observati on distance	As the viewing distance increases, the vertical and horizontal angles of human vision decrease proportionally. When viewed from a greater distance, the image is also affected by the atmospheric effect caused by dust particles and moisture in the air. As a result of this effect, wind turbines appear greyer, and the grey color reduces the visual contrast between the background and the wind turbine.
Observer dynamism	The visibility of a wind turbine is different when observed in a static and dynamic state. Seen from a static position, the image of the wind turbine does not change over time. Meanwhile, with a dynamic observer position (e.g., observing from a moving car), the visual relationship between wind turbines and the landscape is constantly changing. The field of vision may be limited in part by the physical ability to monitor wind turbines from a vehicle (e.g. vehicle window size).
Wind turbine construction site and weather conditions	When viewed from a lower position than the wind turbine is built, most of it is visible against the backdrop of the sky. Visual contrast can form between white electrical color and clouds, their color. Dark grey clouds provide greater contrast to wind turbine than white clouds. The level of contrast also depends on the position of the sun and the location of the wind turbine. When the sun is in front of the observer, the visible location of the wind turbine is in the shade. If the background is dark, the contrast between the wind turbine and the background is even lower. When the sun is behind the observer, the entire wind turbine is illuminated. If the background is lighter, the contrast will be much lower compared to a dark background. In cloudy weather, wind turbines tend to become less visible. In some cases, the blades may be completely invisible in the background of the clouds.
Purpose of land use	Wind turbines (especially wind farms) are mostly built on sparsely populated areas of agricultural land. Areas of agrarian plains are widely surveyed (open visual spaces predominate), so wind turbines can be seen from a distance. The forest massifs in the areas obstruct the wind turbines and thus reduce the visual impact. In this case, the towers or the lower parts of towers are usually masked. And the blades and the cabin of the wind turbine are openly visible. Settlements also reduce the visibility of wind farms due to their vertical elements.
Territor y relief	In hilly areas, there are places where observed wind turbines become more visible or vice versa. In the plains, the visibility of wind turbines decreases steadily with increasing distance.

Landscape structure analysis

According to the general map of the aesthetic potential of the Lithuanian landscape in terms of imagery, the territory of wind farms development is classified as a territory of very small (northern proximity - small) landscape. According to the naturalness of the Lithuanian landscape, it is classified as a heavily anthropogenized bald landscape.

The area is classified as a sandy, semi-clayey plain landscape according to the general nature of the natural landscape (see figure below). Most of the territory is covered by agrarian landscapes (agricultural land). The area is characterized by monocultures (spring, winter wheat, oilseed rape).

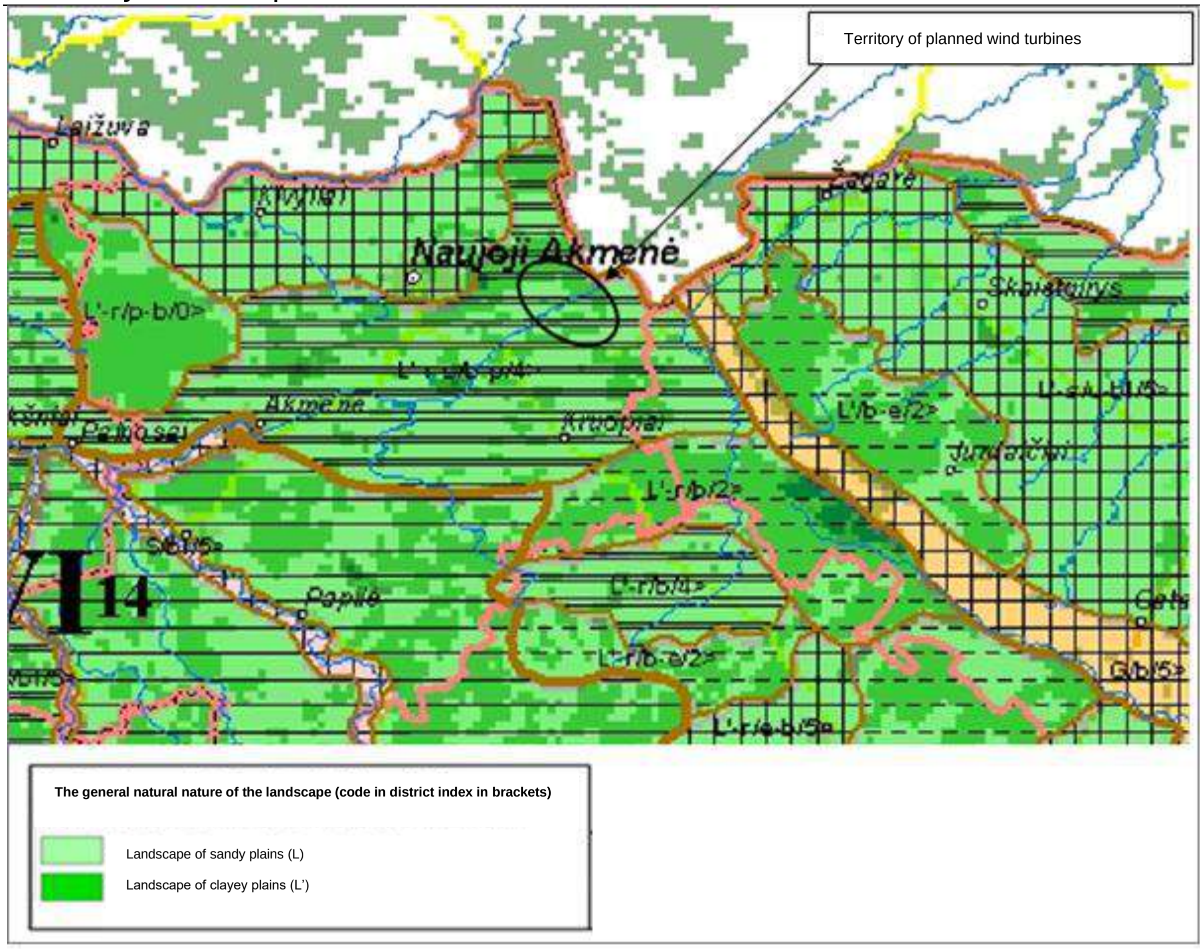
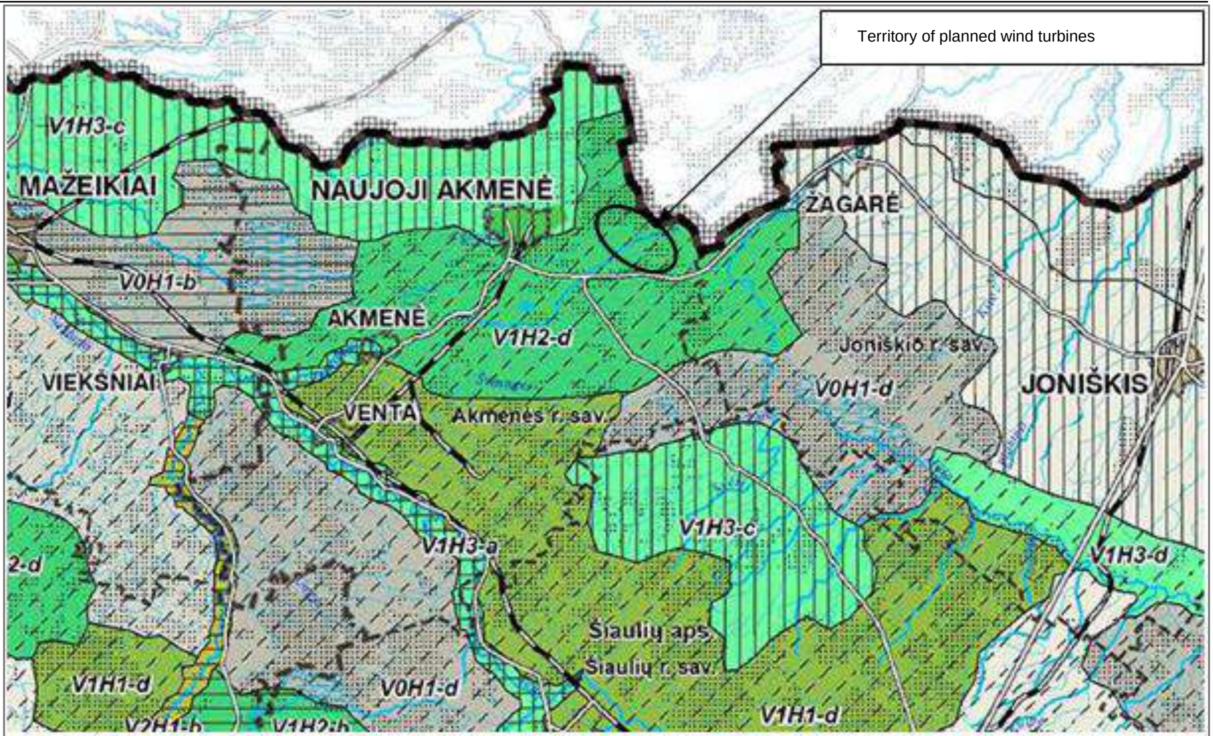


Fig. 10. Physiomorphotopes of the landscape of the analyzed area [16]

According to the drawing of the visual aesthetic potential of the National Landscape Management Plan of the Republic of Lithuania (Scale 1: 400000) (see the figure below). The vertical partition forming the visual structure of the territory is weak, the landscape of undulating and flat valleys with two-level videotope complexes predominates. According to the horizontal visual partition, the landscape of semi-open, open, mostly surveyed spaces predominates. The spatial structure of the landscape without distinct vertical and horizontal dominants.

[16] Kavaliauskas P. “Study of the Variety of the Spatial Structure of the Landscape of the Republic of Lithuania and the Identification of Its Types”.



DIFFERENTIATION OF LANDSCAPE VISUAL STRUCTURE FACTORS

Vertical visual fragmentation of the landscape
V0 - Blurred vertical fragmentation
(plain landscape with single-level videotopes)
V1 – weak vertical fragmentation
(undulating and flat valley landscape with two-level videotope complexes)
V2 - average vertical fragmentation
(hilly and clear valley landscape with three-level videotope complexes)
V3 – very clear vertical fragmentation
(heavily hilly and deep valley landscape with four-to-five-level videotope complexes)

Horizontal visual fragmentation of the landscape
H0 - landscape of predominantly closed opaque (wooded or built-up) spaces
H1 – landscape of predominantly semi-enclosed partially transparent spaces
H2 – landscape of semi-open mostly transparent spaces
H3 – prevailing landscape of open, well-visible spaces

Visual dominance of the landscape
a - a complex of vertical and horizontal dominants in the spatial structure of the landscape
b - only horizontal dominants are expressed in the spatial structure of the landscape
c - only vertical dominants are expressed in the spatial structure of the landscape
b - spatial structure of the landscape without distinct vertical and horizontal dominants

Fig. 11. Visual structure of the analyzed area[17]

In 2019, one wind turbine was built in the development territory of WTs near the Šapnagiai settlement. The closest separate wind turbines are located in Mažeikiai district.

Akmenė district municipality has made changes to the general plan of the territory of Akmenė district municipality, in which a scheme for determining the territories of wind

[17] National Landscape Management Plan of the Republic of Lithuania.

turbines has been prepared. The mentioned area of the analyzed wind turbines falls within the areas of the scheme for the determination of the areas of wind turbines.

Assessment of the impact on the landscape according to the methodology of aesthetic recreational assessment of the landscape

The assessment of the impact of the planned wind turbines on the landscape was carried out on 05 and 09 January 2020. The days were partly cloudy, visibility was good. Two evaluations were performed on site according to different methodologies:

- The methodology of aesthetic recreational assessment of the landscape prepared by A. R. Budriūnas and K. Ėringis was used for the first assessment.
- The methodology for determining the significance and degree of contrast and the nature of the visual impact of wind turbines from selected sites was used for the second assessment.

During the assessment, not only the wind turbines planned for this project were assessed, but also the total impact of the wind turbines.

According to the first methodology (by A. R. Budriūnas and K. Ėringis), landscapes are evaluated from the aesthetic point of view according to the optimal variety and harmony of objects and phenomena. The landscape was assessed according to 80 features, which are divided into 4 groups: the general impression of the landscape; relief expressiveness; spatial diversity of vegetation; diversity and expediency of anthropogenic objects.

Observed from the first viewpoint, the aesthetics of the landscape features were assessed and got 31 points without the planned wind turbines and 33 points with the planned wind turbines. Observing the aesthetics of the landscape features from the second viewpoint, the score was 38 points without the planned wind turbines and 38 with the planned wind turbines.

An additional review and photo fixation of the area's landscape change was carried out on 02 and 21 July 2020. The additional photo fixation was aimed at assessing the change in the landscape and the visibility of the planned wind turbines at another time of the year (summer), with differences in tree leafage, agricultural land use and other factors affecting the visual impact of wind farms.

According to the number of points, the landscape observed from the first and second viewpoint, is classified as of low aesthetic quality. According to the evaluation results, the landscape from the first viewpoint without wind turbines was assessed at 31 points, and with the planned wind turbines - 33 points. The landscape from the second viewpoint without wind turbines was assessed at 38 points, and with the planned turbines also at 38 points. According to the difference in the number of points we see, that the projected wind turbines will not have a negative impact on the visual and aesthetic quality of the landscape. In the first case, the overall scenery of the landscape even slightly increases when assessed with the planned wind turbines. In the second case, the imagery remains unchanged.

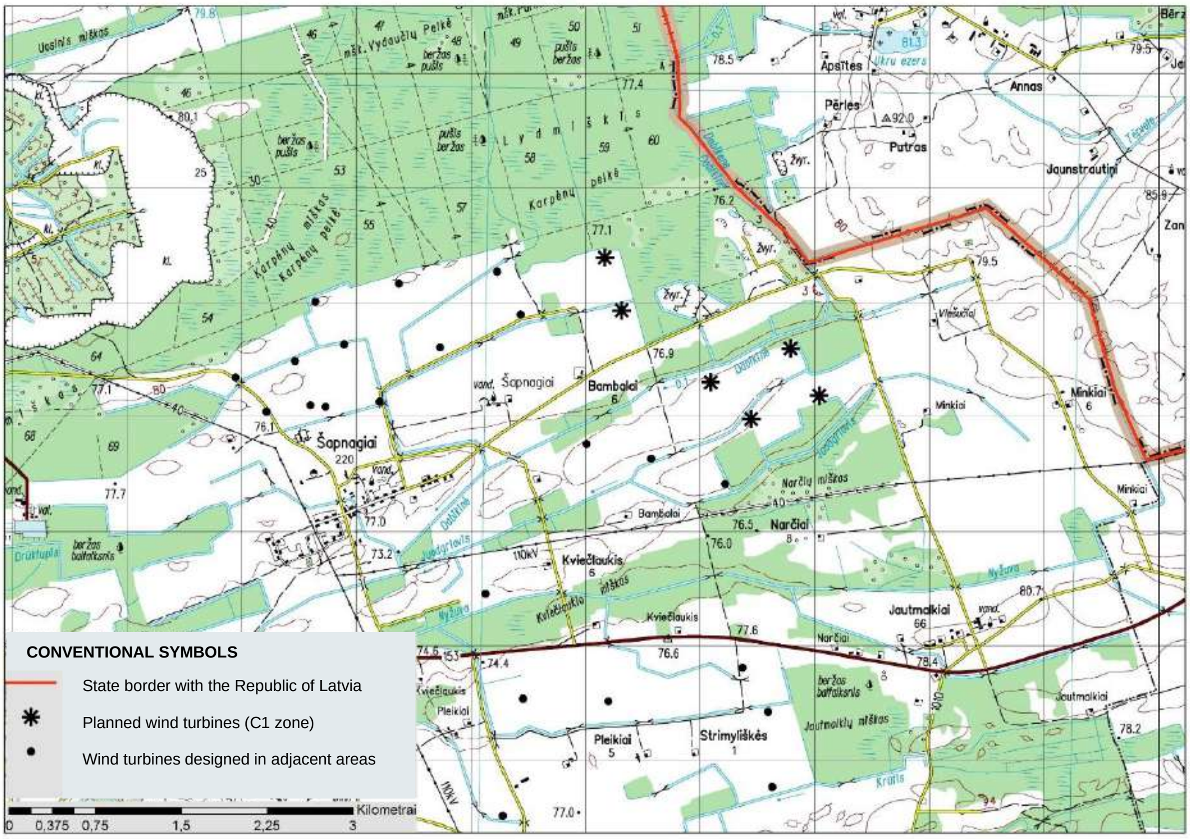


Fig. 12. 1 and 2 viewpoints of the assessment of the impact of the designed wind turbines on the landscape

Fig. 13. Photo fixation from the first viewpoint. Photographed north of the village of Bambala

Fig. 14. Visualization from the first viewpoint. WTs of other entities will not be visible

Fig. 15. Photo fixation from the second viewpoint. Photographed from the road Jautmalkiai - Bambalai

Fig. 16. Visualization from the second viewpoint

Fig. 17. Visualization from the second viewpoint. WTs planned by other economic entities have also been assessed

2.5.1. Current condition of protected areas

There are no protected areas in the territory of the PEA (state reserves, national or regional parks, nature reserves, biosphere reserves). The nearest natural heritage object is Raistu Linden, which is located about 5 km from the nearest territory of the PEA WTs. Adjacent protected area: Žagarė Regional Park (about 8 km from the nearest area of the PEA WTs).

Nearest areas meeting BAST criteria:

- *The forest near Dilbinėliai,* which is about 8 km away from the PEA WT territory. The area is important for broadleaf and mixed forests, lady's-slipper orchids;
- *Žagarė forest,* which is about 10 km away from the PEA WT territory. The area is important for its broadleaf and mixed forests, swampy mixed forests;
- *Žagarė oasis,* which is about 10 km away from the PEA WT territory. The area is important for its steppe meadows; coniferous forests on fluvioglacial oases; the large copper; spined loach; otters; river lamprey; misgurnus;
- *Karniškės surroundings,* which are about 10 km away from the PEA WT territory. The area is important for active wetlands; western taiga; swamp deciduous forests; wetland forests (see figure below*)*.

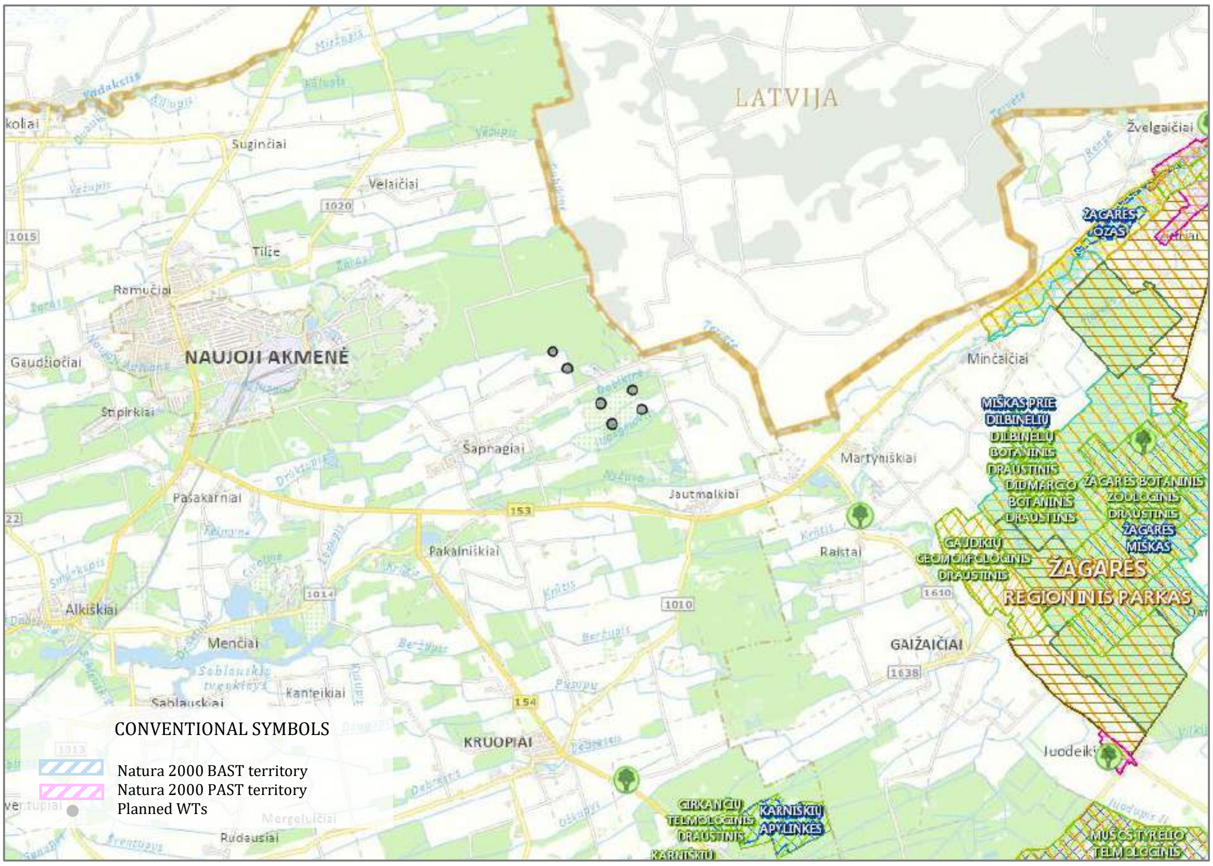


Fig. 18. Position of the PEA plot in relation to the protected areas[18]

[18] Online access: https://stk.am.lt/portal/

The Girkantai Telmological Reserve, located about 9 km from the nearest territory of PEA WT, and the Karniškės Telmological Reserve, located about 10 km from the nearest territory of PEA WT, have been given the status of a potential Natura2000 ecological network territory.

2.5.2. Current condition of biological diversity

Studies on bats, birds and natural habitats were carried out to assess the PEA area and its impact on biological diversity.

The evaluation of protected plants, fungi and naturally valuable habitats was performed by Dr. Sigitas Juzėnas, Master of Science in Botany.

Protected plants, fungi and naturally valuable habitats

Protected plants and fungi

An extract from the Protected Species Information System (SRIS) managed by the Ministry of Environment of the Republic of Lithuania was formed on 16-10-2019. The data collected by SRIS and presented in the extract on the sites of germinal plants and fungi from 2000 to the date of receipt of the certificate are analyzed. Only those protected plants and lichens that are included in Order No. D1-814 of the Minister of Environment of the Republic of Lithuania of 10 September 2018 “On the amendment of Order No. 504 of the Minister of Environment of the Republic of Lithuania of 13 October 2003 “On Protected Animals, Plants and Lichens of the Republic of Lithuania) are discussed below"" to the list of species of fungi: *Cetrelia olivetorum* (Nyl.) W. L. Culb. & C. F. Culb., heath spotted orchid - *Dactylorhiza maculata* (L.) Soó, blue moor-grass - *Sesleria caerulea* (L.) Ard., Broad-leaved march - *Dactylorhiza majalis* (Rchb.) P. F. Hunt & Summerh., bird's-eye primrose - *Primula farinosa* L., military orchid - *Orchis militaris* L., compact bogmoss - *Sphagnum compactum* Lam. & DC.

The studies observed these protected plants for the first time in June-July 2020 – bird's-eye primrose (*Primula farinosa* L.) and blue moor-grass (*Sesleria caerulea* (L.) Ard.) (Fig. 19 pav. NW part), the sites of which have not been registered with the SRIS. The bird's-eye primrose was observed by biologist Aurelijus Narbutas on June 12, 2020. Two generative individuals were observed at the bottom of the drained slope at the edge of the drainage ditch up to 1 m from the water surface. On July 21, 2020, an inspection of the site of the bird's-eye primrose revealed a blue moor-grass that has spread along the boundary of the water in the ditch along a 2-4 m wide strip of islands for about 150 m. It had was already bloomed. In the densest places, 1 sq. m accounted for 20% of the grassland. The SRIS extract identifies and finds new sites for protected plants and lichens during field research, which are marked in Figure 19. (*AUG-CETOLI017722, AUG-DACLON028926, AUG-DACMAC014877, AUG-ORCMIL031734, AUG-PRIFAR033013, AUG-SESCAE033106, AUG-SESCAE033107, AUG-SESCAE033108, AUG-SPHCOM077041*) are far away from the analyzed PEAs and they are not expected to be affected by the PEAs. This is particularly clear in Figure 20. There is no known site of the protected plant or fungus in the analyzed area that would be within 10 m of underground power transmission lines, access roads, R80 or R250 potentially significant or potential adverse effects.

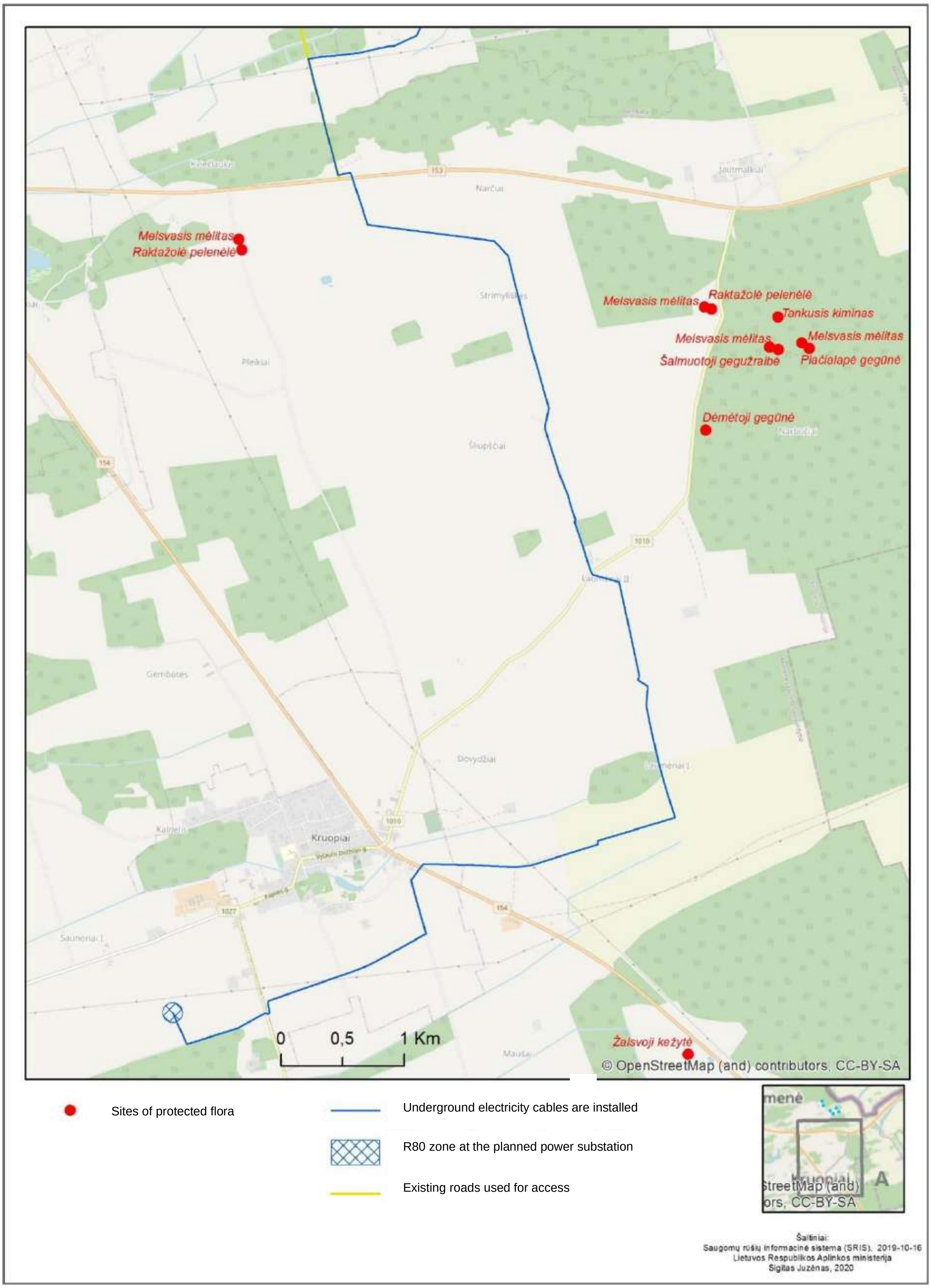


Fig. 19. Locations of protected plants in the Republic of Lithuania in the PEA environment (1)

Fig. 20. Locations of plants protected in the Republic of Lithuania in the PEA environment (2)

Fig. 21. Bird's-eye primrose (*Primula farinosa* L.) near the drainage ditch in the WT 24 R250 zone (observation by A. Narbutas on 12-06-2020).

Fig. 22. Blue moor-grass (*Sesleria caerulea* (L.) Ard.) near the drainage ditch in the WT 24 R250 zone (observation by S. Juzėnas on 21-07-2020).

Habitats of EC importance

According to the inventory data of natural habitats of EC importance (Institute of Botany of the Nature Research Center, 2015), valuable natural habitats fall into the following potential impact areas of wind turbines (Figure below):

80 m around the WT and 10 m buffer along the power cable lines and access to newly installed roads:

- 9050 Grass-rich spruce groves. Most of this valuable spruce grove is already clear-cut. An underground power cable line will run from the power substation along the road, so there will be no negative impact on the rest of the valuable forest habitat.
- 9080 *Wetland deciduous forests. The underground power line will run along a reclamation ditch on the other side of the ditch, so there will be no impact on this forest habitat.
- 91E0 * Alluvial forests. A part falls within the WT 35 R80 zone (more than 55 m from the WT to the forest boundary). It is a birch tree with ash, black alder and aspen, located along the straightened, drained riverbed of the Dabikinė River. There are mature trees within the habitat. Neckera pennata Hedw., grows on the trees, which is a common moss in Lithuania, but is sensitive to changes in the microclimate (humidity) due to cuts. It

also needs old trees. On the other side of the river, part of the alluvial forest, with ash predominating in the stand, was cut down. The impact of WT 35 on this habitat will be negligible compared to the adjacent new clearing. Significant negative impact during installation or repair - direct destruction of vegetation is not expected, as the works will be carried out on non-forest land. As the valuable forest habitat adjacent to WT 35 is formed in moist soil for most of the year, the risk of fire is negligible.

250 m:

- 91E0 *Alluvial forests – WT 35.

Threats to natural forest habitats of EC importance in areas R80 and R250 due to PEA can only be managed through the planning and operation of non-forest land and without altering the hydrological characteristics of the forest land in which the habitats are located. In the valuable forest habitats within the PEA territory, the microclimatic conditions in the remaining parts of the habitats have already changed due to clear-cutting. These habitats lost some of their valuable properties before the PEA discussed in this report.

No new natural habitats meeting the criteria for the designation of habitats of EC importance were identified during the July 2020 surveys in the PEA area. Significant adverse effects on existing flora and fungi of existing natural habitats of EC importance in the PEA area in question are unlikely due to the proposed normal activities. Direct destruction of natural habitats of EC importance due to PEA is possible only in extremely rare cases - in case of technical accident.

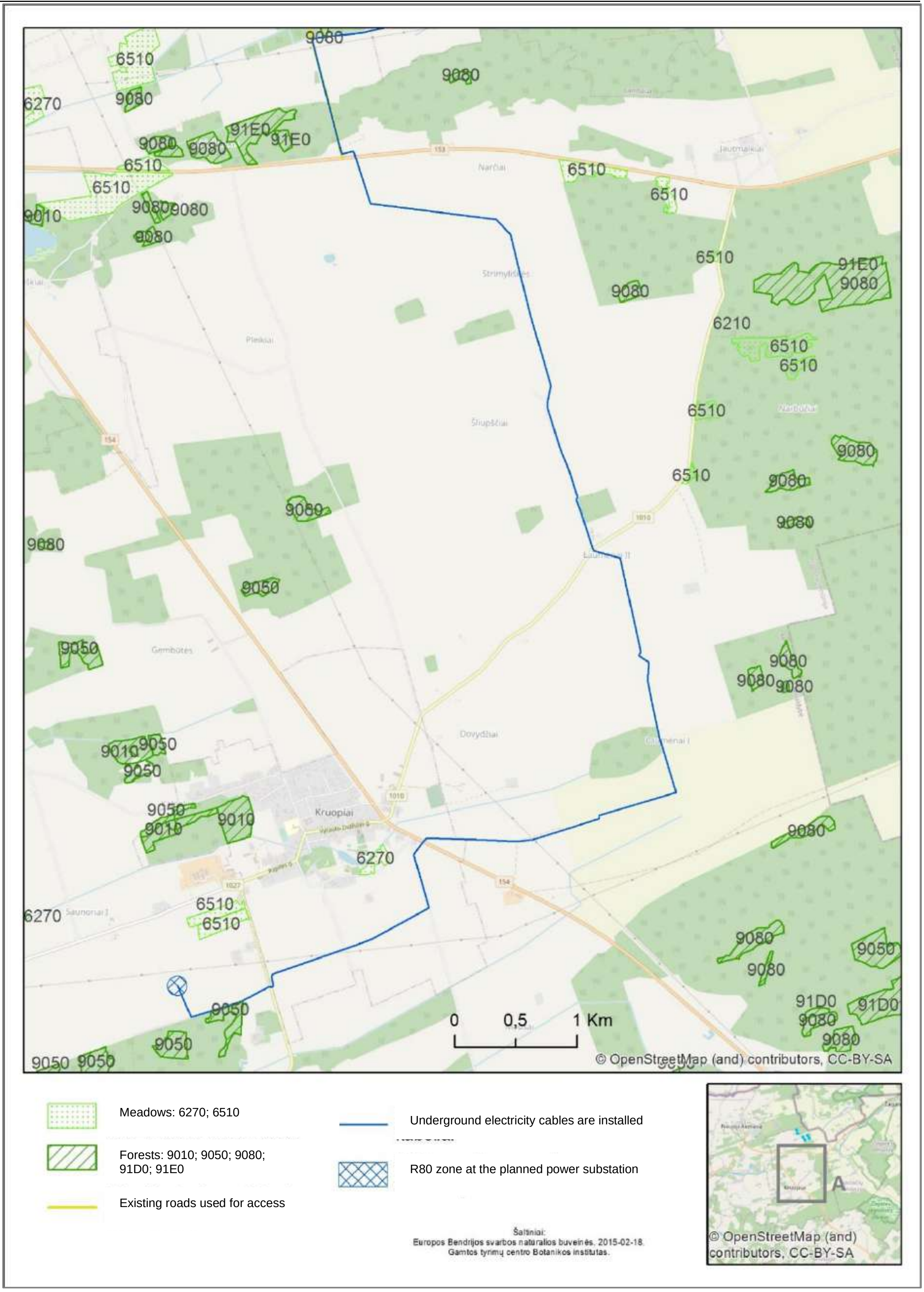


Fig. 23. Natural habitats of EC importance in the PEA environment (1)

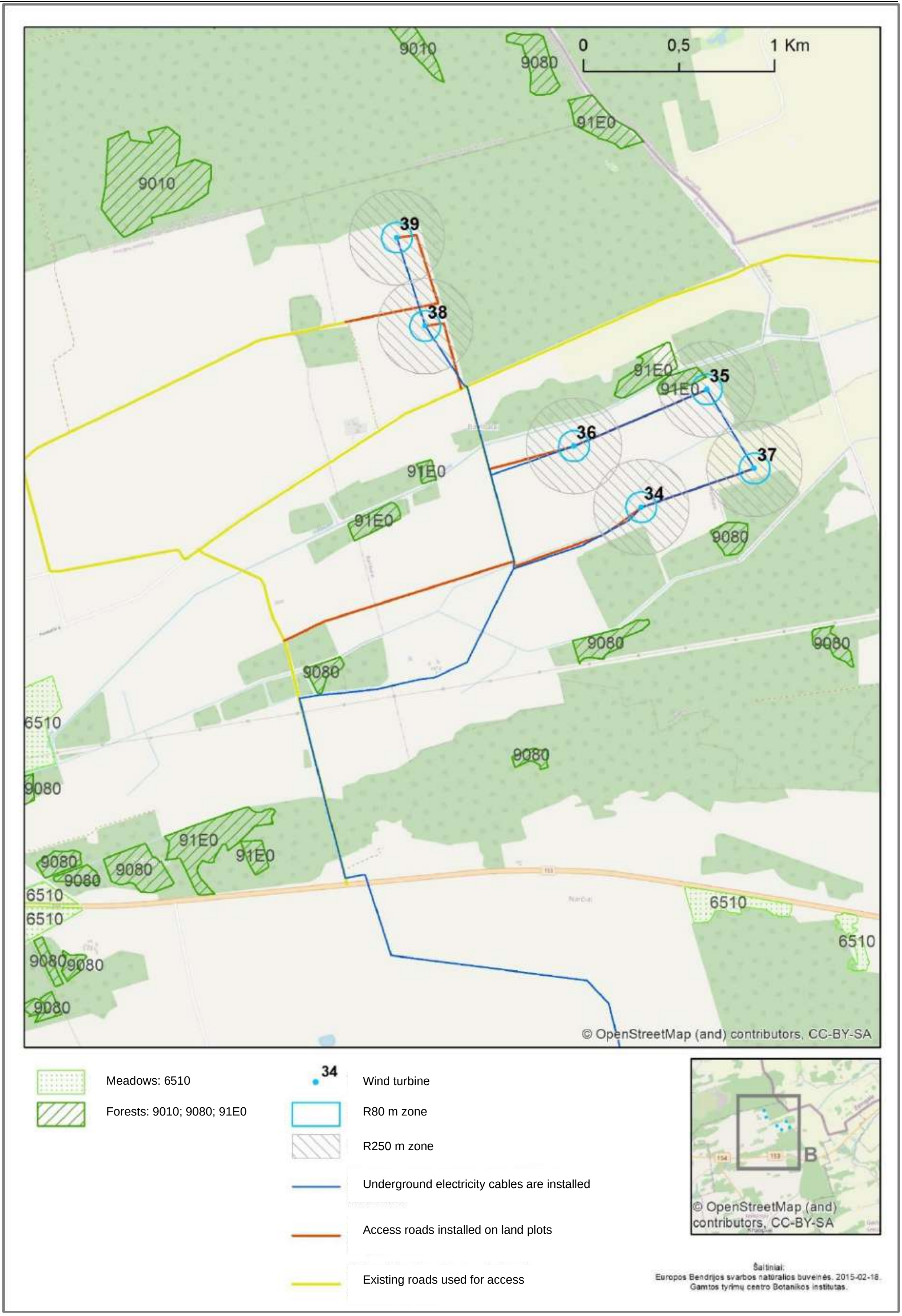


Fig. 24. Natural habitats of EC importance in the PEA environment (2)

Forest groups and main forest habitats

The planned economic activity is mainly planned on non-forest land plots (Fig. below). However, in the planned wind farms, the areas are bordered by forest land, which is subject to different restrictions on farming - forest groups III and IV. These forests, which are different from the point of view of farming, are distributed in the following distance zones from the PEA:

10 m area of the planned underground electricity transmission line (cable)

Forest group III. Field protection forests. The analyzed area will be adjacent to a road bordering a small area of birch (class of between 8 – 10 years old). Part of this quarter 537 is clear-cut (Fig. 25).

Forest group IV. Commercial forests. They are bordered in several places, but they are planned to be installed along the existing roads and roads, and in the case of quarter 465 - on the other side of the drainage ditch (Fig. 26).

80 m zone

Wet black alder and birch (C.1) type woodland key habitat (WKH) with the number 486801 has been identified in the forest near WT 35: "~ 50% of the wood is made up of biologically old trees. Alluvial birch, black alder with U, Ą, L, density Iv and Lz creek was damaged by Dabikinė sewage." Part of the WKH territory was later assigned to 91E0 * alluvial forest habitat after another inventory. However, the 2020 study found that part of the wood that makes up WKH is clear-cut.

Forest group IV. Commercial forests – WTs 35, 37 and 39. The predominant tree species are birch (5 – 8 years old class), white alder (5-year class), black alder (9-year class) and a slight admixture of ash. A small part of the forests in the R80 area have already been cut down. WT 39 was distinguished because it is planned next to a pine forest growing in wetlands (9-year class).

250 m zone

Most of WKH No. 486801 (Wet Black Alder and Birch (Type C.1)) is located at WT 35.

Forest group IV. Commercial forests – WTs 34, 35, 36, 37, 38 and 39. Trends in wood composition remain the same as in the R80 area, only with an increase in the area of forest.

Due to the PEA, significant negative impacts on forests are not expected, as all construction and operation works are planned on non-forest land. The planned underground electricity transmission lines will run along existing roads. However, special attention should be paid to the preservation of the condition of valuable forest habitat fragments adjacent to WT 35, preserving the 20 m gap between the service site and the forest boundary. Deforestation is possible in the event of a technical accident.

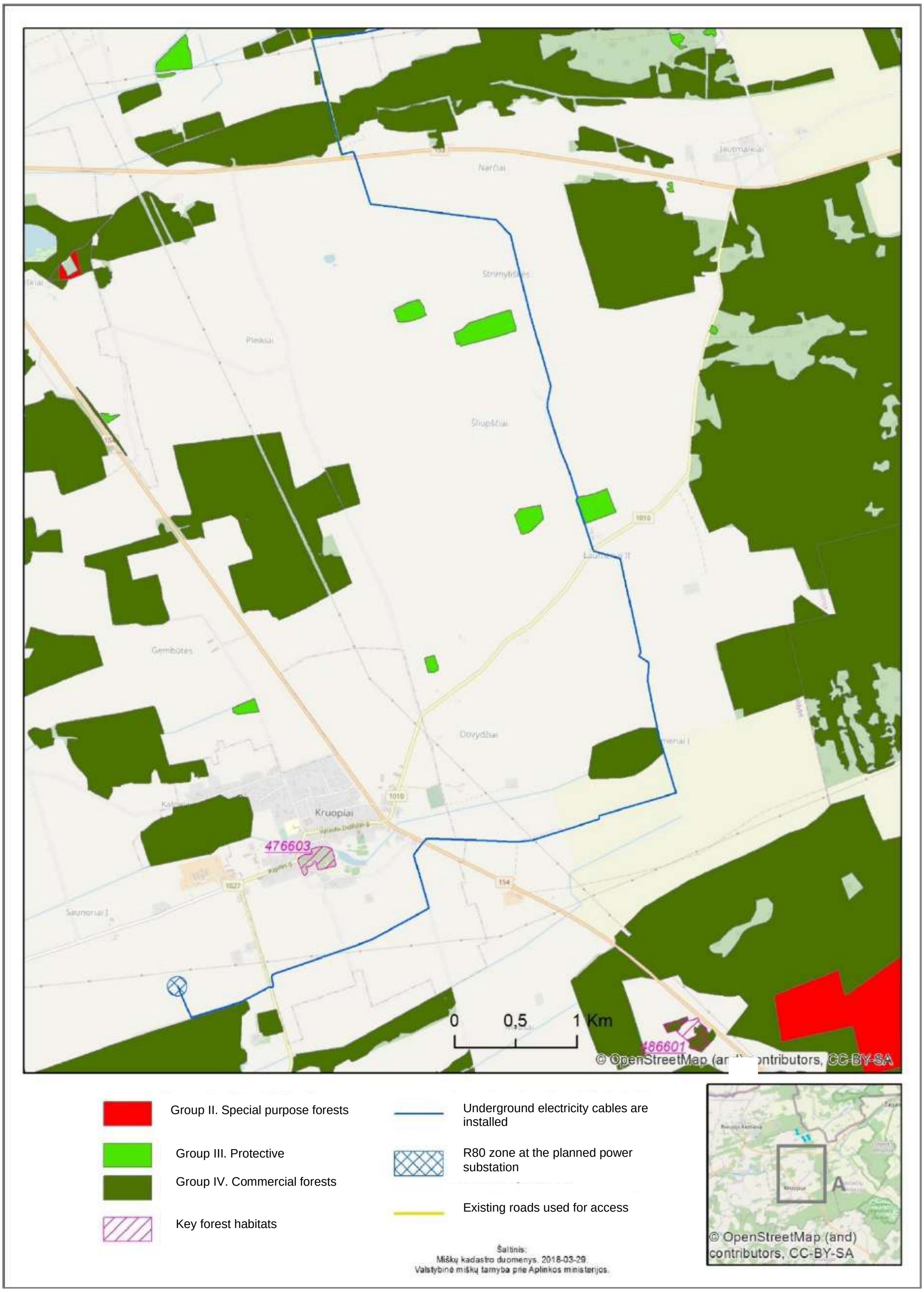
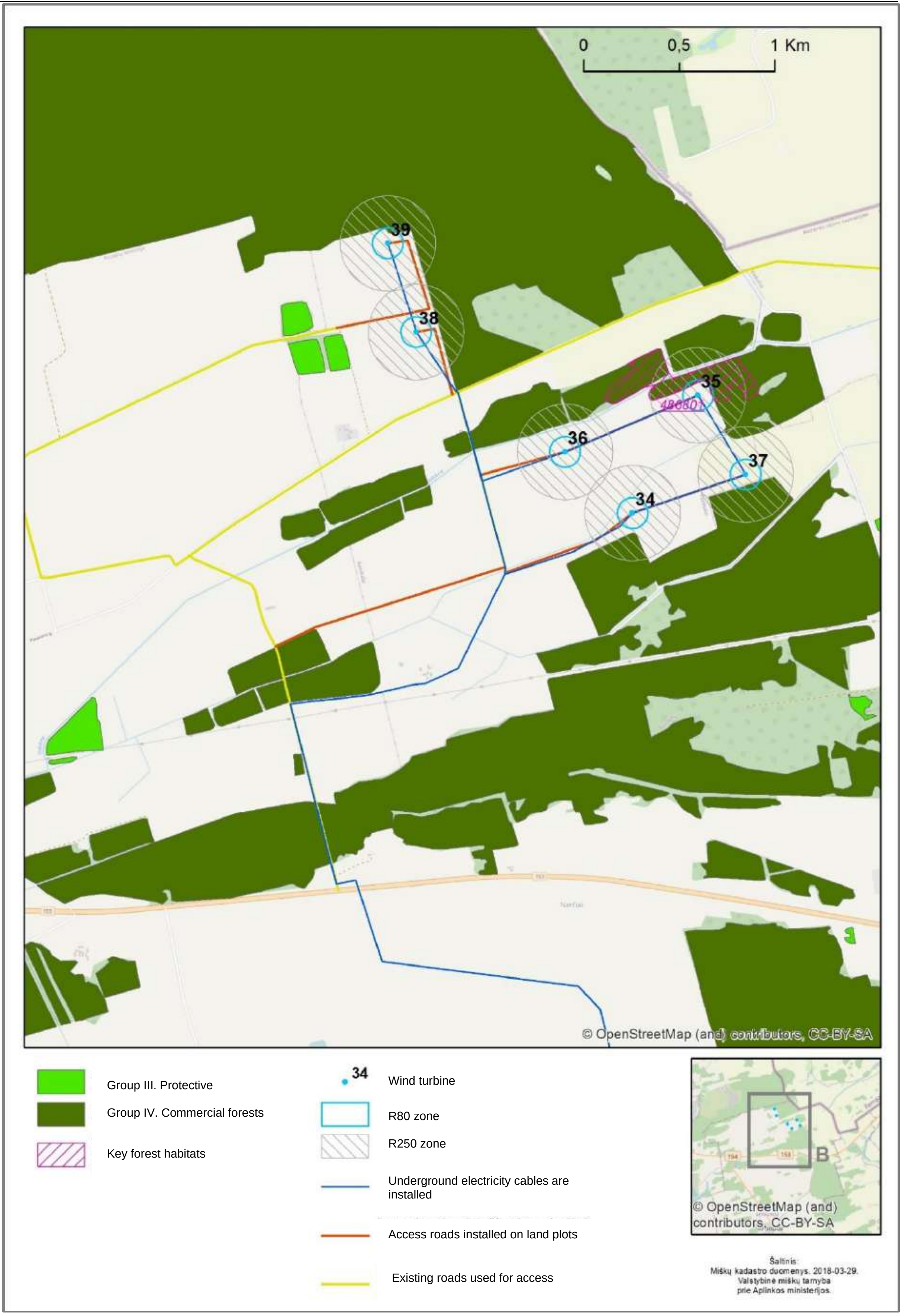


Fig. 25. Forest groups and woodland key habitats (WKH) in the PEA environment (1)



Pav. 26. Forest groups and woodland key habitats (WKH) in the PEA environment (2)

Peat beds and perennial grass crops important for biological diversity

Peat beds and their types and crops valuable for biological diversity in the PEA environment are included in all areas planned for the installation of wind turbines (Fig. below).

Planned underground power transmission lines and a 10 m zone of the access road to be installed

Perennial grasslands, natural and semi-natural grasslands are bordered by underground power cable lines along existing roads or field roads (see fig. below). However, the planned new service road to WT 34 and WT 37 (between Šapnagiai and Bambalai villages) will be installed near perennial meadows on the outskirts, so its area will be slightly reduced (see figure below).

Lowland marsh type peat. An underground power transmission line between Šliupščiai and Strimyliškės and between WT 36 and WT 35 in agricultural fields will cross the lowland peat layer.

80 m zone

There are no peat beds or perennial grasses important for biological diversity.

250 m zone

There are no perennial grass crops important for biological diversity.

Lowland marsh type peat – along WTs 35, 36, 37 and 39.

The 10 m wide areas of the planned underground power transmission lines cover a small part of perennial natural and semi-natural grasslands, as the planned underground power transmission lines are located along roads or field service roads. The subsequent use of power transmission lines will not restrict the continued use of perennial natural and semi-natural grassland crops. Wind turbines and new access roads are currently planned to be installed on agricultural plots with a low-intensity sea buckthorn plantation and cereal fields (see figure below). More valuable agricultural land with perennial extensively used sea buckthorn is not botanically valuable for the conservation of animal biodiversity. No protected plants were found in these sea buckthorn areas. The declared grassland and pasture crops that would have met the characteristics of natural grassland habitats of EC importance during the study did not fall within the areas wind turbines R80 and R250 of the analyzed PEA.

Most of the known wetland soils in the PEA area are located in forestry plots. In them, the negative impact of the PEA is only potentially possible due to a technical accident. Excavation works in wetlands are planned only on agricultural plots that are reclaimed. They do not contain valuable wetland-related habitats or protected plants and fungi.

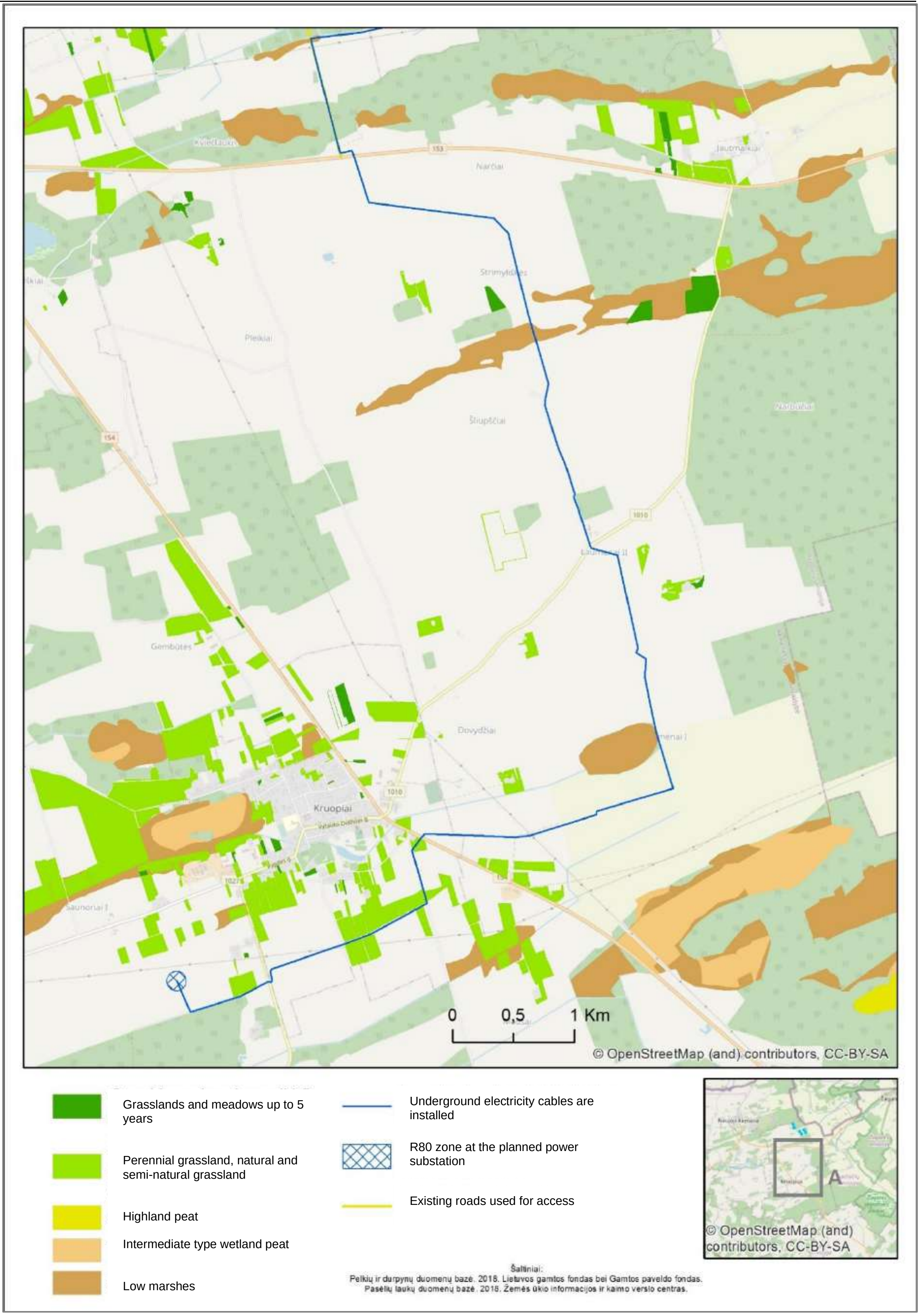


Fig. 27. Peat beds and their types and crops important for biological diversity in the PEA environment (1)

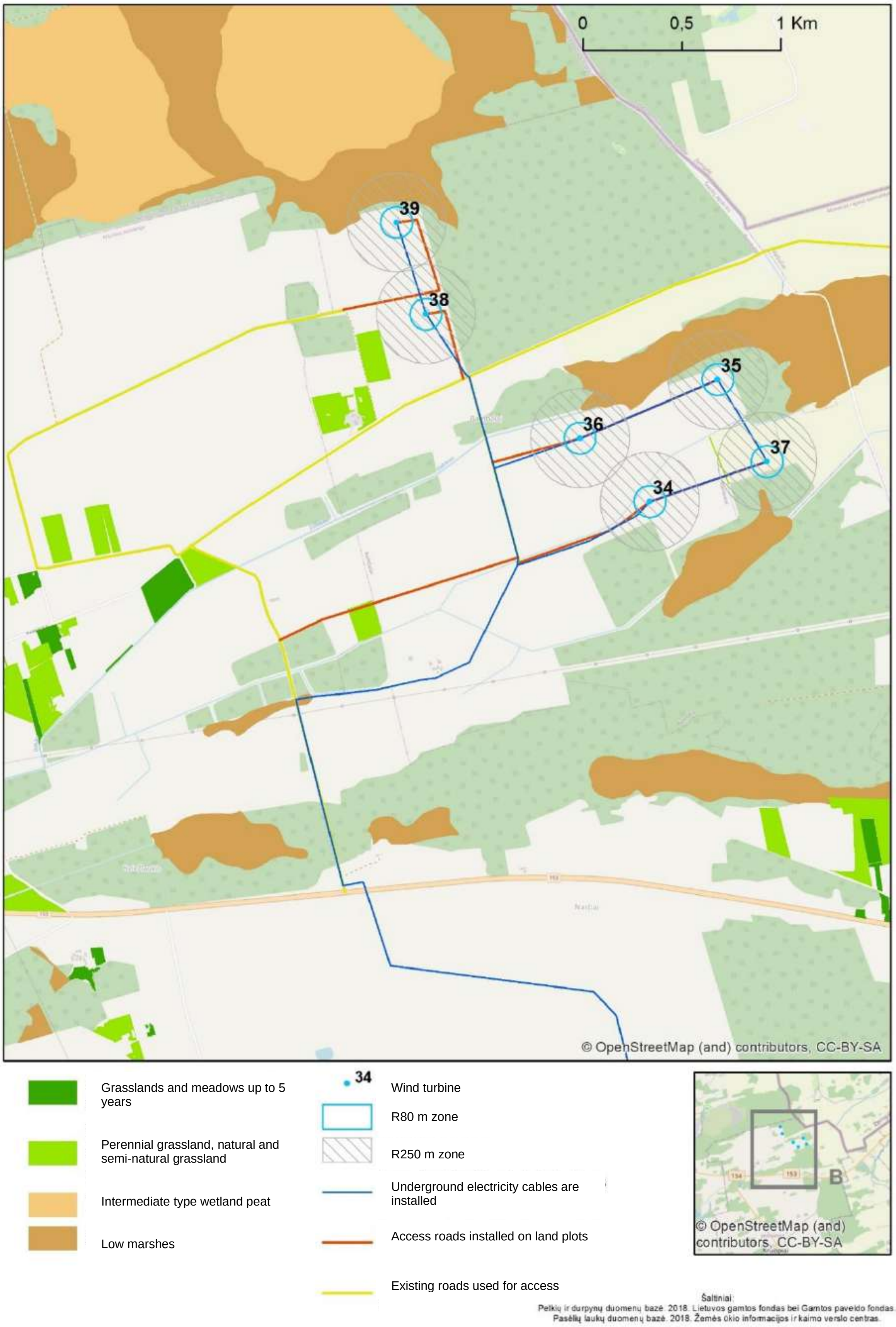


Fig. 28. Peat beds and their types and crops important for biological diversity in the PEA environment (2)

Fig. 29. Sea buckthorn plantation at WT 34

Fig. 30. Field road in the sea buckthorn plantation towards WT 36

Fig. 31. Crops at the planned construction site of WT 38

Fig. 32. Crops at the planned construction site of WT 37

Prevalence of alien and invasive plant species in the area

During the surveys in July 2020, it was established that only two species of invasive plants are spreading in the planned PEA area, although they are included in the Order No. D1-810 of the Minister of Environment of the Republic of Lithuania of 28 November 2016 Order No. 504 of 13 October 2006 “On the Approval of the List of Invasive Organism Species in Lithuania and on the Revocation of Certain Orders of the Minister of the Environment”.

Fig. 33. Ash-leaved maple (Acer negundo L.)

Ash-leaved maple – On the edge of a working field, by the gravel road. LKS coordinate 6238321; 438465. Habitat - a fragment of nitrophilic and ruderal vegetation at the folded field stones. Multiple incompatible individuals. Proliferation due to PEA is not expected.

Fig. 34. Canadian Elode (Elodea canadensis Rich. ex Michx.)

Canadian Elode – At the bottom of reclamation ditch. Photography LKS coordinates 239268; 438893. Widespread throughout the analyzed PEA. Habitat - drained riverbeds, ponds. Due to the PEA, more intensive spread is not expected, as the hydrological regime of the existing water bodies will not be changed, the bottom will be mechanically affected. Further non-PEA-dependent spread is possible. It spreads in a vegetative way and, where it grows, forms the bottom cover of shallow water bodies.

Valuable greenery (parks, squares, etc.) and protected natural monuments (valuable old trees) in the different impact areas of the analyzed PEA are not known.

The group of old oaks valuable for biological diversity (Fig. 35) is more than 450 m west of WT 38 and WT 39. These trees are not included in the analyzed PEA impact areas, but the adjacent gravel road will be used for the installation and maintenance of the WTs. The planned underground power cable between WT 35 and WT 36 is planned near a single oak valuable for biological diversity (Fig. 36). However, the oak crown boundary only borders the buffer zone of the analyzed impact. This oak is also on the edge of the WT 36 R250 zone. No adverse effects are expected for all of these valuable trees.

Fig. 35. A group of old oaks valuable for biodiversity, a view from the existing gravel road

Fig. 36. A single oak tree adjacent to the planned underground power cable between WT 35 and WT 36.

National plant genetic resources included in the lists of national plant genetic resources approved by Order No. D1-861 of the Minister of the Environment of 31 December 2009 “On the Approval of National Lists of Plant Genetic Resources” do not fall into the different impact zones of the analyzed PEA.

Mammals

Theriology expert Laima Baltrūnaitė performed an assessment and possible impact on mammals (except bats) in the PEA area. The assessment was carried out on the basis of literature data, information databases (Protected species information system SRIS) to assess mammal species (except bats) included in the Lithuanian Red Data Book, Annexes II, IV of the Habitats Directive and Annex II of the Bern Convention.

Diversity of mammal species in the planned wind farm

13 mammal species (excluding bats, the list of which is not provided) have been registered in Lithuania and are included in the Lithuanian Red Data Book, Annexes II and IV of the Habitats Directive (Directive 92/43 EEC on the conservation of natural habitats and of wild fauna and flora, Annex II: plant species for the protection of which special areas of conservation are required, Annex IV: Animal and plant species of Community interest in need of strict protection and Annex II to the Berne Convention (European Convention on the Conservation of Wildlife and Natural Habitats, Annex II: Strictly Protected Species) (table below).

Table 6. Lithuanian mammal species included in the Lithuanian Red Data Book, Annexes II and IV of the Habitats Directive and Annex II to the Bern Convention

Species	Lithuanian Red Data Book	Bern Convention	Habitats Directive
Order Rodentia rodents			
Gliridae dormice			
Muscardinus avellanarius hazel dormouse		III	IV
Dryomys nitedula forest dormouse	+	III	II
Glis glis European fat dormouse	+	III	
Dipodidae jerobas			
Sicista betulina nothern birch mouse		II	IV
Lagomorpha lagomorphs			
Leporidae			
Lepus timidus white hare	+	III	V
Cetartiodactyla whales and ungulates			
Delphinidae dolphins			
Phocoena phocoena guinea pig			II
Bovidae			
Bison bonasus bison	+	III	
Carnivora predators			
Canidae dog-like carnivorans			
Canis lupus wolf		II	
Ursidae bears			
Ursus arctos brown bear	+	II	
Mustelidae weasel			
Mustela erminea stoat	+	III	
Lutra lutra otter		II	II, IV
Felidae cats			
Lynx lynx	+	III	
Phocidae true seals			
Halichoerus grypus grey seal	+	III	II,V

Rodents

Hazel dormouse is widespread in Lithuania, but not abundant. It is found in forests of various sizes (Balčiauskas et al. 1999, Juškaitis 2014). There is no published data on the presence of this species in the study area nor in the nearest survey squares 10 x 10 km (here are the data according to the used 10x10 km grid of the national grid system "Lietuva-94", Balčiauskas, et Al., 1999). The nearest known site is in the Kamanai Reserve, more than 20 km away (SRIS 22/10/2019). It is probable that the hazel dormouse can be found in the forests near the planned wind farm (Karpėnai, Lydmiškis, Narčiai, Jautmalkiai, Narbučiai, Suokynė).

Forest and European fat dormice were not registered either at the survey site or in the surrounding survey squares (here are the data according to the used 10x10 km grid of the national grid system "Lietuva-94" Balčiauskas, et al. 1999, Juškaitis 2015, 2018, Juškaitis, Augutė 2015, Juškaitis and et al. 2015, SRIS 10/22/2019). Based on the known distribution of these species, known sites suitable for these species are unlikely to be found at the study site.

Birch mouse is widespread throughout Lithuania. Until 2019, this species was included in the Lithuanian Red Data Book as a species of uncertain status, which could not be assigned to other categories due to lack of data. However, with increasing data on the biology of the species, the species distribution map in Lithuania was supplemented with new information, more information on the habitats used by the species was collected and the species was removed from the Lithuanian Red Data Book (Juškaitis 2000, 2004, Balčiauskas et al. 1999). It is found in various habitats, it is likely that it can also be found in the area of the planned wind farm, but the habitats of the predominant agrarian landscape here are not a typical habitat for this species.

Hares

The white hare is registered both in the 10 x 10 km study squares and in the SRIS system (Balčiauskas et al., 1999, SRIS 22-10-2019). The species closest to the wind farm was registered in the forests of Karpėnai, Gėpaičiai and Paliesiai. This species favors the agrarian landscape, is more common in forests, found in the deserts (Prūsaitė et al. 1988).

whales and ungulates

A guinea pig at the study site cannot be detected due to its biology.

The bison was not registered in Akmenė district. The probability of detecting this species in the intended location of the wind farm is extremely low.

Predators

The wolf is registered both in the 10 x 10 km survey squares and in the SRIS system (Balčiauskas et al., 1999, SRIS 10/22/2019). The nearest wolf registration point from the planned wind farm is in Girkantai forest (> 9 km to the nearest wind turbine). The wooded areas around the park are likely to be used for movement (migration corridors), but not as a permanent residential area.

Stoat was not registered in the studied area or in the adjacent 10 x 10 km squares, but it is probable that the species may live in these areas, it was not detected due to poor research (Balčiauskas et al., 1999).

Otters are registered in the SRIS system in the surrounding areas at different distances from the planned wind farm, as well as registeredd in 10x10 km grid squares. As otters are often found both in regulated rivers and in reclamation canals (Baltrūnaite et al. 2009), these animals can live or visit the territory of the planned wind farm.

The closest lynx was registered in Gerkiškės - Girkančiai forests (> 7 km from the wind farm) (SRIS 22-10-2019). Small forests adjacent to the planned wind farm may be used for traffic (migration corridors).

The grey seal at the research site cannot be detected due to its biology.

Ornitofauna

Ornithological expert Aurelijus Narbutas carried out the determination of feeding areas of breeding birds, migratory birds and birds of prey, as well as the monitoring of autumn migration.

Hatching birds in the PEA and adjacent areas

The PEA and the adjacent territory are characterized by an agrarian landscape, the agricultural land is dominated by sea buckthorn bushes. There are no larger surface water bodies in the PEA territory, there are small drained streams flowing to the west and south-west: Dabikinė, Juodgriovis. The site of the PEA is dominated by small forests. Larger forest massifs are located in the adjacent territory - on the northern side Karpėnai forest, Lydmiškis, on the southern side - Narčiai forest. There is a small Bambalai gravel quarry in the adjacent area. There are no areas important for the protection of birds in the planned wind farm. The nearest territory important for the protection of Natura 2000 birds, Mūša Swamp (LTAKMB001), has an area of 1700 ha, 13 km southeast of the PEA site. The purpose of designating a protected area as a Natura 2000 network is:: for the protection of the habitats of European golden plover (Pluvialis apricaria), wood sandpiper (Tringa glareola), greater white-fronted goose (Anser albifrons) and taiga bean goose (Anser fabalis). The next closest territory important for the protection of Natura 2000 birds is the Kamanų swamp (LTAKMB001), with an area of 6401 ha, 17 km west of the PEA site. The purpose of designating a protected area as a Natura 2000 network is: for the protection of the habitats of montagu‘s harrier (*Circus pygargus*), black grouse (*Tetrao tetrix*), European golden plover (*Pluvialis apricaria*), wood sandpiper (*Tringa glareola*), Eurasian pygmy owl (*Glaucidium passerinum*), greater white-fronted goose (*Anser albifrons*) and taiga bean goose (*Anser fabalis*). At a distance of 6.7 km northeast of the planned wind farm, there is an area of importance for the protection of Natura 2000 birds in Latvia, Ukru Garša, the purpose of which is to preserve the following species in the Natura 2000 network: lesser spotted eagle (*Clanga pomarina*), European honey buzzard (*Pernis apivorus*), hazel grouse (*Bonasa bonasia*), black stork (*Ciconia nigra*), corn crake (*Crex crex*), white-backed woodpecker (*Dendrocopos leucotos*), middle spotted woodpecker (*Dendrocopos medius*), black woodpecker (*Dryocopus martius*), red-breasted flycatcher (*Ficedula parva*), Eurasian pygmy owl (*Glaucidium passerinum*), common crane (*Grus grus*), red-backed shrike (*Lanius collurio*).

The technical characteristics of the planned wind turbines are presented in Table 1. It is important for flying birds to keep out of the range of the wind turbine rotor. It is important to choose a wind turbine model that would reduce the chances of a bird dying, i.e. to take into account the rotor model chosen so that as few bird species and individuals as possible pass through it. In order to assess which models of wind turbines may have the greatest negative impact on birds and influence the passage of birds during the migration, the data of the surveys conducted in Akmenė district with the heights of bird passage in June-November were examined, see the figure below. Most of the observed bird flights are recorded low. Average flight altitude 37 m, variance 38, median 30, i.e. half of all observed flights were below 30 m, the 0.75 percentile is 40 m, i.e. 75% of the observed flights were up to 40 m high, the 0.95th percentile is 100 m, i.e. 95% of observed flights took place below 100 m, see fig. below.

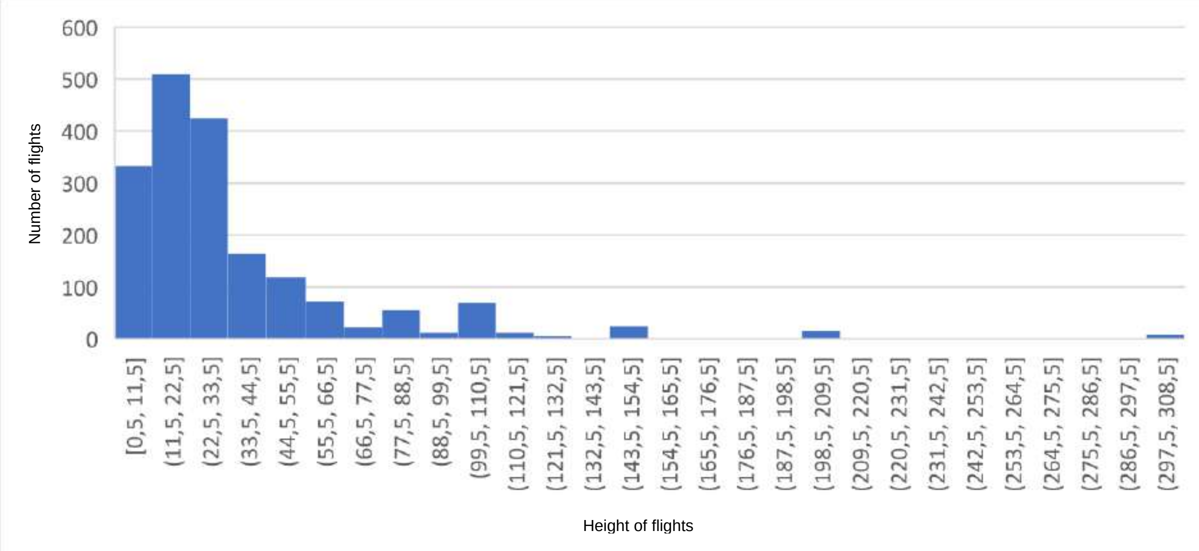


Fig. 37. Flight height of birds sensitive to the impact of WTs in Akmenė district in June-July

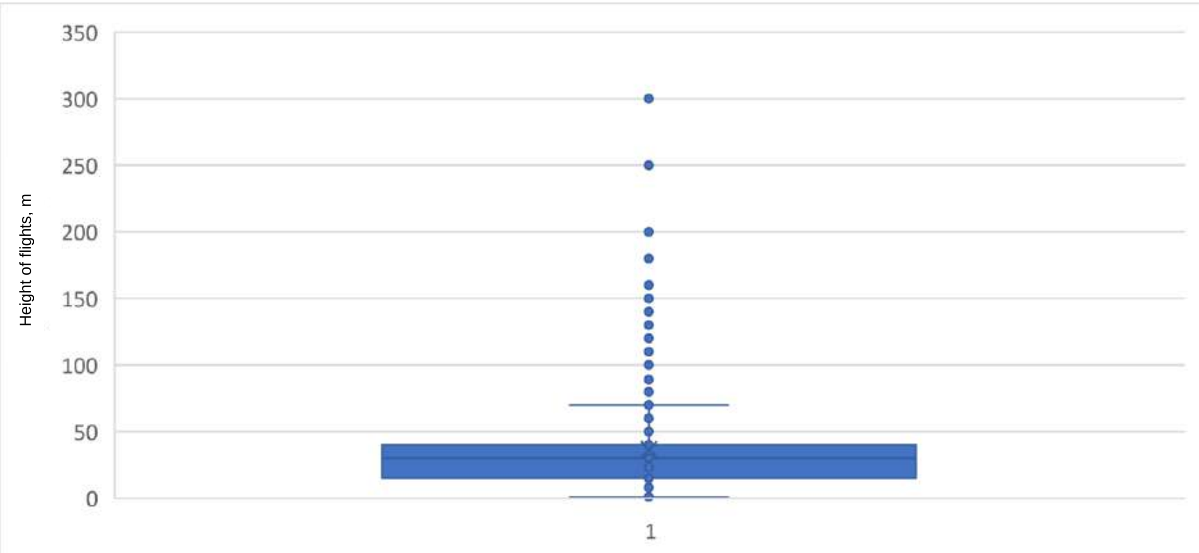


Fig. 38. Statistical characteristics of the position of birds sensitive to the impact of the wind turbines in Akmenė district in June-November

The figure below shows the number of individuals of flying birds during the hatching and migration that fall within the height of the area of operation of the rotor. Siemens Gamesa (77-241 m) and Nordex (77-241 m) had the highest number of flying birds in the wind farms. Accordingly, the maximum number of bird species and individuals pass through them, see fig. below. Estimating the flight altitude of a flying bird at a higher altitude is sufficiently subjective, the errors in estimating the altitude are increasing, the differences in the planned wind turbine parameters are not significant, and therefore the differences between the planned wind farms and their impact on birds are not significant.

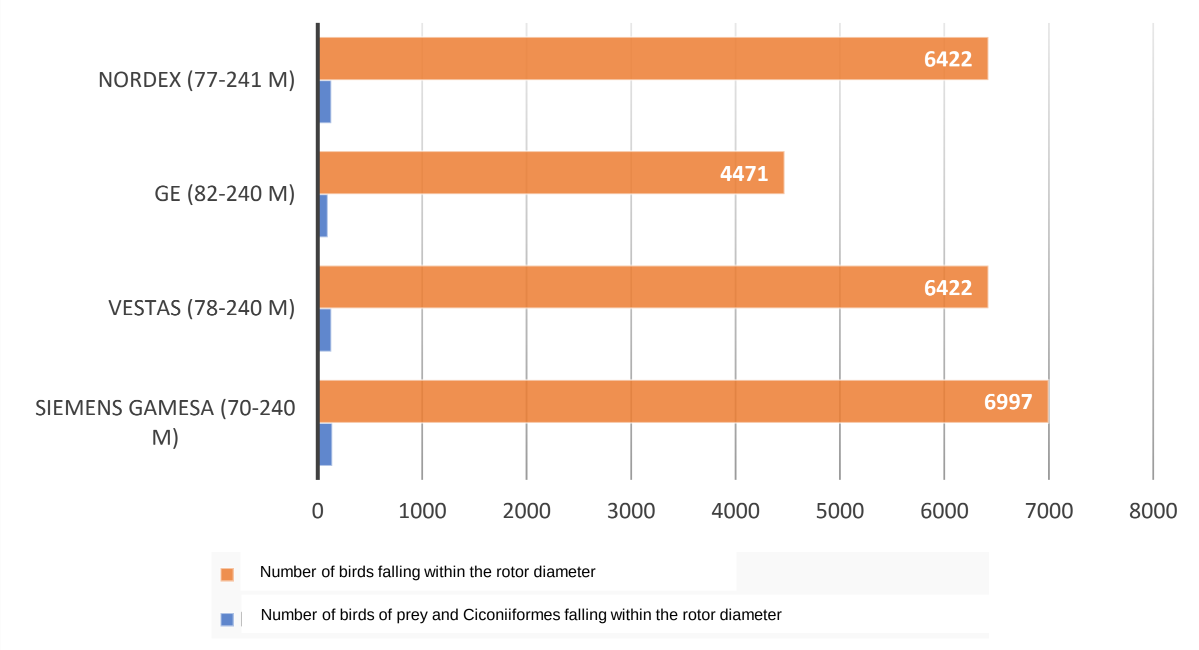


Fig. 39. Number of flying birds, birds of prey and Ciconiiformes sensitive to the impact of the wind turbine in Akmenė district, falling to the height of the rotor diameter of the planned wind turbines

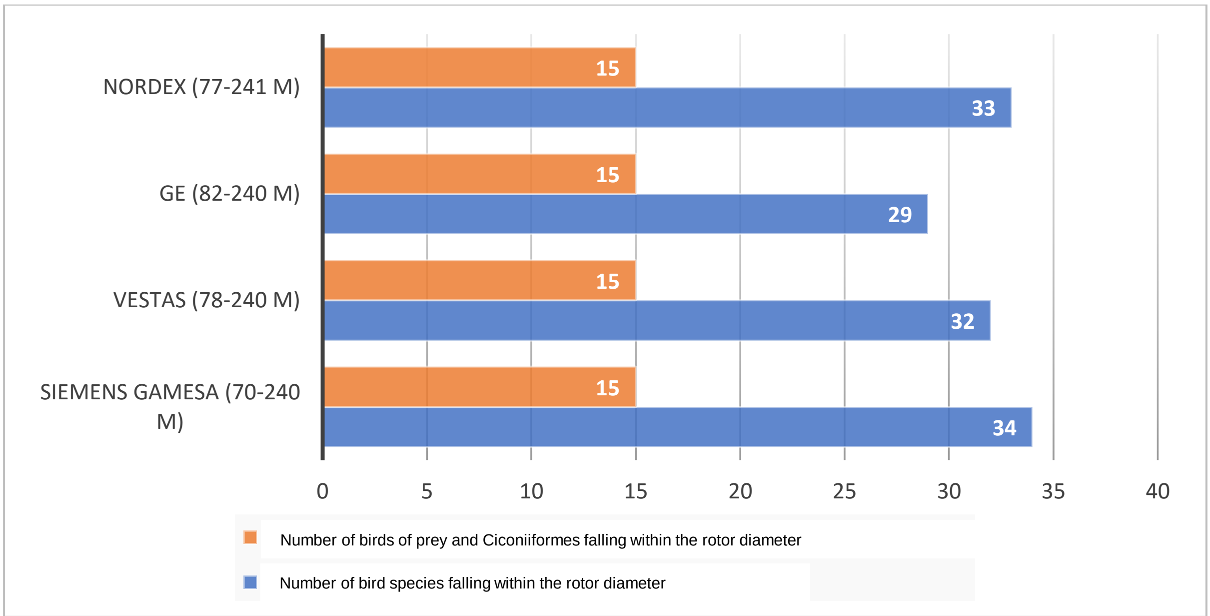


Fig. 40. Number of all flying bird species, birds of prey and Ciconiiformes sensitive to the impact of the wind turbine in Akmenė district, falling to the height of the rotor diameter of the wind turbines

The number of flying birds of predatory and stork species did not differ significantly between different wind turbine models. These observations were collected during the hatching and migration. Analysis of heights and rotor diameters of wind turbines by other researchers has shown that the risk of collision for birds of prey increases with increasing wind turbine height and rotor diameter (Thelander et al. 2003; de Lucas et al. 2008; Rasran et al. 2009), however, this does not apply to other birds whose risk of collision does not depend on the height of the wind turbine or the diameter of the rotor (Everaert & Kuijken 2007, Hötker et al. 2006). Birds avoid high wind turbines and generally keep a greater distance from them, but only for hatching, migrating pewit a statistically significant linear relationship between tower height and avoidance distance from the wind turbine has been observed, meanwhile, tower height does not have a significant negative effect on locally hatching sparrows (Hötker et al. 2006)

Taking into account the planned rotor diameters, the area of direct impact of birds around the wind turbine is R80 m, which is determined around the wind turbine with a radius of 80 m (average rotor diameters are 162 m, minimum - 158 m, maximum - 170 m). The risk of birds encountering wind turbines in the PEA area is assessed. The risk depends on the weather conditions, the biological and ecological characteristics of the specific species, the birds may be knocked out by the wind turbine due to the wind eddies caused by the rotating blades. The planned area is the area bounded by the outer edges of the plot for the installation of a wind turbine. Adjacent area, selected within a radius of 2 km from the edge of the wind turbines, an area of appropriate size, taking into account existing and present bird species.

Bird monitoring methodology

In order to assess conventional, less visible and protected hatching species in the area of direct impact of wind turbines, spot bird surveys were carried out at or near the wind turbine sites. Point bird surveys make it possible to assess the direct impact on the proposed site of the wind turbine during construction, which species are at risk of habitat loss. In order to assess the species, accumulations, feeding places of birds of prey flowing through the planned wind turbines, observations were made in the wind turbines from a constant point. Observations from a constant point allow the assessment of the impact on migratory bird species further away from the wind turbine, the assessment of the impact on the flying, feeding and migratory species in the impact area of the wind turbine and the impact on them.

The points of the bird point accounting route were selected taking into account the planned construction sites of the wind turbines. Point bird counts were performed at 73 points in Akmenė district, where Windfarm Akmenė One UAB and Windfarm Akmenė Two UAB wind turbines will be built. In Windfarm Akmenė Two, UAB, up to 6 wind turbines in Akmenė district municipality, Kruopiai eldership zone C1 were carried out in 6 places, see the figure below. Point bird counts were carried out at the centers of the planned wind turbine locations, and in some cases of difficult access, the surveys were carried out as close as possible to the center of the planned wind turbine. Some places are difficult to access due to the lack of developed road infrastructure, as well as difficult to access on foot, because most places grow grain, legumes and oilseed rape. In the C1 zone in Kruopiai eldership, point counts were performed at 6 points of the planned wind power plants. The performed records well reflect the current composition of the bird community in the locations of the planned wind farms, PEA.

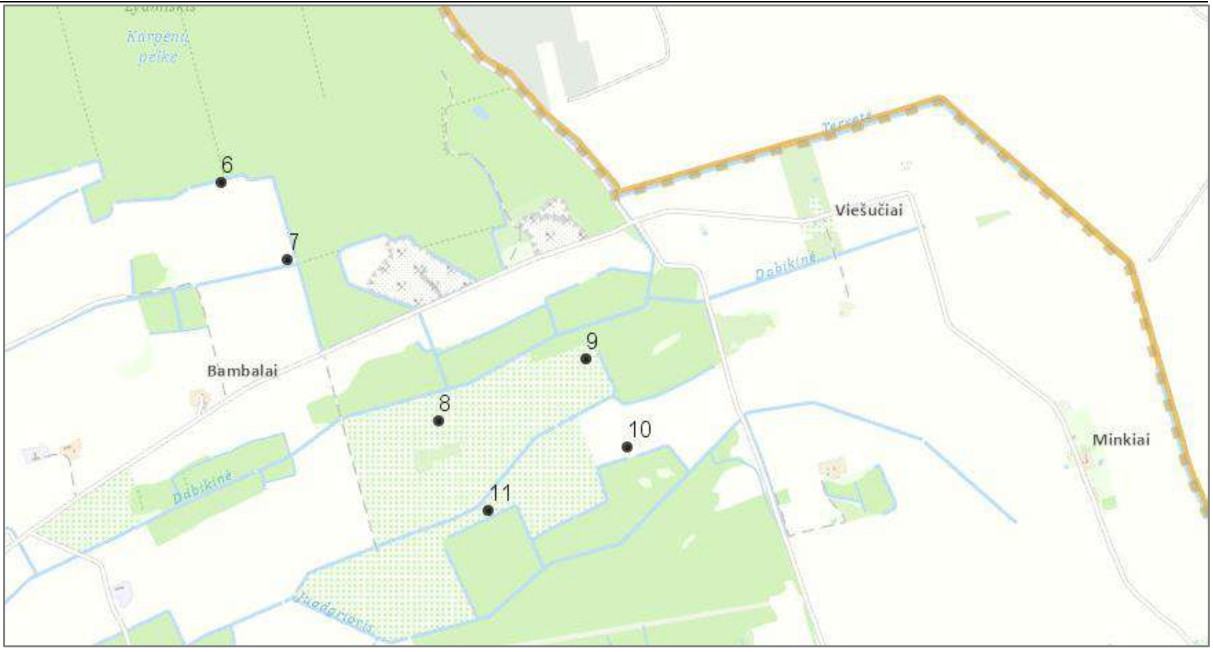


Fig. 41. Point accounting locations in Akmenė Two, UAB, up to 6 wind turbines in Akmenė district municipality, Kruopiai eldership zone C1

In Windfarm Akmenė One, UAB and Windfarm Akmenė Two, UAB, 42 bird species (525 individuals) were registered, and 18 bird species (36 individuals) were registered in the planned Windfarm Akmenė Two, UAB of up to 6 wind turbines in Akmenė district, Kruopiai eldership C1 zone. The species composition of the birds is shown in the figure and table below.

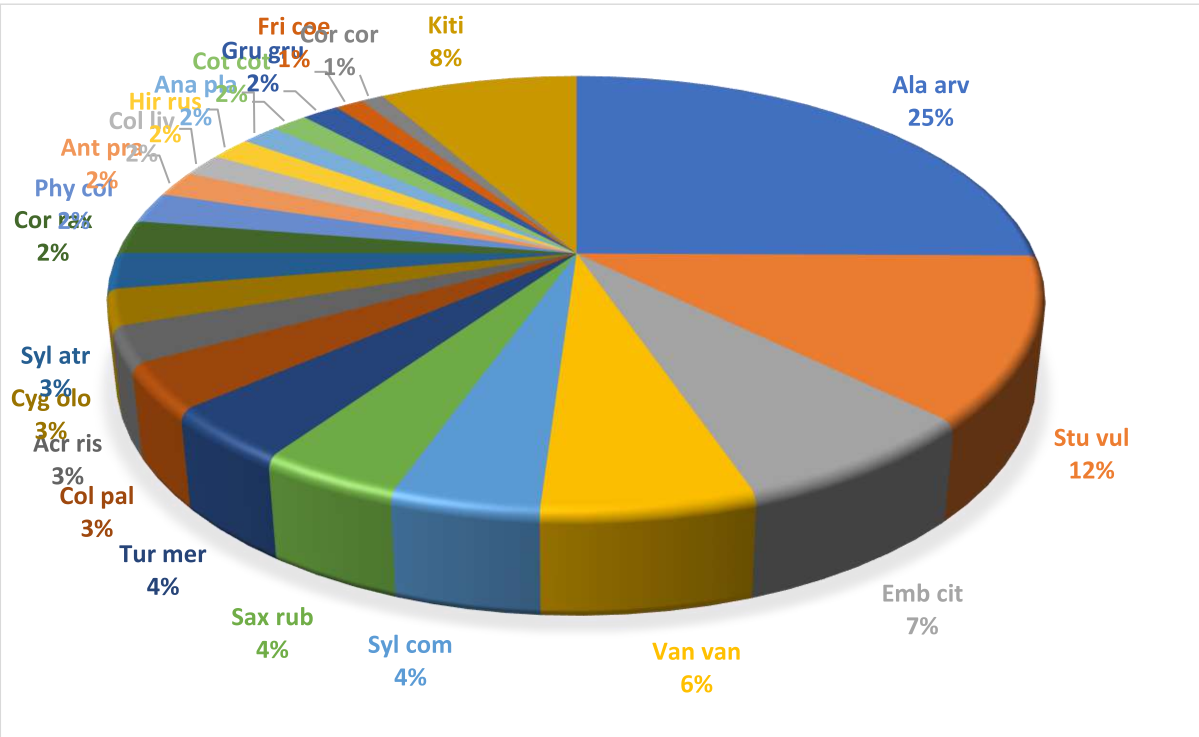


Fig. 42. Composition of bird species in wind turbine sites in Akmenė district municipality, Windfarm Akmenė One, UAB and Windfarm Akmenė Two, UAB

According to point accounting method in planned wind farms in Akmenė district municipality planned by Windfarm Akmenė One, UAB and Windfarm Akmenė Two, the absolute dominant (eudominan) species is Eurasian skylark(25%), dominant species: common starling (12%), yellowhammer(7%), peewit (6%), subdominant species: common whitethroat(4%), whinchat(4%) common blackbird(4%), woodpigeon(3%), marsh warbler(3%), mute swan (3%), Eurasian blackcap (3%), common raven(2%), common chiffchaff (2%), meadow pipit (2%), rock pigeon (2%), barn swallow (2%), mallard(2%), common quail (2%), common crane (2%), common chaffinch (1%), secondary (rare) species (<1,0%): sedge warbler , red-backed shrike, common rosefinch, golden oriole, icterine warbler, European robin, Blyth's reed warbler, Eurasian wren, tree pipit, European pied flycatcher, song thrush, thrush nightingale, white wagtail , cuckoo , magpie , Grey Heron, white stork, common buzzard, western marsh harrier, grey partridge, Eurasian wryneck.

Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone point accounting was performed at 6 points where wind turbines are planned to be built. The absolute dominant (eudominant) species in this wind farm is Eurasian skylark(19%), dominant species: meadow pipit (11%), yellowhammer (8%), red-backed shrike (8%), common whitethroat (6%), common chiffchaff (6%), common raven(6%), whinchat(6%), golden oriole (6%), subdominant species: icterine warbler (3%), common blackbird (3%), woodpigeon(3%), common rosefinch (3%), tree pipit (3%), marsh warbler (3%), common chaffinch (3%), Eurasian blackcap (3%), hooded crow (3%) (see fig. and table below). The bird community of the turbine locations of the planned economic activity consists not only of birds from the open landscape, but also of birds typical of the forest, as wind turbines are planned near larger forest massifs. The following species of birds have been observed among forest birds: common blackbird, common woodpigeon, Eurasian blackcap, common chiffchaff, tree pipit, raven.

Table 7. List of species composition of birds in wind farms of Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone

Line No.	Name of bird species	Contraction of bird species
1	Eurasian skylark	Ala arv
2	Yellowhammer	Emb cit
3	Meadow pipit	Ant pra
4	Red-backed shrike	Lan col
5	Whinchat	Sax rub
6	Common blackbird	Tur mer
7	Eurasian blackcap	Syl atr
8	Common whitethroat	Syl com
9	Marsh warbler	Acr ris
10	Common chaffinch	Fri coe
11	Raven	Cor rax
12	Common woodpigeon	Col pal
13	Common chiffchaff	Phy col
14	Golden oriole	Ori ori
15	Hooded crow	Cor cor
16	Common rosefinch	Car ery
17	Icterine warbler	Hip ict
18	Tree pipit	Ant tri

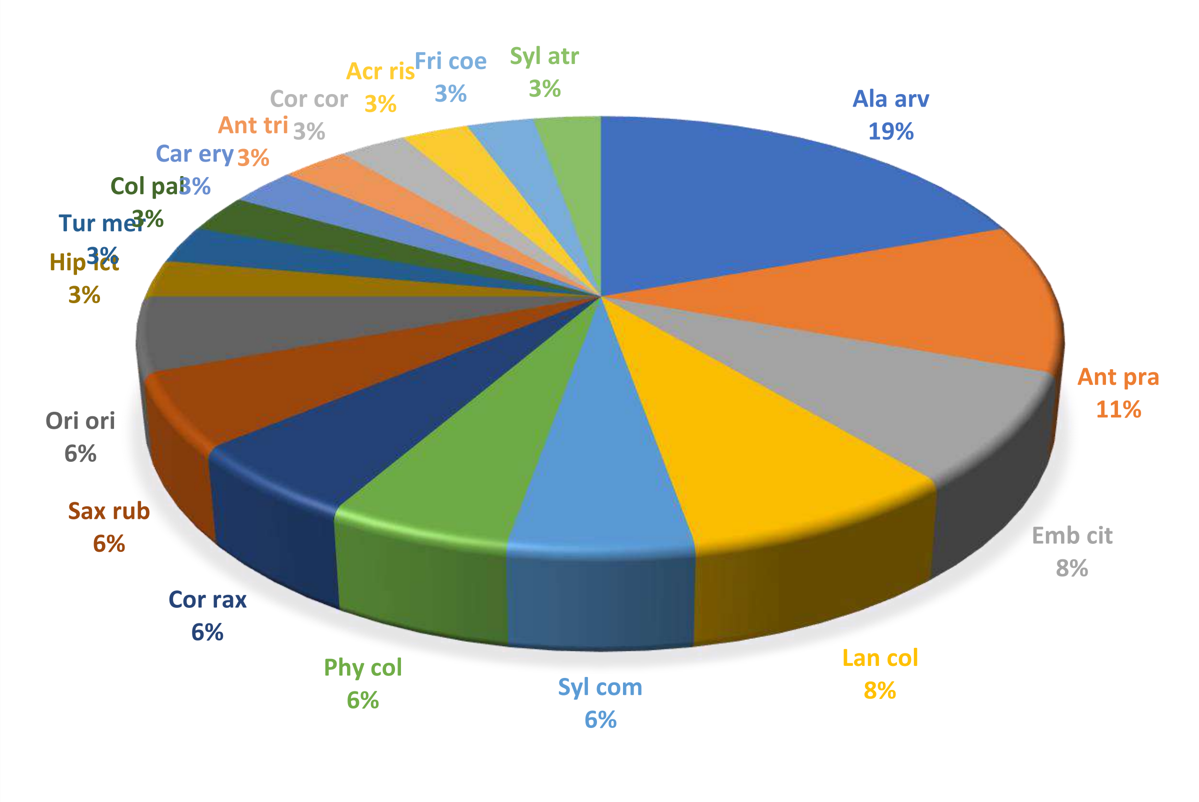


Fig. 43. Bird species composition of wind farm locations of Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone

Species detected up to a distance of 100 m during point surveys will be most significantly affected, as construction work will destroy or change habitats, birds may be disturbed on the spot or further during the construction work during the hatching. Most of the PEA area is agricultural land, therefore the change of agricultural land will not have a significant impact on bird populations. Construction works will not take place in May-June, thus avoiding disturbance to the birds during the hatching. Point surveys show that the most common species within 100 m distance from planned wind turbines are Eurasian skylark, whinchat, meadow pipit, common whitethroat, yellowhammer, red-backed shrike, marsh warbler, common chiffchaff, icterine warbler, common rosefinch, golden oriole, Eurasian blackcap. Species flying over observation sites and non-site-related or associated species were recorded as species observed at a distance of more than 100 m.

Overflights of birds and determination of feeding areas for birds of prey

Overflights of birds and observations of feeding places for birds of prey during the hatching period were carried out in June-July, morning observations were carried out from 6 am to 12 noon and afternoon observations were made from 3 pm to 6 pm. Observations were carried out closer to the planned wind turbine locations to assess the bird species visiting the wind farm area. Bird observations were performed by 2 observers. A flock of birds or individual birds were observed throughout the visually visible flight time. Binoculars, monoculars, binoculars with automatic distance and altimeter (infrared) were used during the observation. The flight paths of the birds are mapped to a map on the smartphone based on an orthophoto, reproducing the flight paths as accurately as possible. During the observations, the following parameters were recorded on paper records: time of flight, species of birds, number of individuals, direction of flight, altitude, flight activity, weather conditions and other relevant notes. All data from the paper data table were entered into computer data sheets in Microsoft Office Excel. “Microsoft Office Excel” data tables are integrated into a common monitoring database by linking species data and flight information to the flight path or other graphical objects (feeding grounds, nesting objects, or bird sites). The report provides summary cartographic material with flight paths, places of feeding, nests, locations.

Observations of bird migrations were carried out from a fixed point in August-November, observations were carried out for up to 3 hours within the period from 7 am to 11 am, and sometimes migratory observations were carried out in the evenings. Bird observations were performed by 3 observers. A flock of birds or individual birds were observed during visually visible flight time. The flight paths of the birds are mapped to a map on the smartphone based on an orthophoto, reproducing the flight path as accurately as possible. Parameters recorded in paper records during observations: time of flight, species of birds, number of individuals, direction of flight, altitude, flight activity, weather conditions and other relevant notes.

In order to identify the assemblages of migratory birds in the PEA and adjacent areas, to capture the species not detected during the observation, the car was driven in search of the assemblages of migratory birds sensitive to the impact of a wind turbine, the size of the assemblage is recorded, the species composition is marked, the locations of the assemblages are marked, and polygons are drawn on an orthophoto-based map on the smartphone. The table shows the numbers of the assemblage polygons, the number of individuals, the species composition, the purpose of the area used (land use and type of land use), weather conditions and other relevant remarks.

<u>Bird species and potential impacts from wind turbines observed in the PEA and adjacent areas</u>

In June-July 56 bird species were observed in the PEA and adjacent areas, the list of all observed and protected bird species is presented in the table below. 6 species of birds in the LRDB (Lithuanian Red Data Book) and 11 species listed in Annex I to Directive 2009/147 / EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (PD) were observed in the PEA and adjacent environments.

Table 8. Bird species registered in the PEA and adjacent areas

Line No.	English name	Latin name	Protection status
1	Willow warbler	*Phylloscopus trochilus*	-
2	White stork	*Ciconia ciconia*	PD annex I
3	White wagtail	*Motacilla alba*	LRDB, PD annex I
4	European Goldfinch	*Carduelis carduelis*	-
5	Great spotted woodpecker	*Dendrocopos major*	-
6	Mallard	*Anas platyrhynchos*	-
7	Great tit	*Parus major*	-
8	Eurasian skylark	*Alauda arvensis*	-

Line No.	English name	Latin name	Protection status
9	Yellowhammer	*Emberiza citrinella*	-
10	Corn crake	*Crex crex*	LRDB, PD annex I
11	Eurasian blackcap	*Sylvia atricapilla*	-
12	Common swift	*Apus apus*	-
13	Black stork	*Ciconia nigra*	LRDB, PD annex I
14	Common blackbird	*Turdus merula*	-
15	Black woodpecker	*Dryocopus martius*	PD annex I
16	Eurasian wren	*Troglodytes troglodytes*	-
17	Eurasian tree sparrow	*Passer montanus*	-
18	Marsh warbler	*Acrocephalus palustris*	-
19	Eurasian jay	*Garrulus glandarius*	-
20	Common woodpigeon	*Columba palumbus*	-
21	Goldeneye	*Bucephala clangula*	-
22	Rook	*Corvus frugilegus*	-
23	Common raven	*Corvus corax*	-
24	European robin	*Erithacus rubecula*	-
25	Common grasshopper warbler	*Locustella naevia*	-
26	Lesser spotted eagle	*Clanga pomarina*	LRDB, PD annex I
27	Tree pipit	*Anthus trivialis*	-
28	Western marsh harrier	*Circus aeruginosus*	PD annex I
29	Common linnet	*Linaria cannabina*	-
30	Common chaffinch	*Fringilla coelebs*	-
31	Common buzzard	*Buteo buteo*	-
32	Common cuckoo	*Cuculus canorus*	-
33	Whinchat	*Saxicola rubetra*	-
34	Red-backed shrike	*Lanius collurio*	PD annex I
35	Common peewit	*Vanellus vanellus*	-
36	Common icterine warbler	*Hippolais icterina*	-
37	Common snipe	*Gallinago gallinago*	-
38	Montagu's harrier	*Circus pygargus*	LRDB, PD annex I
39	Meadow pipit	*Anthus pratensis*	-
40	Grey Heron	*Ardea cinerea*	-
41	Common crane	*Grus grus*	PD annex I
42	Grey partridge	*Perdix perdix*	LRK
43	Grey-headed woodpecker	*Picus canus*	LRDB, PD annex I
44	Common chiffchaff	*Phylloscopus collybita*	-
45	Hooded crow	*Corvus cornix*	-
46	Common quail	*Coturnix coturnix*	-
47	Common rosefinch	*Carpodacus erythrinus*	-
48	Thrush nightingale	*Luscinia luscinia*	-
49	Common whitethroat	*Sylvia communis*	-
50	Song thrush	*Turdus philomelos*	-
51	Magpie	*Pica pica*	-

Line No.	English name	Latin name	Protection status
52	Barn swallow	*Hirundo rustica*	-
53	Rock pigeon	*Columba livia*	-
54	European honey buzzard	*Pernis apivorus*	LRDB, PD annex I
55	Common starling	*Sturnus vulgaris*	-
56	Golden oriole	*Oriolus oriolus*	-

The observation focused on highly sensitive or moderately sensitive bird species, the bird species and their groups were selected according to Table 6 of the Wind Energy Development and Biodiversity Important Projects (VENBIS) in the methodological measure “Standards for determining the significance of potential effects of WT on birds and bats". The sensitivity of birds to wind turbines is determined by the impact of wind turbines on birds, which can be a direct collision, disturbance, obstruction, habitat loss or alteration. Factors influencing direct bird collisions are grouped into species-specific factors (morphology, vision, phenology, behavior, and abundance), location (landscape, flight paths, food abundance and weather) and wind turbine (turbine type and configuration, lighting). (Marques et al, 2014). The main threat to the operation of wind turbines is the direct collisions with wind turbines and deaths of birds, but some birds are exposed more often than others. Locally hatching birds are more likely to encounter wind turbines than migratory birds, as hatching birds spend more time in these areas than migratory species. (Rydell et al. 2012). Collection of data on dying birds from German wind farms between 1989 and 2010 shows that birds of prey account for the largest share of dying birds (37%), Passeriformes (27%), gulls and seagulls (11%), pigeons (7%), ducks, geese and swans (5%) and swifts and swallows (5%), sandpipers (1,8%), storks (1,8%), owls (1,8%), galliformes (0,8%) (Duerr, 2010). According to the data of the VENBIS project in Lithuania, in 2010-2015 in four wind farms, common and abundant bird species that hatch, feed or migrate during migratory periods were killed: Eurasian skylark(22%), mallard(10%), common chaffinch (7%), common starling (5%), barn swallow (5%), redwing(3%), white stork (3%), swift (3%), Eurasian curlew (3%), yellowhammer (2%), common blackbird (2%), common peewit (2%), song thrush (2%), sparrowhawk(2%). The threat arising due to the construction and operation of wind turbines is not only the direct collisions of birds with wind turbines, but also the loss of habitats during the construction of new roads, increased disturbance of people during the maintenance of wind turbines. New roads may contribute to habitat fragmentation, but given that the main areas are agricultural land, habitat fragmentation due to the proposed economic activity will be insignificant or of little significance. Species found during observation in the PEA and adjacent areas, possible effects of wind turbines on bird species or groups are examined below.

<u>*Storks*</u>

Map of stork swarm birds, feeding places, locations observed in Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone is shown in fig. below. 2 nesting sites of white storks (Ciconia ciconia) are registered in the PEA and adjacent areas. Data on white storks were collected during the 2009-2010 census, existing nesting sites were inspected in 2020: the nest located in Bambalai km was abandoned because it was overgrown with branches, in another nest, Šapnagiai it only visited, but did not hatch. Unoccupied nests of the white stork could potentially be used in the future. Species listed in Annex

I to Directive 2009/147 / EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. Although white storks may fly far in search of food, white storks have been observed feeding in sea buckthorn bushes in the PEA area, which occupy large areas in the PEA area. White storks floating in the air currents can fall at the rotor blades of a wind turbine and die. White storks breed in Lithuania most frequently compared to the populations of other countries, therefore the number of dying white storks at the PEA from wind turbines may not exceed 1.8%, as determined in Germany as a percentage of all species of dead birds. According to the VENBIS project, white stork was one of the least dying bird species in Lithuania due to the impact of wind farms - 3% of all dead bird species. The location of the white stork (Ciconia ciconia) nest does not fall within the 500 m radius of the planned economic activity site. White storks have adapted to the anthropogenic environment, wind farms are located at a safe distance and the abundance of the species in Lithuania is high, the expected impact of wind farms on white storks will be minimal.

Black stork (Ciconia nigra) was observed in the wind farm area. Black stork was first observed in a cut-off meadow in the village of Bambalai (47 / 68-15), where it landed in the morning until 10 a.m., at a distance of 0.28 km from the wind turbine 38. In another observation, black stork was recorded flying above Kviečlaukis forest (47 / 68-24), feeding in Dabikinė stream (47 / 68-23), flying above Kviečlaukis forest and nearby forests at a distance of 1.8 km from the wind turbine 36. The nearest known black stork observation sites are in Žagarė forest, 10 km from the PEA (SRIS data), where an adult individual was observed on 14-04-2016, and another location is in the forests of the Kamanų reserve. Black storks fly at an average distance of 3 km in the Baltic States. The PEA area is not suitable for the hatching of the black stork, it prefers large forest massifs. The hatching point can be in the adjacent territory in the northern part, located in large forest massifs (Karpėnai, Lydmiškis) or even in Latvia, in the territory important for the protection of Natura 2000 black storks, Ukru garša reserve, 6.7 km away from the PEA.

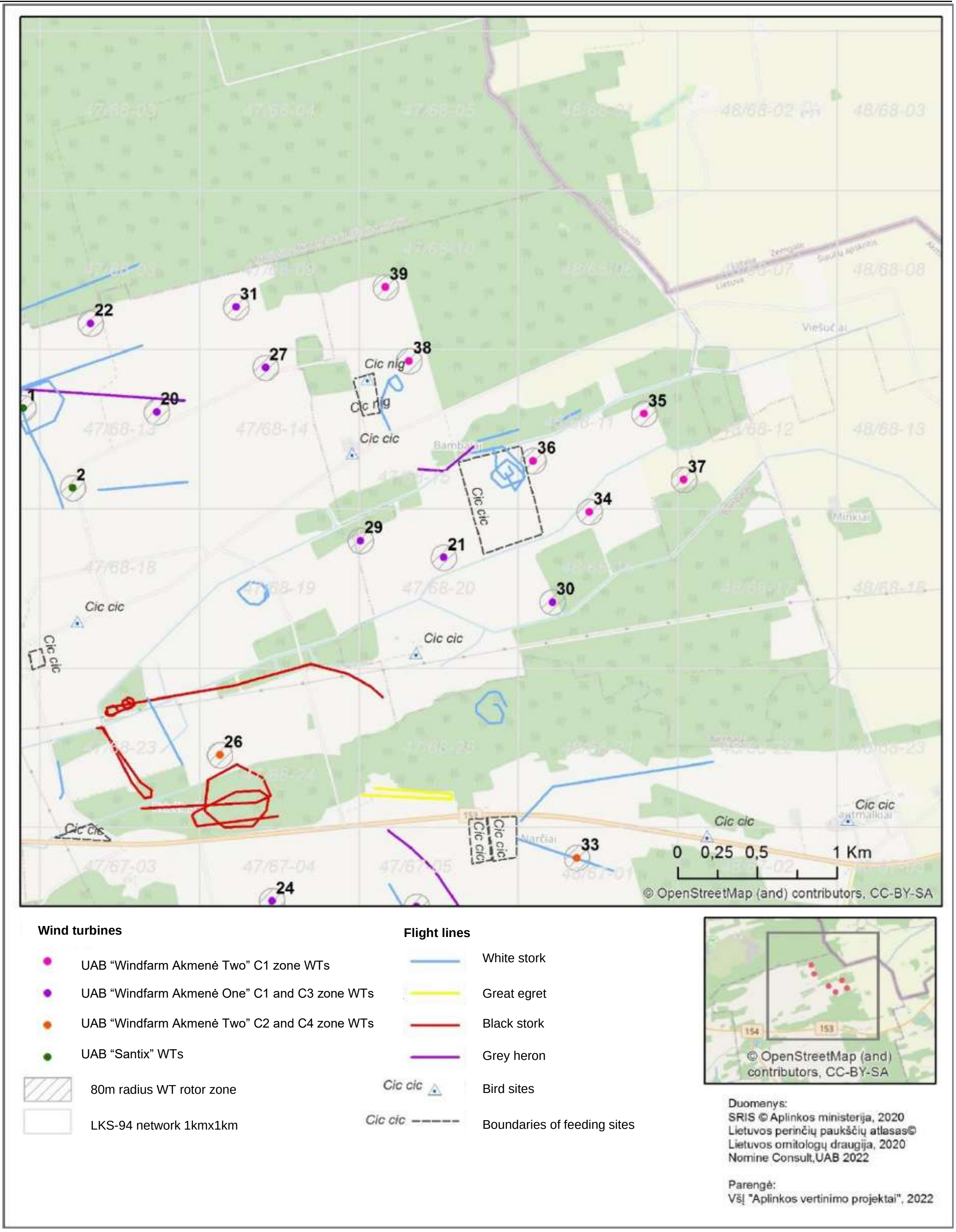


Fig. 44. Map of Ciconiiforme birds flights, feeding places, sites observed in Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone

Great egret (*Ardea alba*) was added to the 2009 November 30 Annex I to Directive 2009/147 / EC of the European Parliament and of the Council on the conservation of wild birds. Great egret is closest observed in square 47 / 68-25. During the hatching period, it is found in swamps, old riverbeds, lake shores, islands overgrown with a wide strip of reeds and bushes. It feeds in shallow waters, on the edges of canals and ponds. The hatching and feeding conditions for Great egret in the PEA and adjacent areas are not favorable.

Grey Heron (Ardea cinerea) is found in the PEA and adjacent areas, overflights are observed, feeds in drainage ditches and streams. Observed at wind turbine 36. Habitats in the PEA area are not suitable for migration, water bodies are lacking, hatch mostly in colonies, forests in the adjacent area are more suitable habitats for gray herons.

During the autumn migrations, white storks (Ciconia ciconia) gather in clusters before flying out, only isolated white storks were observed in Akmenė district at the end of August, and no white stork clusters were observed in the adjacent areas. Black storks (Ciconia nigra) were not observed during migrations. Great bittern (Botaurus stellaris) are nocturnal migrants and were not observed during the day in the PEA and adjacent areas. Great bittern (Botaurus stellaris) are nocturnal migrants and were not observed during the day in the PEA and adjacent areas. Single gray herons (Ardea cinerea) and great egret (Ardea alba) were observed during migrations in the adjacent area in the southern part, unfavorable conditions for the formation of agglomerations in the PEA

Anseriformes, Grebes, Pelecaniformes

Map of flights, places to eat, sites of Grebes, Pelecaniformes, Divers, Anseriformes, observed in Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone areas in zone C1, is shown in Fig. below.
Great crested grebe (Podiceps cristatus) was observed with its young at a distance of 4.5 km from the PEA - Pakalniškės gravel quarry in an artificial water body (47 / 67-02). There are no larger surface water bodies, habitats suitable for passage and accommodation in the PEA territory. No colonies of great cormorants (Phalacrocorax carbo) were detected in the PEA and adjacent areas.

There are no larger surface water bodies in the PEA territory, good conditions for the passage of whooper swan, mute swan. The Whooper swan could hatch in the artificial water body of the Pakalniškės quarry, 4.5 km away from the PEA, or give birth to the already significantly increased juveniles from another water body (Dabikinė stream or Sablauskiai pond). Isolated crossings of mallards (Anas platyrynchos) are observed in the PEA territory, individual pairs may hatch in drained canals, streams and gravel quarries. Goldeneye (Bucephala clangula) was observed in the adjacent area of the Bambalai Gravel Quarry Pond, quarter 48 / 68-06. Greylag goose was not detected in the PEA and adjacent areas during the hatching period. In Germany, the proportion of dying geese (ducks, geese and swans) is significant - at 5%. Hatchings of geese in the PEA area are individual, direct collisions with wind farms in the PEA and adjacent areas are insignificant.

During the autumn migrations, flocks of flying geese were observed during the PEA and in the adjacent areas. Tundra bean geese (Anser serrirostris), taiga bean geese (Anser fabalis) and greater white-fronted geese (Anser albifrons) were observed during migrations. Gray geese were not recorded during the migration period. The

average number of geese flocked in Akmenė district consisted of 54 individuals, with a maximum of 200 individuals. During the observed migrations, 61% of the 56 flights were higher than 70 m (rotor area), the highest up to 800 m. Flying geese were more abundantly observed in the adjacent environment. Herds of geese up to 150 individuals were observed during migration in the PEA and adjacent areas. During the autumn migrations, geese fly in a widespread direction in the PEA and adjacent areas to the south-west and west. Predominant goose species: Tundra bean geese / taiga bean geese and white-fronted geese. No geese assemblages were observed in the PEA area. Flight heights up to 80 m were observed during the spring migrations observed during the VENBIS project. The altitude of a migratory flight is highly dependent on the environmental conditions, when the crosswind is blowing, the birds fly higher when the headwind is blowing - lower. Geese avoid wind turbines, fly around them, conditions in the PEA and adjacent areas are favorable for geese to fly in the eastern parts, where no wind turbines will be built, wind farms located at an average distance of 500 m from each other, which also facilitates geese crossings.
Duck migration in the continental part of Lithuania is low, individual mallards (Anser platyrynchos) have been observed in the PEA and adjacent areas. After the intensification of swan migration in October, in the artificial water body of Pakalniškės, 4.5 km from the nearest wind turbines, large assemblages of whooper swan (Cygnus cygnus) and tundra swans (Cygnus columbianus) began to form. An assemblage of 200 whooper swans and tundra swans was observed in the Pakalniškės artificial water body. Whooper swans and tundra swans spent the night in the Pakalniškės water body, and in the morning they flew to the southwest to feed from the Pakalniškės water body. In Akmenė district, it was found that whooper swans and tundra swans flew at an average height of 31 m, in groups of 15 individuals (maximum 61 individuals), only 1 flight out of 98 flights was higher than 70 m (rotor zone). According to VENBIS data, the average flight altitude of swans varies from 40 to 110 m in spring.

Considering that there are no larger water bodies in the PEA territory, Grebes, Pelecaniformes, Divers, Anseriformes do not form accumulations in the PEA territory, insignificant overflows are observed, therefore the impact of these activities on these birds will be minimal.

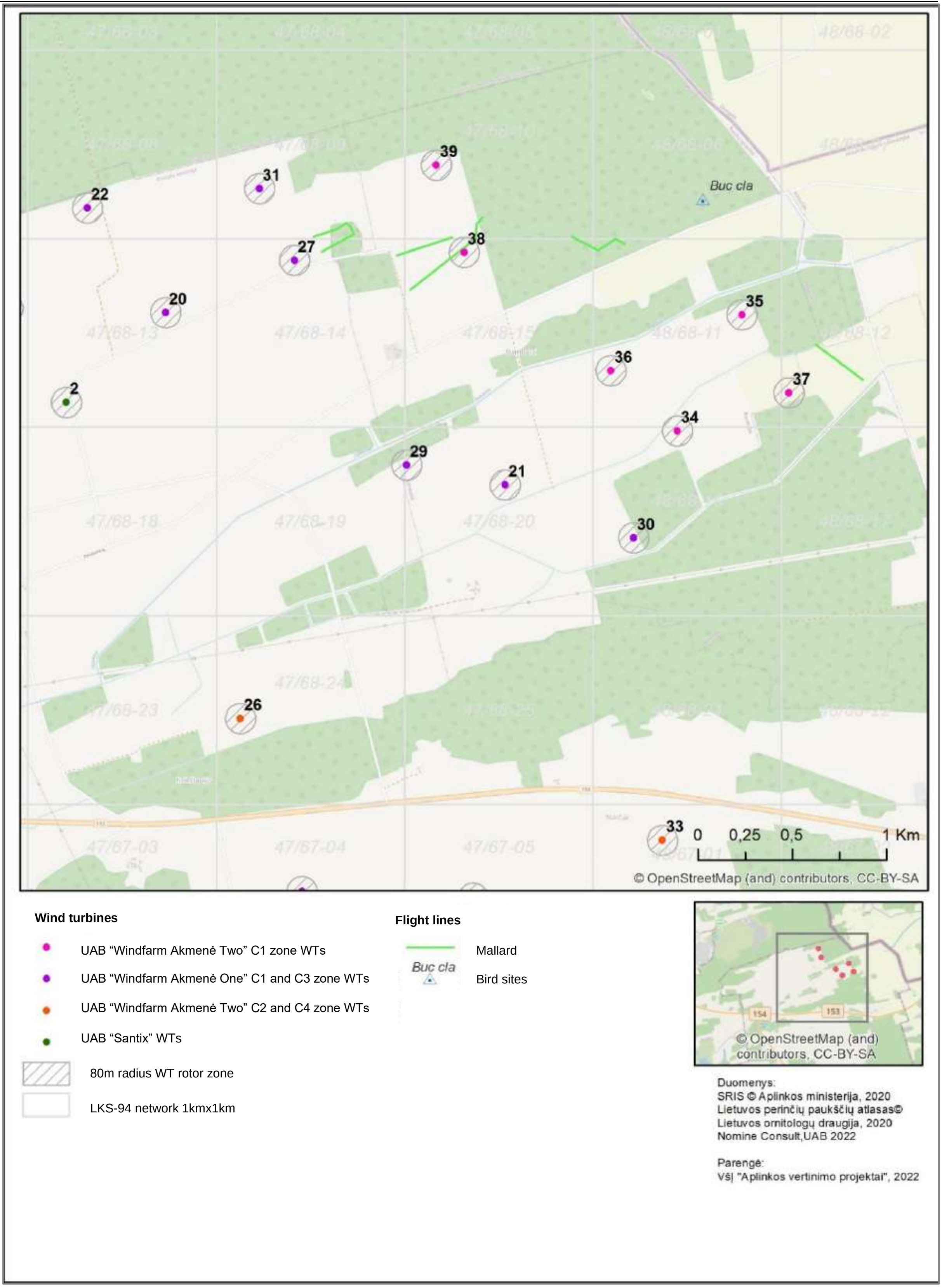


Fig. 45. Map of Grebes, Pelecaniformes, Divers, Anseriformes flights, feeding places, sites observed in Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone

Accipitrinae and Falconiformes

Map of flights, places to eat, sites of Accipitrinae and Falconiformes, observed in Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone areas, is shown in Fig. below.

Despite good visibility, maneuverability, and flying in favorable weather, birds of prey remain one of the largest groups of birds to die from wind turbines. Birds of prey have low reproductive rates, populations are small compared to sparrow birds, and dying individuals can have a significant impact on populations of birds of prey.

European honey buzzard (Pernis apivorus) was added to the 2009 November 30 Annex I to Directive 2009/147 / EC of the European Parliament and of the Council on the conservation of wild birds and the Lithuanian Red Data Book. European honey buzzard observed in the PEA area in Bambalai (47 / 68-15), observed flying over wind turbine 38. The European honey buzzard fed in the PEA area. The nearest other observation sites are in Žagarė forest at a distance of 9 km from the PEA (SRIS data), where an adult was observed on 11-06-2009. According to research telemetry data, European honey buzzards spend the most time in forests, accounting for 69-94% of fixed sites. The hatching point can be in the adjacent territory in the large forest massifs in the northern part (Karpėnai, Lydmiškis) or even in Latvia, in the territory important for the protection of Natura 2000 European honey buzzards, Ukru garųa reserve, 6.7 km from the PEA. European honey buzzard chick was observed on September 7 outside Karpėnai forest, 4 km from wind turbine 39.

Lesser spotted eagle (*Clanga pomarina*) is listed in Annex I to Directive 2009/147 / EC of the European Parliament and of the Council on the conservation of wild birds and in the Lithuanian Red Data Book. In the PEA area, lesser spotted eagle was observed flying near wind turbine 38, more abundantly observed and observed in pairs in the adjacent area, to the west and southwest of the PEA. Lesser spotted eagles are observed feeding in the adjacent area, demonstrating territorial behavior. Lesser spotted eagles in the PEA territory may pass in the adjacent forests (Karpėnai forest, Lydmiškis). The nearest known nest site is in Žagarė forest, 9 km from the PEA (SRIS data), where an adult was observed on 15-09-2015. Lesser spotted eagles make up about 20% of the European population of lesser spotted eagles in Lithuania, therefore it is very important to ensure their protection and favorable conditions for hatching and feeding.

Montagu’s harrier (*Circus pygargus*) is listed in Annex I to Directive 2009/147 / EC of the European Parliament and of the Council on the conservation of wild birds and in the Lithuanian Red Data Book. Montagu’s harrier was observed in the PEA and adjacent areas, 1 individual was observed feeding in Bambalai (47 / 67-14), near wind turbine 38 at 0.38 km, next time near wind turbine 34 at a distance of 0.09 km. Montagu’s harriers hatch in marshy lakes, lake islands overgrown with reeds, abandoned meadows, even in cereal fields. They make their nests on the ground, usually in a wet, drenched place on the stumps. The nest site in the PEA area is unknown. The feeding Montagu’s harrier can fly up to 10 km from the nest. Telemetry surveys in Germany have shown that Montagu's harrier fed on wind farms at regular distances of less than 10 m from blades. When hunting Montagu’s harriers fly low, less than 5 m in height, but 5% of the analyzed flights fell into the area of rotor impact (30–100 m) (Grajetzky, 2013). The likelihood of a collision with Montagu’s harriers is not high.

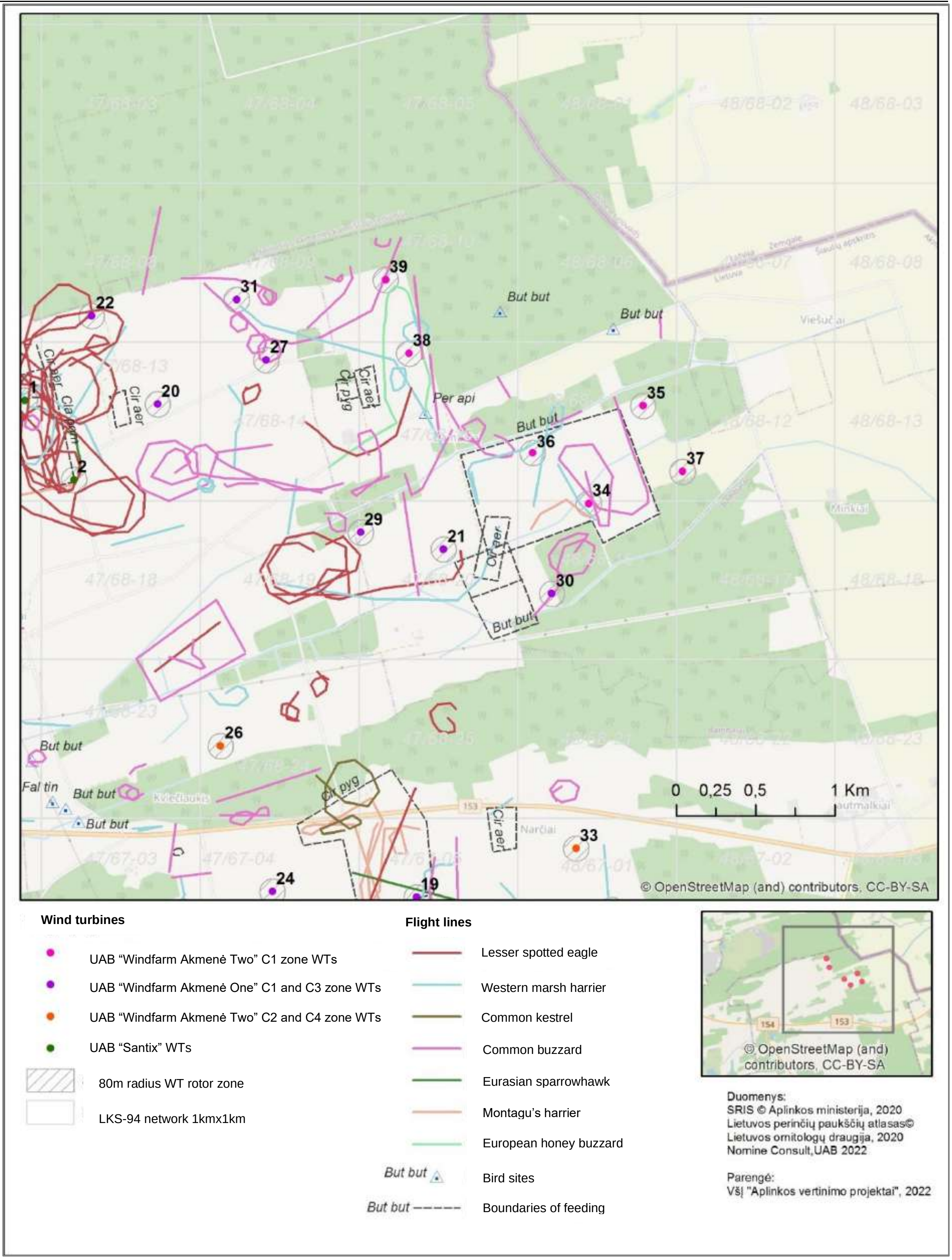


Fig. 46. Map of Accipitrinae and Falconiformes flights, feeding places, sites observed in Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone

Western marsh harrier (*Circus aeruginosus*) is listed in Annex I to Directive 2009/147 / EC of the European Parliament and of the Council on the conservation of wild birds.

Western marsh harrier is a common and widespread species in Lithuania. Observed in the PEA and adjacent areas. The shores of water bodies overgrown with reeds, reedbeds, and sparse shrubs are chosen for the hatching. The conditions for the hatching in the PEA territory are not suitable, there are no large surface water bodies, and the streams are drained. Western marsh harriers feed exclusively on planned wind farm areas, flying in search of food at altitudes of 5-10 m. Of the 142 Western marsh harrier flights observed in the Akmenė district, only 1% of flights were higher than 70 m (rotor area). Western marsh harrier rarely encounters and dies from wind turbines, much less frequently than other birds of prey (Rasran et al. 2009).

Sparrowhawk (Accipiter nisus) - a common and widespread species in Lithuania, can breed in the adjacent area. Of the 48 Sparrowhawk flights observed in the Akmenė district, 8% were higher than 70 m (rotor area). Sparrowhawks do not avoid wind farms, but seldom encounter wind turbines and are killed much less frequently than other birds of prey (Rasran et al. 2009), so the impact on this species is minimal.

Common buzzard (*Buteo buteo*) – common and widespread species in Lithuania. Common buzzards inhabit the edges of various forests, woods. 1-2 couples can hatch in the PEA and adjacent areas. About 7,000 Common buzzard couples can hatch in Lithuania. Monitored in all planned wind farms in the territories several times, keep constant. Common buzzards in wind farm areas feed and glide in thermal air currents. Common buzzards do not shy away from wind turbines and keep a distance of 150 m from wind turbines (Hötker et al. 2006). It feeds lurking on a branch or uses thermal air currents and can get caught between the rotor blades of a wind turbine. Of the 162 Common Buzzards flights observed in the Akmenė district, 21% were higher than 70 m, in Germany, it is one of the most common species of birds of prey to die. In Germany, the highest number of common buzzards was found near wind farms up to 750 m and 2000 m from the edges of wooded areas, surrounded by forests, trees or individual tree shrubs (Bose et al., 2020). The locations of the planned wind turbines are not favorable in regard to common buzzards, as they are built near forest edges, in bushes, but considering that the common buzzard is the most abundant species of birds of prey in Lithuania, the impact of the collision on these birds will be moderately significant.

Species of birds of prey common to autumn migrations observed during autumn migration in the PEA and adjacent areas: common sparrowhawk (*Accipiter nisus*), common buzzard (*Buteo buteo*), and rough - legged hawk (*Buteo lagopus*). During the migrations, single or several migratory birds were observed, but only in small numbers throughout the territory. Common sparrowhawks in Akmenė district were observed flying at an average altitude of 32 m, maximum 100 m, and common buzzards at an average altitude of 44 m, maximum 250 m. Throughout the fall, the common buzzard was observed in the PEA and adjacent areas, as well as the common buzzard was observed several times in the adjacent area. During the migrations, single merlin (Falco columbarius), Hen harrier (Circus cyaneus) and sea eagle (Haliaeetus albicilla) were observed in the PEA and adjacent areas. Merlin was observed at a distance of 0.98 km from wind turbine 38, merlin was observed feeding, with prey on the ground. Hen Harrier was observed in an adjacent area flying and searching for food, 0.5 km from wind turbines 35, 37. An adult white-tailed eagle (Haliaeetus albicilla) was observed in the PEA near 0.2 km from the wind turbine. More abundant sea eagles were observed above or near Pakalniškės forest, 4.5 km away from the planned wind turbines on the southern side. The average flight altitude of a white-tailed eagle in the Akmenė district would be 93 m. White-tailed eagles adhere more closely to water bodies, as there are no larger surface water bodies in the PEA area, so white-tailed eagles rarely visit the PEA area.

Data on dying birds from German wind farms between 1989 and 2010 show that Strigiforme birds account for a small proportion of dying birds at 1.8% (Duerr, 2010). Of strigiforme birds, the voice of the Eurasian pygmy owl (Glaucidium passerinum) is heard the near the wind turbine 36 in the autumn, and the bird is sedentary, which may be a young individual hatching or wandering in an adjacent environment. Eurasian pygmy owls are found and observed in Žagarė Regional Park, Žagarė Forest.

Birds of prey did not accumulate in the PEA and adjacent areas, no large-scale migration of birds of prey over the PEA territory was observed, therefore due to the planned economic activity during the migrations the impact on birds of prey is expected to be minimal.

Galliformes, Gruiformes, Charadriiformes

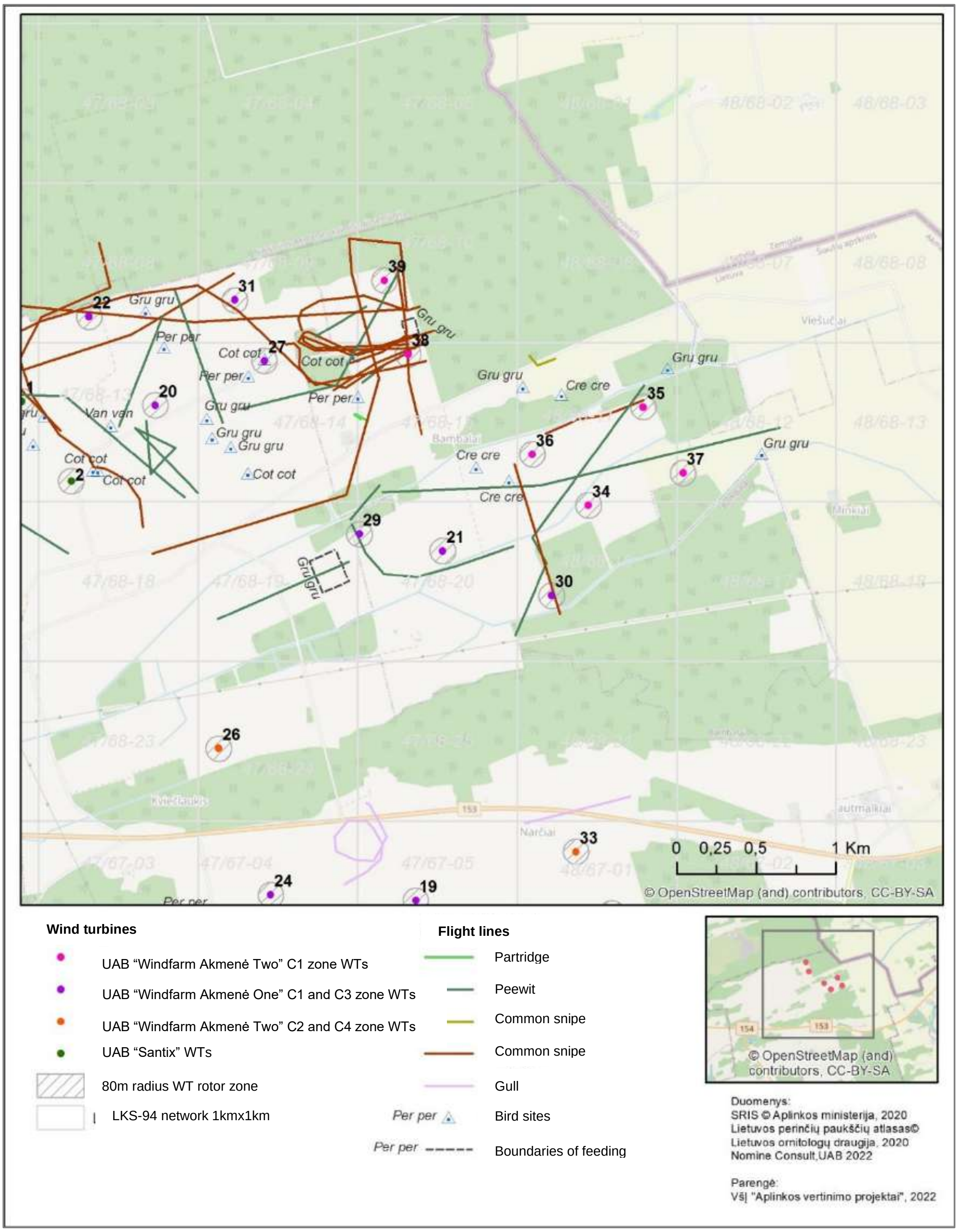
Galliformes often encounter wind turbines because of little maneuverability in flight due to the small wings compared to the whole body. For black grouse, western capercaillie in the PEA territory conditions are unfavorable, arable land predominates, black grouses, western capercaillies in the PEA territory are not detected. There are high marshes in the adjacent area, where black grouse can be found.

Grey partridge (Perdix perdix) is observed throughout the PEA and adjacent areas, it is sedentary species. The species is listed in the Lithuanian Red Data Book, but conditions in these areas are favorable for Grey partridge to live, it is a common and widespread species in the Akmenė District PEA and adjacent areas. In Akmenė district, an average of 1 pair per 2-3 km^2 of agricultural land was observed, the numerous abundance of Grey partridge may have been determined by the warm winter of 2020 favorable for Grey partridge. Mostly observed near roadsides, on the outskirts of agricultural land. During the hatching, the pair stayed close to wind turbine 38, 0.42 km away.

Common quail (Coturnix coturnix) was observed in the adjacent area. This is a common, widespread species in Lithuania. In these areas, the conditions for hatching are favorable to the common quail, found on agricultural land (mostly cereals). n Akmenė district, an average of 1 pair per 2 km^2 of agricultural land was observed. 0.35 km from the planned wind turbine 38 were observed in the PEA territory. Grey partridge and common quail live on agricultural land in the PEA area, therefore the loss of habitats due to the PEA birds will not have a significant negative impact.

Corn crake (Crex crex) is included in Annex I to Directive 2009/147 / EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds and in the Lithuanian Red Data Book. In the PEA and adjacent area, corn crakes were observed at wind turbine 36 in squares 47 / 68-15, 48 / 68-11, at a distance of 0.22 and 0.36 km. The species is listed in the Lithuanian Red Data Book, but under the right conditions, corn crake is a common species. In the PEA area, the conditions for corn crake are not very favorable, dry perennial sea buckthorn bushes predominate, and ameliorated streams, where perennial sea buckthorn berry meadows are also found. Sea buckthorn bushes cover an area of 100 ha, wind turbines built and roads will occupy relatively small areas, so there will be no significant negative impact for corn crake.

Common crane (Grus grus) is a common and widespread species in Lithuania. Feeding in the PEA territory, frequent crossings in the western part of the PEA territory, during observations are often observed while flying past wind turbine 38 between Lydmiškis and the nearby forest. Common cranes fly at low altitudes at an average altitude of 33 m, 7% of the 85 common crane flights observed in the Akmenė district were higher than 70 m, which allows to avoid the rotor ompact area.



Pav. 47. Map of Galliforme, Gruiforme, Charadriiforme bird flights, feeding places, sites observed in Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone

Common peewit (Vanellus vanellus) is a rare species in the PEA and adjacent areas. Common peewit migration began in July, with small transfers of common peewit groups from one field to another.

One of the largest groups of dying birds in Europe is gulls and seagulls, but in Lithuania, after the assessment of dead birds in four wind farms in 2010-2015, no dead gulls and seagulls were found. The conditions for the passage of gulls and seagulls in the PEA territory are not favorable, there are no gull colonies around them, only single flights are observed.

Most Galliforme birds are sedentary. In autumn, a gray partridge was observed in the PEA area, near 38 wind farms. Because common quails are nocturnal migrants, no PEAs have been observed. No other Galliforme birds were observed in the PEA and adjacent areas during the autumn.

During the autumn migration in the adjacent arable soil, near the Karpėnai forest, 1.5 km from the PEA, abundant accumulations of common crane (Grus grus) were observed, up to 200 individuals flying to the Karpėnai limestone quarry for the night. The assemblages have been observed several times in this place, much more favorable conditions for the formation of common crane assemblages are beyond the Karpėnai limestone quarry, where assemblages of up to 600 individuals have been observed during the day. Small groups of 2-4 individual common cranes flying to feeding places were observed in the PEA area. The planned wind farms are not planned to be built between the common crane sleeping place and place to eat. Other Gruiformes, water rail were not observed in autumn in the PEA and adjacent areas, closest observed in Sablauskiai pond, 7.5 km from the PEA.

The Charadriiformes species most frequently observed during migrations: common peewit (Vanellus vanellus) and European golden plover (Pluvialis apricaria). Up to 700 individual common peewit assemblage was observed in the adjacent area at a distance of 0.6 km from the wind turbine 37. Common peewit migration began during the summer, with very large numbers of flying common peewit (4-70 individuals) not observed in the PEA area. In Akmenė district, peewits flew at an average altitude of 40 m during the hatching and migration observations, half of them flew at the height less than 30 m, and the maximum height was 200 m. Few European golden plover assemblages were observed in the PEA territory in autumn, 19 individuals were observed in the PEA area, 0.26 km from the wind turbine 39, and 170 individuals were observed in the adjacent area at 0.6 km from the wind turbine 37. More and more often, the European golden plover is observed in the adjacent environment on the west side. The PEA area is dominated by perennial sea buckthorn bushes, surrounded by larger forest massifs, which is not favorable for the formation of large assemblages of European golden plover and common peewit, the formation of assemblages the is partly determined by the existing land use. Preference was given to plowed soils or low winter crops where good conditions exist for these birds to feed. Common curlew migratory crossings took place in the PEA areas, one crossing was observed during the summer. Individual flights of other sandpipers were observed. In the PEA and adjacent areas, gulls did not accumulate during migrations, observing 1-3 European herring gulls near the wind turbine 36. No seagull crossings were detected in the PEA area, there are no larger surface water bodies in the PEA and adjacent areas, and therefore no negative impact on seagulls is expected. There are no suitable feeding and recreational habitats for Charadriiformes in the PEA areas, so the likelihood of staying is low and the expected impact is minimal.

Passeriformes, Cuculiformes, Apodiformes, Piciformes, Columbiformes

Map of flights, places to eat, sites of Passeriformes, Cuculiformes, Apodiformes, Piciformes, Coraciiforme, Columbiformes, observed in Windfarm Akmenė Two, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone areas, is shown in Fig. below.
According to the VENBIS project, the Eurasian skylark (Alauda arvensis) was the most dying bird species in Lithuania due to wind turbines, accounting for 22% of all bird species killed. According to point counts, the Eurasian skylark is the most commonly found species in the PEA, so the proportion of dying birds may be similar, but the population is large and the impact on the Eurasian skylark population is insignificant.
The PEA area is dominated by ornithofauna of the agrarian landscape living in perennial sea buckthorn bushes, which occupy 100 ha due to the loss of relatively small crops when they are built with wind turbines or roads, hatching birds will not be significantly affected.
Red-backed shrike (*Lanius collurio*) is listed in Annex I to Directive 2009/147 / EC of the European Parliament and of the Council on the conservation of wild birds. Red-backed shrike is a common and widespread species in Lithuania. In the PEA and adjacent areas, good hatching conditions are often found in sea buckthorn bushes. During the hatching, they were mostly observed in sea buckthorn bushes in the PEA territory in quarters 47 / 68-15, 47 / 68-20 and in the adjacent territory in quarter 47 / 68-09. Sea buckthorn bushes cover an area of 1 km^2 in the PEA territory. During construction and operation, sea buckthorn crops will be destroyed only at the sites of wind turbines and the construction of roads towards them, these are relatively small areas, therefore the PEA will not have a significant negative impact on this species. These crops, perennial berry crop fields, are temporary and can be used to grow other crops. Common starling (Sturnus vulgaris) crowded in the PEA in June-July for migration after hatching, no accumulation was observed in the PEA. Barn swallows (Hirundo rustica) observed more frequently in the vicinity of the PEA, observed in the Bambala gravel quarry, were feeding. Common raven (Corvus corax) is more common in the PEA, hooded crow (Corvus cornix), magpie (Pica pica), Eurasian jay (Garrulus glandarius) in adjacent territory. By choosing wind turbines with a larger difference between the ground and the wind turbine, as most Passeriformes fly below the wind turbine blades, sparrow (Passeriformes) birds are expected to have a negligible negative impact on the PEA.
Single or pair crossings of woodpigeons (Columbus palumbus) are observed in the PEA area, especially frequent crossings between the PEA and adjacent forests, woods.
Common swift (Apus apus) was not observed in the PEA area. A larger flying flock was observed near Šapnagiai, in the quarter 47 / 68-24.
Black woodpecker (*Dryocopus martius*) is listed in Annex I to Directive 2009/147 / EC of the European Parliament and of the Council on the conservation of wild birds. Black woodpecker is a common and widespread species in Lithuania, found in the adjacent area, 1 individual was heard shouting in Lydmiškis, quarter 47 / 68-09, 0.55 km from the wind turbine 38. Gray-headed woodpecker (Picus canus) was observed in the

adjacent area, 1 individual was heard shouting in Lydmiškis, in the quarter 47 / 68-15 0.43 km from the wind turbine 38.

Cuckoo (Cuculus canorus) is found in the adjacent area.

Although many birds die due to encountering wind farms, however, due to high reproduction rates and large populations, the impact of wind turbines on Passeriformes is negligible.

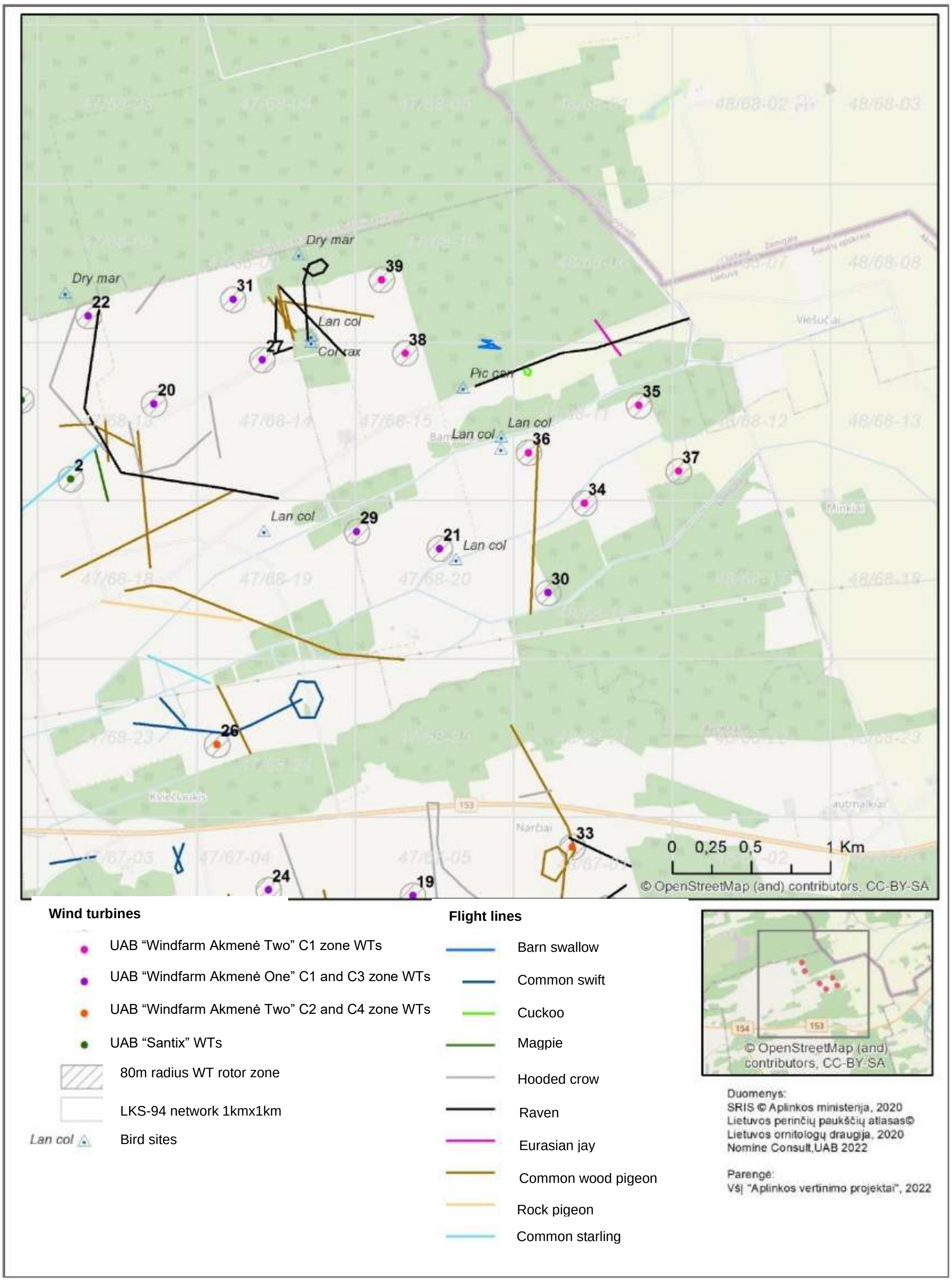


Fig. 48. Map of Passeriformes, Cuculiformes, Apodiformes, Piciformes, Coraciiforme, Columbiformes flights, feeding places, sites observed in Windfarm Akmenė

Passeriformes are the most abundant flock of migratory birds. In the Alaudidae family Eurasian skylark (Alauda arvensis), woodlark (Lullula arborea), horned lark (Eremophila alpestris) were observed. The most commonly observed barn swallow (Hirundo rustica) in the Passeriformes family. Individual migrating great gray shrikes (Lanius excubitor) from the Laniidae family were observed during migration in the PEA and adjacent areas. From the Motacillidae family, meadow pipit (Anthus pratensis). Mistle thrush (Turdus viscivorus), fieldfare (Turdus piliaris), common blackbird (Turdus merula), song thrush (Turdus philomelos) were observed. An accumulation of 300 fieldfares was observed in the PEA area. From the Paridae family, Eurasian blue tits (Cyanistes caeruleus), great tits (Parus major) migrated sparingly. From buntings yellowhammer (Emberiza citrinella), snow bunting (Plectrophenax nivalis) were observed. Of the Passeriformes family most frequently migrated Fringillidae (see figure below), the most abundant species being common chaffinch (Fringilla coelebs), and bramblings (Fringilla montifringilla) were abundantly observed. In addition to these species, other members of the species Fringillidae were observed: European greenfinch (*Chloris chloris*), European goldfinc (*Carduelis carduelis*), Eurasian siskin (*Spinus spinus*), hawfinch (*Coccothraustes coccothraustes*), common linnet (*Linaria canabina*), Eurasian bullfinch (*Pyrrhula pyrrhula*), common redpoll (*Acanthis flammea*). No common starling (Sturnus vulgaris) assemblages were observed in the PEA area during the summer-autumn period in the Sturnidae family. Of the Corvidae family, rook (Corvus frugilegus), western jackdaw (Coleus monedula), single carrion crow (Corvus corone), Eurasian jay (Garrulus glandarius), common magpi (pizza pizza) were sparsely observed during the autumn in the PEA and adjacent areas.

During the observation, the largest flows of Passeriformes were observed around the observer due to the visual and acoustic properties of the observation, unfavorable autumn weather observation conditions and the location of wind turbines in a large area. Higher flows of Passeriformes are usually observed near a wooded area than in the open. More frequent Passeriformes flows during migration from north-west to south-west were observed over wind turbine 39. At wind turbines 34, 35, 36, 37, Passeriformes fly wide, in the northern part, at wind turbine 36 - slightly more abundant and denser. During migration, Passeriformes do not generate large migratory flows in the PEA area. The wind turbines act as a barrier to the passage of Passeriforme birds except Corvidae, however, given the average flight altitude of Passeriformes is 25 m below the wind turbine blades, the impact on Passeriformes should be kept to a minimum.

Migration of Columbiformes birds is not abundant, with small migrating or locally retained flocks of up to 30 individuals of common wood pigeon (Columba palumbus) observed in the PEA and adjacent areas. During migrations, 3 stock doves (Columba oenas) were observed in the adjacent area, 0.5 km from the PEA. The average flight height of Columbiformes flocks flying in the Akmenė district is 23 m, maximum 90 m.

No common cuckoo (Cuculus canorus) of Cuculiforme family was observed during migration in the PEA and adjacent areas due to early migration in July, migration at night.

Common swift (Apus apus) was not observed in the locations of the planned wind turbines.

Eurasian hoopoe (Upupa epops) was observed in Šapnagiai village on August 23, 3 km from the PEA. Eurasian hoopoe in August flies off, making it the most likely migratory bird. If it is a locally hatching bird, the development of power plants will not have a significant impact, as the occupied habitat is small, averaging about 12 ha, of the 15 birds surveyed in France (7.41–30.76 ha) (Barbaro, 2008).
In the artificial water body of the Pakalniškės quarry, 4.5 km from the PEA, 2 common kingfishers (Alcedo atthis) were observed in the autumn. Common kingfisher is listed in Annex I to Directive 2009/147 / EC of the European Parliament and of the Council on the conservation of wild birds and the Lithuanian Red Data Book.
Birds of the Piciformes family were observed in the PEA and adjacent areas during the non-hatching period: was observed at a distance of 0.55 km from the wind turbine 39, 0.22 km from the wind turbine 36, grey-headed woodpecker (*Picus canus*) – 0.27 km from the wind turbine 36, 0,43 km from the wind turbine 38, middle spotted woodpecker (*Dendrocoptes medius*) was observed at the distance of 0,42 km from the wind turbine 36. Great spotted woodpecker (Dendrocopos major) visits the PEA.

Sensitivity of areas in relation to the breeding birds in the PEA and adjacent areas according to VENBIS data

According to the database created during the VENBIS project, a concentration of hatching birds, wintering birds and migratory birds is concentrated in or near the analyzed area. According to the sensitivity maps of the areas created during the VENBIS project, the PEA area falls into the areas of moderate or low sensitivity for breeding birds (see figure below) and areas for which there were insufficient data to identify migratory and wintering birds (see figure below). Data collected in the PEA and adjacent territories in June-November and data of the PEA territory VENBIS were supplemented with new observed species, new species assemblages.
According to the VENBIS database "Sensitive areas for hatching birds 1x1 km" wind turbine No. 34 falls into moderately sensitive areas.
The PEA area where the planned wind turbine No. 34 is classified as moderately sensitive areas due to the moderately sensitive common crane (Grus grus). Species sensitive to wind turbines were observed in these quarters during the monitoring: Montagu’s harrier (*Circus pygargus*), western marsh harrier (*Circus aeruginosus*).
According to the VENBIS database "Sensitive areas for hatching birds 1x1 km", wind turbines No. 35, 36, 37, 38, 39 fall into less sensitive areas for breeding bird.
PEA territory, where wind turbines No. 36, No. 38 are planned, are classified as low-sensitive areas due to the types of wind turbine-sensitive plants according to the birds found: lesser spotted eagle (*Clanga pomarina*), common buzzard (*Buteo buteo*) and common crane (*Grus grus*). Species sensitive to wind farms were observed in this area during the monitoring: European honey buzzard (*Pernis apivorus*), western marsh harrier (*Circus aeruginosus*), white stork (*Ciconia ciconia*), black stork (*Ciconia nigra*).
PEA area, where the wind turbines No. 35, No. 37 are planned, are classified as low-sensitive areas due to the species sensitive to the effects of wind power plants according to the detected birds: common buzzard (*Buteo buteo*), common peewit (*Vanellus vandellus*) and common crane (*Grus grus*). Species sensitive to the impact of wind turbines observed in his area – western marsh harrier (*Circus aeruginosus*).

PEA area, where the wind turbine No. 39 is planned, is classified as a low-sensitive area due to the species little sensitive to the impact of wind turbines: common buzzard (*Buteo buteo*) and common crane (*Grus grus*). Species sensitive to the impact of wind turbines observed in his area: western marsh harrier (*Circus aeruginosus*), European honey buzzard (*Pernis apivorus*).

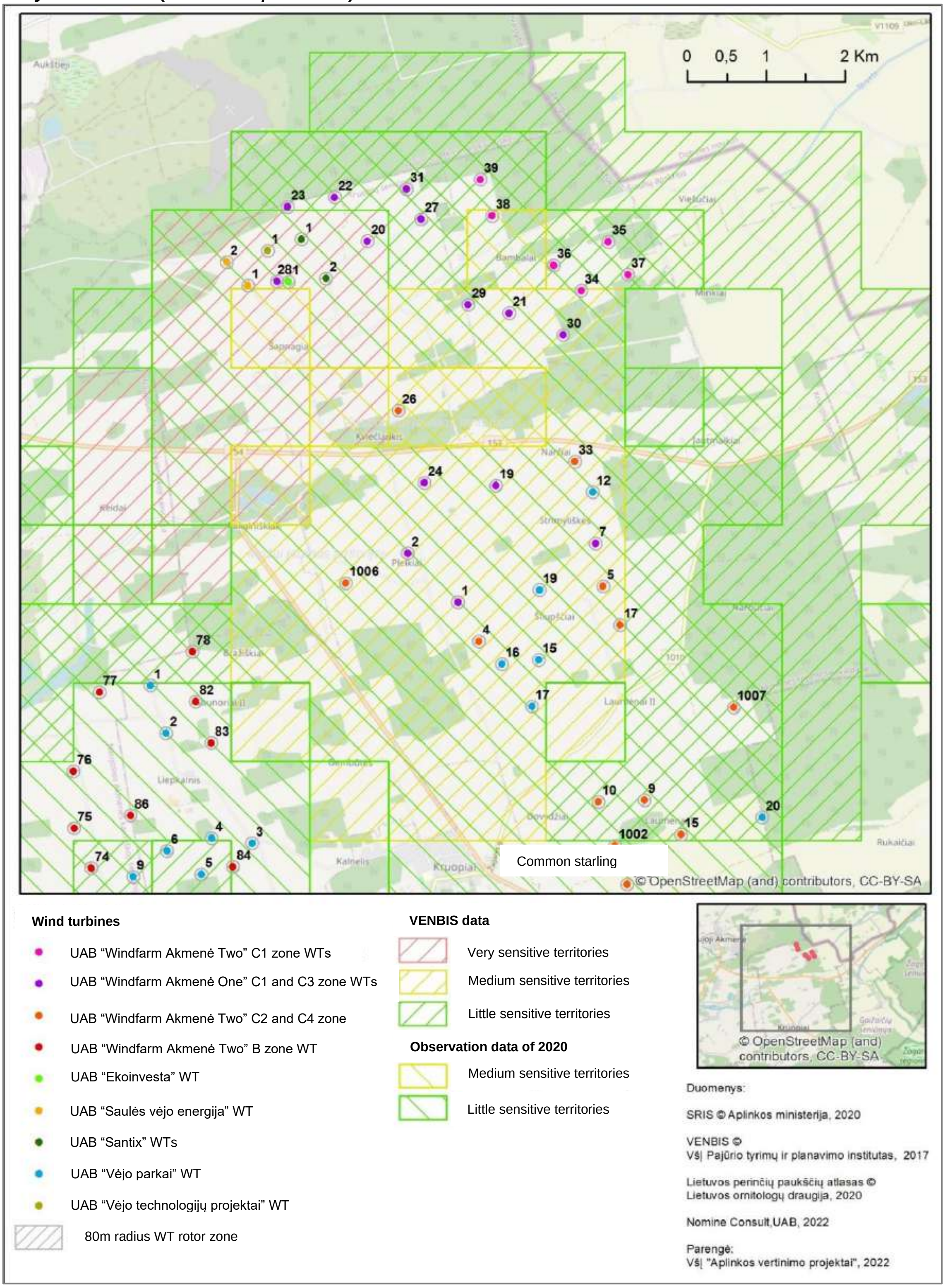


Fig. 49. Sensitivity of areas in relation to the breeding birds in the PEA and adjacent areas according to VENBIS data with supplemented data of 2020

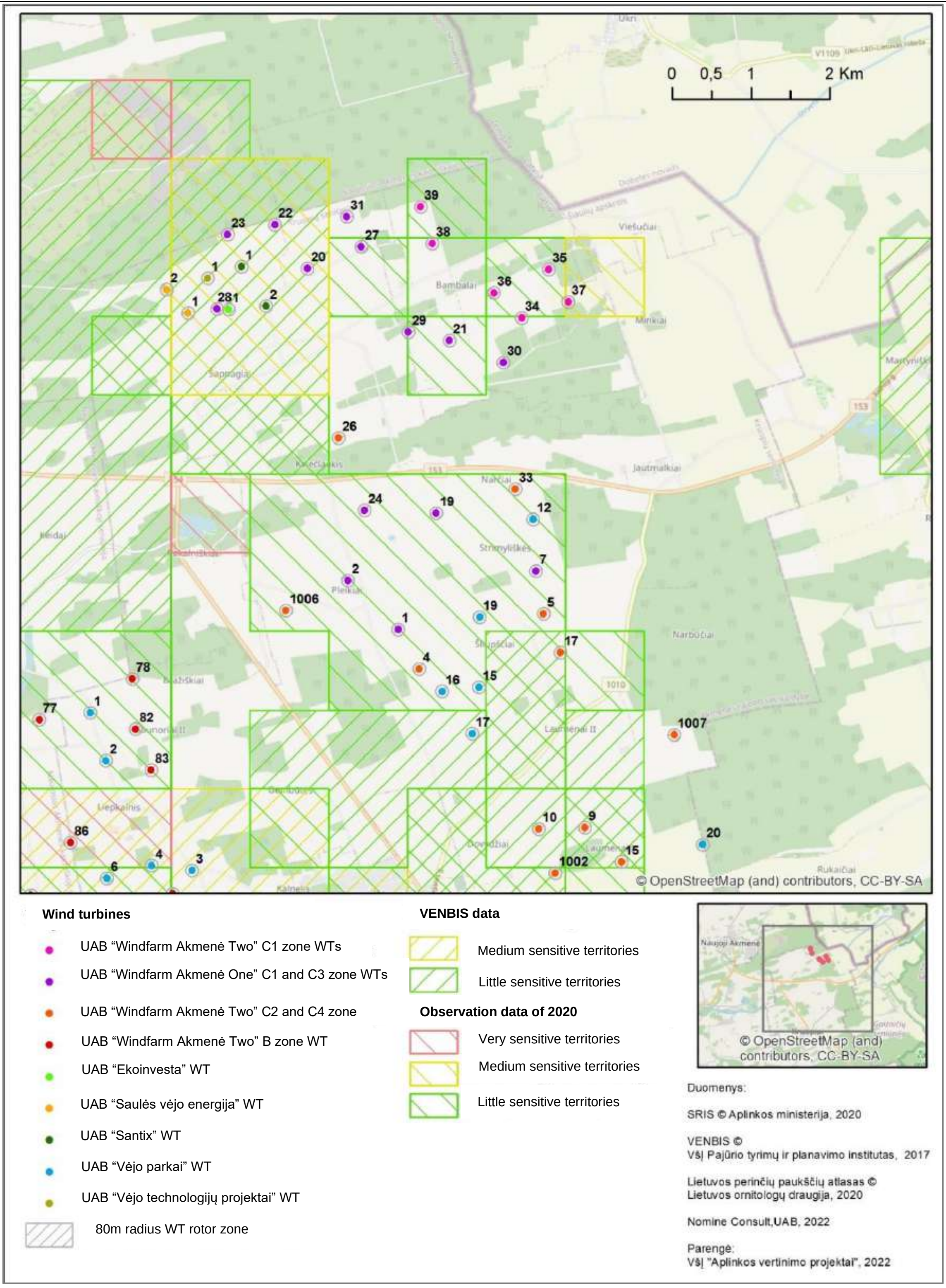


Fig. 50. Sensitivity of areas in relation to migrating and wintering birds in the PEA and adjacent areas according to VENBIS data with supplemented data of 2020

Migratory birds in the PEA and adjacent areas

Visually we can observe only the lower migration of birds, which makes up only a small part of all migrations: in Lithuania up to 10% of birds (Žalakavičius et al., 1995). Visual and radar observations show different reactions of birds to the wind direction - the radar sees birds migrating high downwind, whereas visually observing observer sees migrants flying low against the wind, using weaker winds and exploiting landscape features (Axell H. E. et al. 1963). The normal flight altitude for most migrants is 1000-1600 meters above sea level and does not include the area affected by the rotor of wind turbines.

According to the VENBIS database "Venbis Migratory Birds - Sensitive Areas for Migratory and Wintering Birds 1x1 km", the PEA area is not included in the sensitive areas. Wind turbines No. 34, 35, 36, 37, 38, 39 fall into areas, for which data were insufficient to identify migratory and wintering birds. During the migration observations in 2020, the data were supplemented with the observed bird species and assemblages.

For the PEA areas where wind turbines No. 34, No. 36 and No. 38 are planned, according to the data collected during migrations and the birds found, the data were not sufficient to determine the sensitivity.

The PEA area where wind turbines No. 35 and No. 37 are planned, according to the data collected during migrations and the birds found, can be classified as low-sensitive areas due to the vulture.

The PEA area where wind turbine No. 39 is planned may be classified as a low-sensitivity area due to European golden plover according to the data collected during migration and the birds found. Observations show that European golden plovers gather in clusters at wind turbine 39, 19 individuals were observed. In another part of the PEA area due to non-edible agricultural land for birds, bushes of perennial sea buckthorn, clusters of European golden plovers were not observed. European golden plovers, common peewits prefer more open agricultural land during migration, and perennial sea buckthorn bushes with meadows predominate in the PEA territory, which is not favorable for the formation of large accumulations of European golden plover and common peewit. European golden plover (Pluvialis apricaria) minimum stock size 100 individuals, maximum stock size 500 individuals, common peewits (Vanellus vanellus) minimum stock size 100 individuals, maximum stock size 500 individuals. European golden plover and common peewit accumulations exceeding the minimum number of individuals were observed only in the adjacent area - 0.6 km from the wind farm, where common peewit accumulations amounted to more than 500 individuals. In addition, according to the VENBIS project, European golden plover (common peewits) mostly flew at an altitude of 60 to 80 meters, which falls within the area of the wind turbine blades. During the observation in Akmenė district, European golden plovers flew at an average altitude of 63 m, maximum observation at 400 m, and common peewits at an altitude of 40 m, maximum altitude of 200 m. According to the dying birds, the European golden plover is not recorded in wind farms in Lithuania, although it is often observed during migration at operating wind turbines, therefore the expected impact on migrating European golden plover and peewits will be minimal. The areas dedicated to the protection of the Mūša grove and the Kamanai wetlands are included in the soil seedling protection network. The conditions for the formation of accumulations of peewits and European golden plover in the PEA territory are not favorable, therefore the PEA will not significantly affect the migration of soil seedlings. According to the data of the VENBIS project, birds of prey in all the studied spring seasons mostly flew well below the zone of wind turbine blades - up to 30 meters, in Akmenė district the average flight altitude during all observations was 41 m.

According to the VENBIS project, all Passeriformes (rooks), Columbiformes fly below the boundaries of the wind turbine rotor area, with average flight altitudes ranging between 26 and 37 m. The average flight height of Passeriformes birds flying in the Akmenė district is 25 m. The average flight height of Columbiformes birds flying in the Akmenė district is 31 m. Given the flight altitudes, the PEA is not expected to have a significant effect on the migration of Passeriformes birds. No significant adverse effects on Passeriformes birds are expected.

Bats

Expert of bats, chairman of the Society for the Conservation of Bats in Lithuania, biologist Deividas Makavičius conducted research on bats and prepared an assessment in the PEA territory.

To date, 14 species of bats (Chiroptera) have been registered in Lithuania. For a long time, 15 species have been identified, of which whiskered bat (Myotis mystacinus) has only been identified from the only skull found in the 1978 karst cave "Cow's Cave". Also located in the public space are new species of Greater mouse-eared bat (Myotis myotis) in Lithuania, which are indicated by researchers of the Lithuanian Ornithological Society and other institutions. The Bat Conservation Society did not confirm that this species was found in Lithuania after checking the records submitted by them. In the future, with the change of climate, increasing geographical development of bat species and their increasing research, the following species may be found in Lithuania: Plecotus austriacus, Myotis myotis, Pipistrellus kuhlii, and Myotis mystacinus.

Bat species found in Lithuania:

- Pond bat (Myotis dasycneme) – Lithuanian Red Data Book;
- Daubenton’s bat (Myotis daubentonii);
- Brandt's bat (Myotis brandtii) – Lithuanian Red Data Book;
- Natterer’s bat (Myotis nattereri) – Lithuanian Red Data Book;
- Brown long-eared bat (Plecotus auritus);
- Western barbastelle (Barbastella barbastellus) – Lithuanian Red Data Book;
- Common noctule (Nyctalus nactula);
- Lesser noctule (Nyctalus leisleri);
- Common pipistrelle (Pipistrellus pipistrellus);
- Nathusius’ pipistrelle (Pipistrellus nathusii);
- Soprano pipistrelle (Pipistrellus pygmaeus);
- Parti-coloured bat(Vespertilio murinus) – Lithuanian Red Data Book;
- Northern bat (Eptesicus nilssonii);
- Serotine bat (Eptesicus serotinus) – Lithuanian Red Data Book.

Species to be searched:

- Greater mouse-eared bat (Myotis myotis);
- Whiskered bat (Myotis mystacinus);
- Grey long-eared bat (Plecotus austriacus);

- Kuhl’s pipistrelle (Pipistrellus kuhlii).

Bats listed in Council Directive 92/43 / EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora and found in Lithuania:

- Barbastella barbastelus – annexes IV, II;
- Eptesicus nilssonii – annex IV;
- Epteicus serotinus – annex IV;
- Myotis brandtii - annex IV;
- Myotis dasycneme – annexes IV, II;
- Myotis daubentonii – annex IV;
- Myotis nattereri – annex IV;
- Nyctalus leisleri – annex IV;
- Nyctalus noctula – annex IV;
- Pipistrellus nathusii – annex IV;
- Pipistrellus pipistrellus – annex IV;
- Pipistrellus pygmaeus – annex IV;
- Plecotus auritus – annex IV;
- Vespertilio murinus – annex IV.

For flying bats, it is important that they do not fall within the operating range of the wind turbine rotor. The species of bats flying high (> 40 m) are listed in the table below.

It should be noted that some species choose different flight altitudes during feeding and migration: Daubenton’s bat (Myotis daubentonii), pond bat (Myotis dasycneme), Brandt’s bat (Myotis brandtii), common pipistrelle (Pipistrellus pipistrellus), Nathusius’ pipistrelle (Pipistrellus pipistrellus), Soprano pipistrelle (Pipistrellus pygmaeus), and brown long-eared bat (Plecotus auritus). In the planned zone C1 of the wind farm, the following species may be slightly affected due to the operation of the rotors: Myotis daubentonii, Nyctalus noclula, Eptesicus nilssonii, Pipistrellus nathusii, Pipistrellus pipistrellus and Plecotus auritus.

Table 9. Behavioral and migration characteristics of bats

Bat species	Hunting areas near habitats	Long - distance migrants	High flying (>40 m)	Low flying	Attrac ted by light	Risk of losing hunting grounds
Myotis daubentonii	X		X	X		
Myotis dasycneme		X	X	X		
Myotis nattereri	X			X		
Myotis brandtii	X		X	X		
Nyctalus noctula		X	X		X	X
Nyctalus leisleri		X	X		X	X
Eptesicus nilssonii			X		X	
Eptesicus serotinus		?	X		X	
Vespertilio murinus		X	X		X	X
Pipistrellus pipistrellus	X		X	X	X	
Pipistrellus nathusii	X	X	X	X	X	
Pipistrellus pygmaeus	X	X	X	X	X	
Plecotus auritus	X		X	X		
Barbastella barbastellus	X			X		

Research methods

According to the recommendations of the project “WIND ENERGY DEVELOPMENT AND BIODIVERSITY AREAS (VENBIS)” No. EEE-LT03-AM-01-K-01-004 Activity No 3.1.3. “Development of Standards for Monitoring Programs for Exposure to Birds and Bats in Wind farms”, a transective bat survey method was applied, selecting 3 transects (fig. below). In order to collect additional data on bats in the C1 exposure area, a spot bat counting survey method was also used. 1 counting point was selected (fig. below). The geographical coordinates of transects and counting points (LKS-94) are given in the table below.

Fig. 51. Bat counting points and routes (transects)

Table 10. Geographical coordinates of transects and counting points (LKS-94)

Counting point No.	**Coordinate (LKS-94)**	
6	438241, 6243341	
Counting transect No.	**Coordinate (LKS-94)**	
	Start	**End**
2	437221, 6242223	438914, 6242944
3	439589, 6242415	439781, 6241714
4	439993, 6242812	441031, 6243242

The research of bats for the identification of species, identification of their breeding and feeding areas, identification of migration intensity in the area covered the entire period of their maximum activity (from 1 June to 28 September 2020). The surveys were carried out throughout the wind zone C1 and the adjacent area. Bat counts were performed with ultrasonic detectors Pettersson d240x and Echo Meter Touch 2 PRO.

Bat counts during juvenile rearing and adult feeding were performed once every 2 weeks with overnight monitoring. During the migrations (August II decade - September) the accounting was performed once a week, during the whole dark part of the day. The surveys were carried out using portable ultrasonic detectors, passing through transects that covered different elements of the landscape (tree strips, shores of water bodies, bushes, meadows, etc.) and different distances from wind turbines.

Observation data were recorded in a data collection table indicating date, time, coordinates, bat species, number, weather conditions, and nature of observation. Transect records were carried out on foot and recorded all bat detection cases. Point counts were performed at the selected point to record all bat detection cases within 10 minutes. Bats were observed in calm weather, without strong wind and rain, at temperatures below 7 ° C (above 10 ° C during the study).

Results

The Protected Species Information System (SRIS) does not contain any records of sites found in zone C1 during the breeding and feeding or migratory periods of bats.

Bat species survey in zone C1 conducted in June-September 2020 was carried out using Venbis and Eurobats methodological guidelines for bat surveys. Chiropterological studies (52 study hours using transectal and point accounting methods) in the PEA area (zone C1) revealed 3 species of bats: Eptesicus nilssonii, Nyctalus nactula and Pipistrellus nathusii. 16 data on the detection / transfronts of bat species in the study area were collected. No bat breeding colonies were detected in the planned zone C1 of the wind farm.

Table 11. Species composition and abundance of bats in zone C1

Line No.	Name of the species	Abbreviation for species name	Detection cases (individual)	
			During the breeding period	During the migration period
1.	Northern bat	Ept nil	9	1
2.	Common noctule	Nyc noc	1	2
3.	Nathusius' pipistrelle	Pip nat	3	0
	Total:	3	13	3

Data on the species composition and abundance of bats for transects and counting points are given in the tables below. The species composition of bats during the breeding season in zone C1 and the species composition of bats during the migration period in zone C1 are shown in the figure below.

Table 12. Species composition and abundance of bats in wind farm C1 zone transects No. 2-4 during breeding and migration periods

Transect No.	Name of the species	Abbreviation for species name	Detection cases (flights)	
			During the breeding period	During the migration period
2	Common noctule	Nyc noc	1	2
3	Northern bat	Ept nil	2	0
4	Northern bat	Ept nils	7	1
	Nathusius' pipistrelle	Pip nat	3	0
		Total:	**13**	**3**

Table 13. Species composition and abundance of bats in wind farm C1 zone counting point No. 6 during breeding and migration periods

Point No.		Name of the species	Abbreviation for species name	Detection cases (flights)	
				During the breeding period	During the migration period
6		-	-	0	0
	Total :		0	0	0

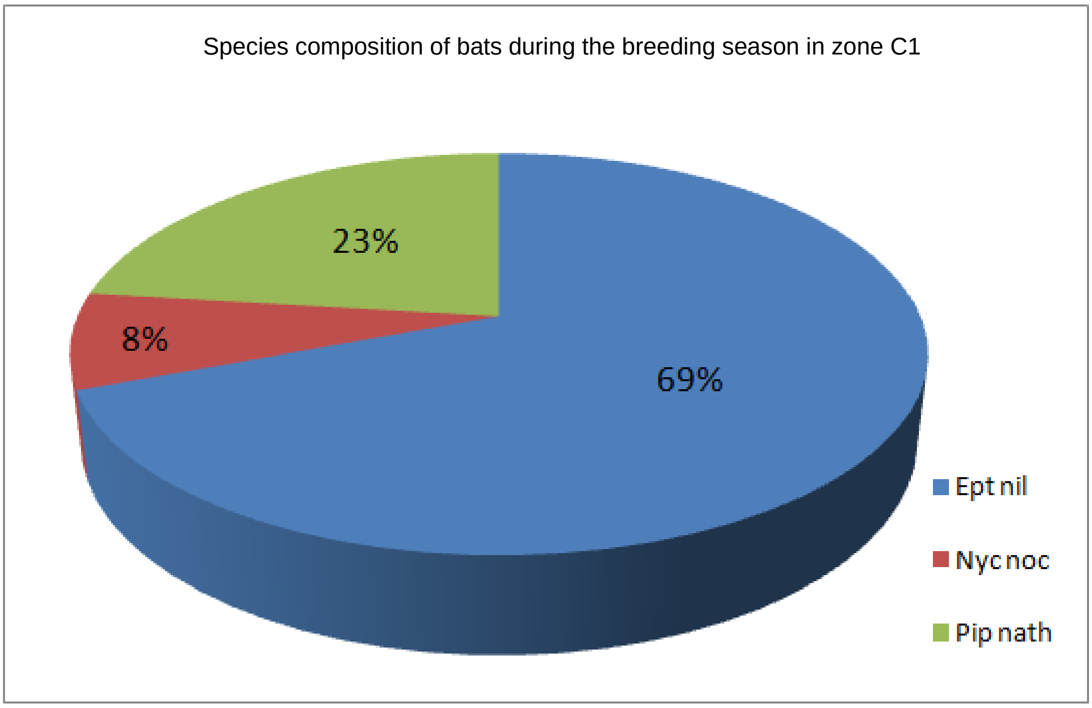


Fig. 52. Species composition of bats during the breeding season in zone C1

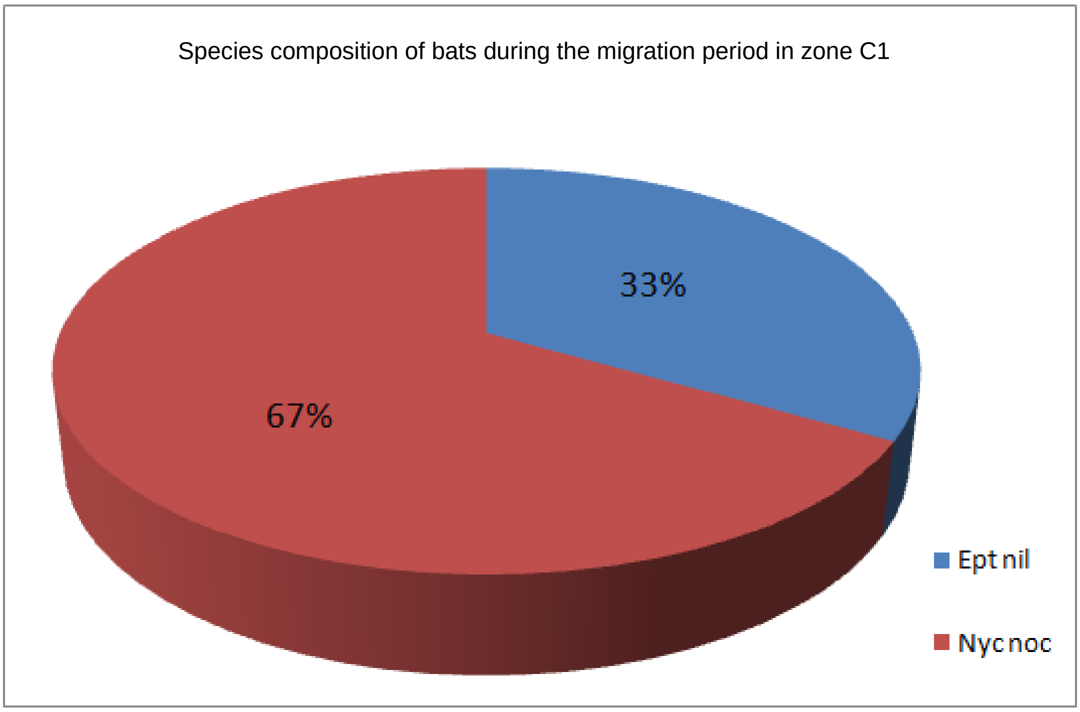


Fig. 53. Species composition of bats during the migration period in zone C1

Summarizing the collected data, it was found that the northern bat (10 registrations), Nathusius 'pipistrelle (3 registrations) and common noctule (3 registrations) predominate in the study area. It should be noted that the northern bat is the most abundant species during the breeding season and the common noctule during the migratory period. Northern bat is a local, wintering species or a close migrant, some of which are not included in the migratory registrations.

<u>Significance of WT impact on bats in C1 and C3 zones</u>

There was little research on bats in the planned VE area during the VENBIS project. The nearest isolated areas are marked as low-sensitivity VENBIS areas for bats (see fig. below).

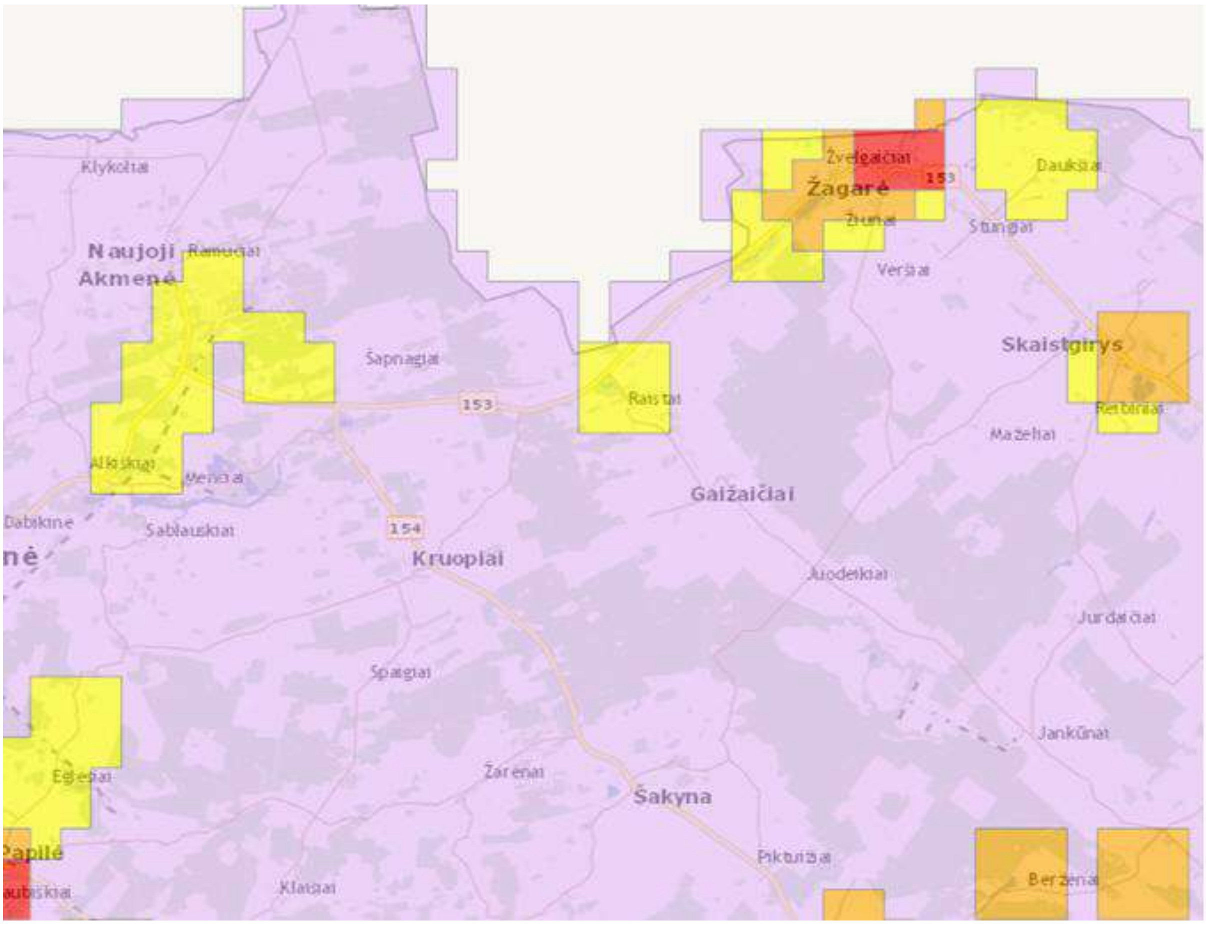


Fig. 54. Sensitivity of areas in the PEA area with respect to bats (VENBIS, 2017)

The planned activities during the breeding, feeding and migration of bats in zone C1 of the wind farm will not have a negative impact as no breeding colonies of bats have been identified in the territory of the wind farm. Feeding areas and migratory crossings are relevant for Eptesicus nilssonii, Pipistrellus nathusi, Pipistrellu, and Nyctalus noctula. All these species were found to feed only in the C1 area. Only temporary individual cases of Eptesicus nilssonii, Pipistrellus nathusii and Nyctalus noctula have been recorded in the PEA during the breeding season. Scattered, non-concentrated cases of flying bats (Eptesicus nilssonii, Nyctalus noctula) were observed during migrations, some cases of Eptesicus nilssonii flies recorded during migration are not included in the migration registrations.

Zone C1 of wind turbines is not important for bats as feeding grounds, as it is dominated by agricultural land where monocultures are grown: oilseed rape, various cereals. Such habitats are unattractive to bats due to the poor diversity and abundance of species of Lepidoptera, Diptera, Coleoptera, etc. There are also no larger bodies of water in the WT area that are necessary for bat breeding colonies. The nearest feeding places according to the database of SRIS and the Society for the Conservation of Bats in Lithuania are determined in Šapnagiai village: northern bat (Eptesicus serotinus), in the quarry of Pakalniškiai: Daubenton's bat (Myotis daubentonii), in the quarry of Menčių: common noctule (Nyctalus noctula) and Daubenton's bat (Myotis daubentonii).

In summary, it is estimated that the installation of up to 6 wind turbines in the PEA area will not have a negative impact on bats or will be very minimal.

<u>Total impact of wind turbines on bats during breeding and migration in the adjacent area</u>

When reviewing the total impact of wind turbines on bats, the nearest wind turbines from the PEA area within a radius of about 10 km are assessed according to the territorial planning documents. Bat counts (transects and counting points) were carried out in the PEA area as shown in Fig. below.

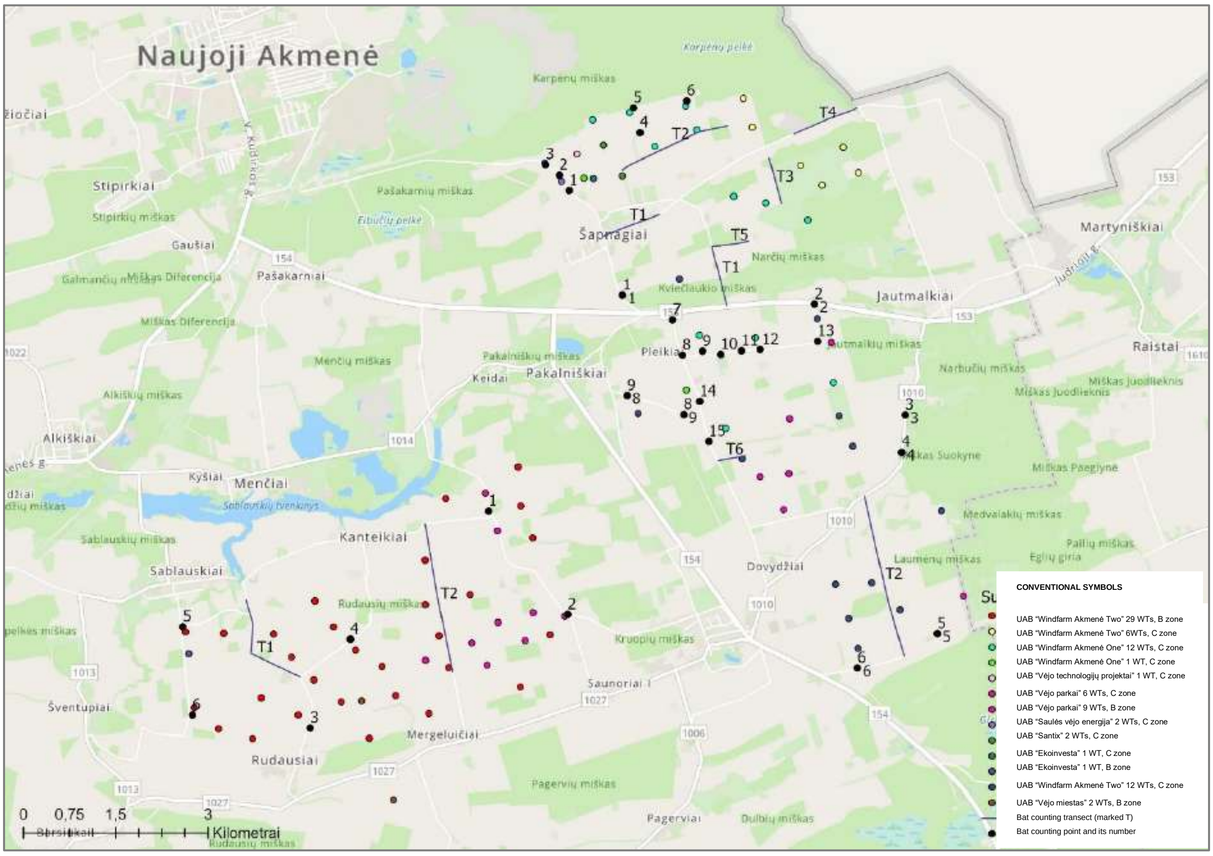


Fig. 55. Scheme of bat accounting transects and points in the PEA territory

Currently 1 wind turbine is operating in the territory of the PEA by UAB "Vėjo investicijų projektai", other wind turbines are planned to be built. Wind turbines of other economic entities (UAB "Windfarm Akmenė One", UAB "Windfarm Akmenė Two", UAB "Vėjo parkai", UAB "Santix", UAB "Saulės ir vėjo energija", UAB "Ekoinversta") are planned in the PEA and adjacent territories (zone C).

Examining the impact zones of wind turbines of other economic entities, it was found that the total area of wind turbines will not have a significant cumulative negative impact on bat species, as breeding colonies identified in this area are local, feed a short distance from the colonies, and choose to fly along rivers (Venta, Virvytė, Dabikinė, etc.). A project carried out by the Bat Conservation Society in 2004 to identify Nathusius' pipistrelle migration flows in Lithuania (with more than 300 special nests) found that the main migration routes stretched to the western (coastal) and eastern parts of Lithuania. Elsewhere (e.g. in the north) migration is fragmented, unconcentrated (fig. below).

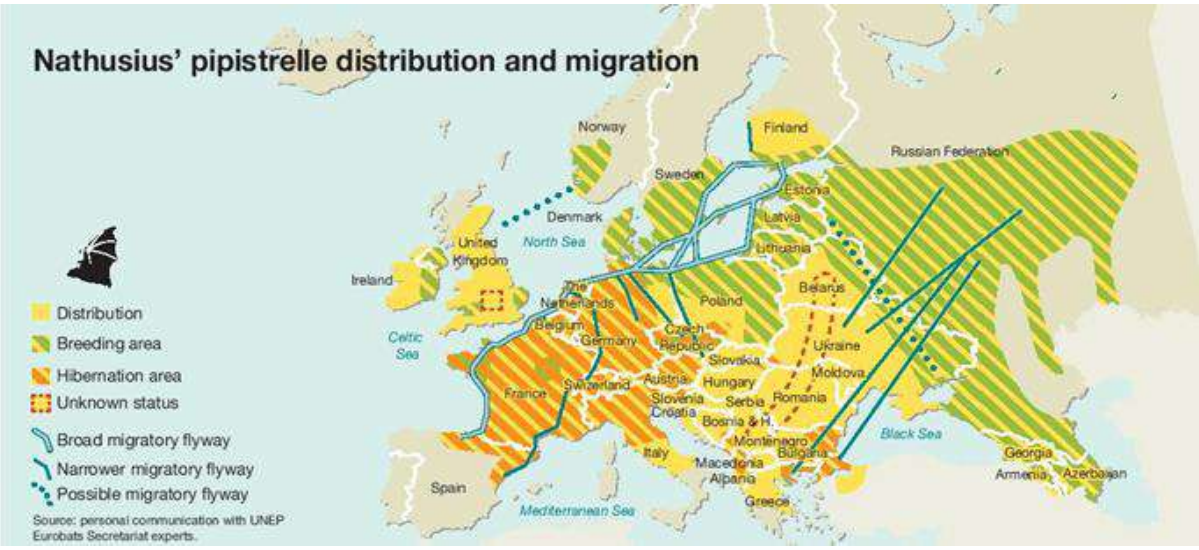


Fig. 56. Nathusius' pipistrelle migration flows

Examination of the impact zones of wind power plants of other undertakings has established that the wind power plants of other undertakings will not have a significant cumulative negative impact on bats. Migrating bats can avoid flying through gaps of less than 500 meters between wind turbines. Wind farm of wind turbines of UAB "Santix", UAB "Ekoinversta", UAB "Saulės ir vėjo energija", UAB "Vėjo parkai", UAB "Windfarm Akmenė Two", UAB "Windfarm Akmenė One" is planned at the PEA site. Due to technical and environmental conditions, an average distance of 500 m is maintained between the planned and other wind turbines, which ensures the conditions for the safe flight of bats. Most of the other wind turbines in this park are located at a distance of 500 m or more from the planned wind turbines and provide good conditions for the safe passage between wind farms built in the PEA area. It should be noted that bats, unlike birds, are not led by vision during migratory flights and use ultrasonic signals during the dark hours of the day and usually fly along "green corridors" (except the seaside): riverbeds, woody overgrown drainage canals, along. They avoid large open areas, thus avoiding collisions with wind turbines that are built at least 0.5 km from such landscape elements (habitats).

The territories of the PEA with a total impact on bats include the territories important to them: Sablauskių pond (124 ha), Pakalniškių quarry (3.84 ha) and Menčių quarry (total area about 200 ha). The quarries of Pakalniškės and Blades are important for

Daubenton's bat (Myotis daubentonii) as a feeding area. It is likely that their breeding colony or colonies are located in nearby homesteads or quarry edge stands. It should be noted that Daubenton's bats feed only on these quarries and fly over the nearby Dabikinės River. Their feeding routes (from the colony) do not intersect with the planned wind turbines in the PEA area. Sablauskiai pond with the adjacent Sablauskių settlement, Menčių quarry and Menčių village. There are enough suitable buildings, old trees and good nutritional conditions for the breeding colonies to settle here. 5 species of bats have been found in this area: common noctule (Nyctalus noctula), Nathusius' pipistrelle (Pipistrellus nathusii), brown long-eared bat (Plecotus auritus), northern bat (Eptesicus nilssonii), Daubenton's bat (Myotis daubentonii). It is probable that in Sablauskių settlement, Menčių village, there are breeding colonies of the mentioned bat species. It should be noted that in this area bats feed locally, found in Sablauskių settlement and Menčių village, and observed while hunting over Sablauskių pond and Menčių quarry. There are enough suitable habitats for bats to feed here and they do not fly to the territory of the wind farms planned to be installed in the PEA or the flights are irregular and individual.

In summary, the planned economic activity will not worsen the breeding, feeding and seasonal migration conditions of bats in this area.

2.5.3. Expected significant impact

On the landscape:

The installation of new wind turbines in rural areas can cause significant visual changes in the region and at the same time have a psycho-emotional impact on the population. One of the key issues in WT environmental impact assessment, which is particularly important for local communities, is the visibility of the WT. On the other hand, compared to other environmental impact issues of WT, the visual impact is considered to be the least significant. (Hiwa M. Qadr, 2018).

The landscape impact assessment was performed in terms of visual significance, degree of contrast and nature of the impact and is presented in the table below.

Table 14. Evaluation of the significance and degree of contrast of the visual impact of wind turbines and the nature of the impact from selected sites. During the assessment, not only the wind turbines planned for this project were assessed, but also the total impact of the wind turbines

Photo fixation, viewpoint No.	Visually affected settlements / other areas	Distance to planned WT (km)	Nature of visual impact	Visual Significance (VS). Contrast level (CL)
1	Landscape of Road No. 153	2,3-3,4	The upper parts of the wind turbines will be visible behind the forest massifs. Due to the distance and the forest massifs, the wind turbines will become the accents of the landscape	Average (due to magnitude of impact) (VS). Average (due to distance and size of observation)(CL)

Photo fixation, viewpoint No.	Visually affected settlements / other areas	Distance to planned WT (km)	Nature of visual impact	Visual Significance (VS). Contrast level (CL)
2	Landscape of Road No. 153	4,2-5,1	In the agrarian landscape, a 110 kV overhead power transmission line is visible in perspective. On the right side - the greenery of Šapnagiai settlement.	Slight impact (due to the size of impact on the landcape and sensitivity of the area) (VS). Average (due to distance and size of observation)(CL)
3	Ukri	0,5-1,9	Observed from the border of the Republic of Latvia. Power plants are designed beyond the forest array. The distance to the nearest Ukri settlement in Latvia is 3-3.8 km.	Avereage impact (due to the size of impact on the landcape and sensitivity of the area) (VS). High (due to distance and size of observation) (CL)
8	Šapnagiai	3,5-4,4	Due to the greenery, single trees, the wind turbines will be visible as landscape accents	Avereage (due to the size of impact on the landcape, greenery) (VS). Average (CL)
9	Road Šapnagiai – Jautmalkiai	0,5-1	The two planned wind turbines will be openly visible	Significant impact (due to the size of impact on the landcape, forest array) (VS). Stiprus (due to distance of observation) (CL)
10	Road Šapnagiai – Jautmalkiai, Bambalai	0,5-1,5	The impact of the planned wind turbines will be reduced by the existing forest massifs	Average (due to the size of impact on the landcape, forest arrays) (VS). Average (CL)
12	Jautmalkiai	2,1-4,3	All wind turbines will be visible from the viewpoint. Visibility is reduced (the lower part of the towers is covered) by the existing Narčiai forest array	Average (due to the size of impact on the landcape, forest arrays) (VS). Average (CL)
51	Akmenė	19,5-20,5	Wind turbines (rotating windmill) can be seen with good visibility in fragments	Visual insignificance (due to the size of impact on the landcape) (VS). Weak (due to distance of observation) (CL)
65	Naujoji Akmenė	7,9-9,9	There is a forest array between Naujoji Akmenė and the wind farm, and the city's industrial district in the direction of the park also reduces visibility	Insignificant (due to the size of impact on the landcape) (VS). Weak (due to distance of observation) (CL)
68	Jautmalkiai	2,3-4,5	Due to the existing Narčiai Forest, the wind turbines will be visible as landscape accents	Average (due to the size of impact on the landcape, forest arrays) (VS). Average (CL)

Photo fixation, viewpoint No.	Visually affected settlements / other areas	Distance to planned WT (km)	Nature of visual impact	Visual Significance (VS). Contrast level (CL)
69	Landscape of Road No. 153	5,2-7,2	This is the first place when driving on the road (No. 153) in the direction of Naujoji Akmenė, when the existing wind turbine and the vertical chimneys of AB “Akmenės Cementas” are starting to be seen. The designed wind turbines will be visible as landscape accents	Average (due to the size of impact on the landcape, forest arrays) (VS). Average (CL)
70	Žagarė Esker Cognitive Trail	11,7-13	The wind turbines will not be visible due to the greenery close to the observer	Visual insignificance (VS). No contrast (CL)
71	Žagarė Esker viewpoint	12,4-13,8	When observing in the direction of Kruopiai settlement, the wind turbines will not be visible due to the existing forest array (when assessing the total wind turbines). When looking in the direction of Šapnagiai settlement, the wind turbines (from the highest point of the sight) can be noticed with a particularly good visibility.	Insignificant (due to the size of impact on the landcape) (VS). Weak (due to distance of observation) (CL)
72	Gaižaičiai	8,5-10,8	Agrarian areas are open to the public. Wind turbines will be subdominant to the landscape	Insignificant impact (due to the size of impact on the landcape and sensitivity of the area) (VS). Average (due to distance and size of observation)(CL)
73	Mūšos tyrelio observation viewpoint	16,7-18,9	Wind turbines will not be visible due to the distance of the forest arrays closer to the observer. The vertical chimneys of AB “Akmenės cementas” are not visible from the viewpoint.	Visual insignificance (VS). No contrast (due to distance of observation) (CL)
74	Šakyna	15-16,7	Due to the forest array in the direction of the wind farm, wind turbines can be visible in good visibility conditions.	Insignificant (due to the size of impact on the landcape, forest array) (VS). Weak (due to distance of observation) (CL)
77	Auce	13-14,8	The wind turbines will be visible as background elements in the landscape	Insignificant (due to the size of impact on the landcape, forest arrays) (VS). Weak (due to distance of observation) (CL)
79	Ukri	3,2-4	In front of the observer is an open agrarian area. Further afield - the forest array. The wind turbines will be visible as landscape accents	Average (due to the size of impact on the landcape, forest arrays) (VS). Average (CL)

The planned wind farm development areas are sparsely populated. Many abandoned Soviet-era collective farm buildings. Agricultural areas are dominated by monocultures (winter, spring wheat, oilseed rape).

Given the importance of assessing the impact of WT on the landscape, additional visualizations were performed from significant points of visibility of wind turbines (closer settlements, important transport, and tourist roads).

After evaluating the viewpoints of the Žagarė Regional Park, from which the projected wind turbines can be seen, it was determined:

- Observing from the first viewpoint on the highest site of Žagarė Esker, the designed wind farms near Šapnagiai settlement can be noticed in very good visibility conditions. The impact of the newly designed wind turbines on this sight will not be significant. From the top of the esker (without climbing the observation deck) the wind farms will not be visible. Photo fixation No. 69. From there, the wind turbine already exists next to Šapnagiai settlement and the verticals of the chimneys of AB "Akmenės cementas" are clearly visible, but the mentioned location of photo fixation is significantly closer than the Žagarė Esker site;
- When observing from Žagarė esker cognitive trail, the wind turbines will not be visible due to the distance and the existing greenery areas;
- When observing the Mūšod Tyrelio Cognitive Trail, the wind turbines will not be visible from the highest observation point of the sight due to the distance of the forest arrays closer to the observer (17-18 km);
- close to the cultural heritage objects of the wind farm development area, for which there would be no significant visual impact of wind farms;
- Akmenė district municipality has made changes to the general plan of the territory of Akmenė district municipality, in which a scheme for determining the territories of wind turbines has been prepared. The mentioned territory of the analyzed wind turbines falls within the territories of the scheme for the determination of the territories of wind turbines.

Conclusions of the methodological expert assessment

During the assessment, not only the wind turbines planned for this project were assessed, but also the total impact of the wind turbines.

According to the methodology of aesthetic recreational assessment of the landscape, the landscape observed from the first and second viewpoints is classified as of low aesthetic quality. According to the assessment results, the landscape from the first viewpoint without wind turbines was assessed with 31 points, and with the planned wind turbines - 33 points. The landscape from the second power plant without wind power plants was assessed with 38 points, and with the planned power plants also 38 points. According to the difference in the number of points collected, we see that the projected wind turbines will not have a negative impact on the visual and aesthetic quality of the landscape. In the first case, the overall scenery of the landscape increases even slightly when assessed with the planned wind turbines. In the second case, it remains unchanged.

The assessment of visual significance, degree of contrast and nature of the impact has shown that the planned wind turbines will have a significant visual impact on the Šapnagiai - Jautmalkiai landscape (No. 153).

The average impact was determined for the settlements of Šapnagiai, Jautmalkiai and the landscapes of the road Naujoji Akmenė - Žagalė (No. 153).

In the territory of Šapnagiai settlement, the visibility of wind power plants is significantly reduced by the existing forest arrays, the Soviet-era farm complex on the northern side of the settlement.

Jautmalkiai settlement is outside the Narčiai forest array, but there are no greenery near the settlement. From the northern part of the settlement, all the planned wind turbines will be visible as landscape accents.

In the town of Naujoji Akmenė, power plants from some areas will be seen as sublimes of the landscape. The impact is reduced by the industrial area in the direction of the wind turbines and the forest massifs. The distance is also long enough, as the closest planned wind turbines are> 5 km.

The remote town of Akmenė is 17-18 km away from the planned wind turbines. At this distance, wind turbines can be seen but become distant background elements.

The impact of wind turbines designed for larger settlements outside the larger forest arrays (Alkiškiai, Kruopiai, Gaižaičiai, Raistai, Žagarė) will be insignificant due to the existing forest arrays and the observation distance (5-12 km).

Conclusions on the impact on the territory of the Republic of Latvia

The designed wind turbines are close to the territory of the Republic of Latvia. The distance from the mentioned wind turbines to the border with the Republic of Latvia is 0.8-1.5 km.

The visual impact assessment of the landscape has shown that the impact of these wind turbines on the territory of Latvia will not be significant. Wind turbines towards the territory of Latvia are surrounded by large areas of Karpėnai, Lydmiškis and Narčiai forest arrays, which significantly reduce visibility.

The closest to the mentioned wind turbines in the territory of the Republic of Latvia is only the settlement of Ukri (distance to the nearest designed wind turbine - 3 km). Due to the mentioned observation distance and forest arrays, the wind turbines from the outskirts of the settlement will be visible as landscape accents. From the settlement of Ukri to the border with the Republic of Lithuania, solid agricultural areas dominate.

Conclusions on cumulative effect

In the area of the development of the planned wind turbines other builders are also planning wind turbines. If all wind farms (all builders) are built, the impact on the landscape will be greater. The impact of the wind turbines on the landscape will be cumulative. Wind turbines will be noticeable from more diverse locations as there will be more of them in the same area.

After evaluating the wind turbines designed by UAB “Windfarm Akmenė Two” and other economic entities, it was determined:

- Due to their spatial parameters, the designed wind turbines will be visible from the road landscape: Šapnagiai - Jautmalkiai and Naujoji Akmenė - Žagarė (No. 153). This is instant visibility mostly from a passing car. No significant long-term effects have been identified;
- New vertical sites of interest will emerge in the landscape;
- In the scheme of determining the territories of wind turbines for the change of the general plan of the territory of Akmenė district municipality, the locations for the installation of wind parks have been selected. The development of wind turbines is possible in the designated area;
- The whole mentioned part of Akmenė district is dominated by open, widely covered plains. Only the existing forest arrays will mostly reduce the dominance of the planned wind turbines;
- Continuing the development / construction of wind turbines (alternative energy) in Lithuania, the mentioned areas of Akmenė district are the most suitable, least sensitive;
- In the vicinity of the designed wind turbines, there are no significant cultural heritage places for visual visibility, places of interest (sites) that would have a significant impact on the wind turbines. Further afield are: Zagarė Esker, Esker Cognitive Trail and Mūšos Tyrelis. Due to the observation distance and the existing forest arrays, the designed wind turbines will not be visible at all from the above-mentioned sites;
- The areas most suitable for the development of wind turbines are located north of the road Akmenė - Naujoji Akmenė - Žagarė (No. 156/154). As the border mentioned is extremely sparsely populated, many homesteads are no longer inhabited. The same situation is in the part of the Republic of Latvia. There are also no particularly significant cultural heritage sites, tourism, cognitive trails, and sightseeing places. This area includes projected wind turbines (C1).

Taking into account the requirements of the Description of the Procedure for the Environmental Impact Assessment of the Proposed Economic Activity p. 101[1], it is assessed that:

1. The PEA wind turbines are not included in the state-level special territorial planning document - the National Landscape Management Plan, approved by the Order of the Minister of Environment of the Republic of Lithuania of 2 October 2015 No. D1-703 “On the Approval of the National Landscape Management Plan”, identified areas and areas of the Specially Protected visual aesthetic potential of the country, very high and high aesthetic potential, especially and moderately expressive landscape complexes (hereinafter - SP landscape areas). The nearest landscape area of SP is the landscape of semi-enclosed and enclosed spaces with a particularly pronounced and moderate vertical account, located at 31 km distance southwest of the WTs of the PEA;
2. The PEA wind turbines will not be visible in the horizontal field of view of the most valuable landscape panoramas of the country at an angle of vertical viewing greater than 2.80º from the viewpoints in the SP landscape areas, whereas the nearest point in the area of the semi-enclosed and enclosed spaces with a particularly pronounced and medium vertical clearance is the Svirkanai outcrop observation site, which is 34 km southwest of the PEA WT. The viewing angle at this distance is - 0.4º

Impact on tourism and recreation

Considering the nearest tourist attractions, cultural heritage values; the fact that there are no resort places, personal health care institutions, sanatoriums in the surrounding areas; to the fact that Wts will be planned on the existing agricultural plots, it is estimated that the implementation of the PEA will not have a negative impact on tourism and recreation.

On protected plants, fungi, and naturally valuable habitats:

- there are no valuable green areas (parks, squares, etc.) and protected natural monuments (valuable old trees) in the affected areas of the PEA, therefore the impact is not expected;
- there are no national plant genetic resources included in the lists of national plant genetic resources approved by Order No. D1-861 of the Minister of the Environment of 31 December 2009 “On the Approval of National Lists of Plant Genetic Resources” in the different impact zones of the analysed PEA;
- The sites of protected plants and lichens are located at such distances from the analysed PEA areas that they are not expected to be affected by the PEA. There is no known site of the protected plant or fungus in the study area that would enter the areas of possible significant or potential adverse effects of underground power transmission lines, access roads;
- Significant adverse effects on the flora and fungi of the existing natural habitats of EC importance in the analysed PEA area due to the planned normal activities are not expected;
- Due to the PEA, significant negative impacts on forests are not expected, as all construction and operation works are planned on non-forest land;
- The prevalence of foreign and invasive plants in the PEA area is not expected;
- the hydrological regime of the existing water bodies will not be changed, the bottom will not be mechanically affected;
- Most of the known wetland soils in the PEA area are located in forestry plots. No adverse effects during the installation and operation of the PEA are expected.

On mammals:

For mammals, the impact of wind farms during construction is likely to be neutral or slightly negative. At the start of operation of wind turbines, a slightly negative local due to the changed environment (noise) or a neutral. If the impact at the start of operation is slightly negative, a neutral impact is likely in the long run:

- For hazel dormouse neutral or slightly negative impact (localized in the area of wind turbines adjacent to the forest) is expected during the construction period, impact during the operation of the wind turbines is likely to be neutral;
- For forest dormouse and European fat dormouse impacts are not assessed due to unsuitable habitats for these species in the PEA area and unregistered habitats;

- the impact on the northern birch mouse during both construction and operation of the wind turbines is likely to be neutral;
- The impact on mountain hare during both construction and operation of the wind turbines is likely to be neutral.
- The impact on guinea pigs, grey seals and bisons are not assessed due to the biology and likelihood of detection in the PEA area;
- The impact on the wolf during construction and exploitation may be short-term slightly negative and is likely to be neutral during the operation of the wind turbines;
- The impact on the stoat during construction may be slightly negative and is likely to be neutral during the operation of the wind turbines;
- Potential short-term and slightly negative impacts on the otter during the construction period (at the construction sites of the WTs at the water bodies, WT No. 34, 35, 36, 38) and at the beginning of operation, it is likely to be neutral during the operation of the WTs;
- Impact on lynx at the beginning of construction and exploitation may be short-term slightly adverse, it is likely to be neutral during the life of the WTs.

<u>On ornithofauna:</u>

The assessment of the impact of wind turbines on biodiversity is performed on an expert basis, analyzing all the information on the state of biodiversity in the wind turbines and adjacent areas. Impact of wind turbines on birds is possible for birds hatching in the PEA area, Ciconiiformes hatching in the adjacent environment, birds of prey flying during the hatching to feed at the planned wind turbines or across the PEA area. Hatching species near wind turbines may be adversely affected, with birds forming clusters at wind farms during migration and migratory bird species flying past wind turbines.

Increased construction noise is expected during the construction of wind turbines, but during construction works at the period other than hatching, the noise factor is not considered to be a significant factor that may cause negative consequences, it is temporary and the ornithofauna of the PEA area will not have a significant negative impact. Species affected by anthropogenic impact live in the PEA territory, agricultural machinery works periodically in the fields, birds feed on agricultural land while agricultural machinery is working, they are adapted to anthropogenic impact factors.

Anseriformes, Pelecaniformes, Grebes do not have suitable habitats for feeding and breeding in the PEA territory. Geese do not accumulate during migration in the PEA area, as there are no larger surface water bodies and they fly in transit during migration. Flying geese fly past wind farms, which can have a negative impact on flying geese during migrations, so it is mandatory to regulate the operating mode of wind turbines during migrations. An important area for swans is the artificial water body of the Pakalniškės gravel quarry, 4.5 km from the PEA, where tundra swans and whooper swans stay overnight during migrations. The water body is not large, due to its size, a relatively small number of swans can stay overnight and at a sufficient distance from the PEA. Although no geese and swans were recorded during the migration in the PEA territory, the formation of geese and swans can be influenced by the nature of farming, cultivated crops. Sea buckthorn bushes grown in the PEA area are not attractive for Anseriformes. It is important that cereals (maize) and legumes are not sown near wind turbines, thus influencing the formation of migratory flocks of geese and swans and the routes of transit. Ciconiiformes are threatened by wind turbines due to loss of feeding places and direct collision. White storks did not hatch in the adjacent environment, one nest was abandoned and the other was visited but was not breeded in. With the start of operation of wind turbines, feeding areas for white storks may be lost due to the construction of buildings, but there are alternative feeding grounds for Ciconiiformes and the breeding pairs of white storks are separated from the planned wind turbines by a sufficient distance. The observations of the black stork, which rested in the PEA area, but did not enter the impact areas of the wind turbines, are exceptional,a feeding black stork was observed below the PEA site in the Dabikinė stream, floating above the Kviečlaukis forest and nearby forests at a distance of 1.8 km from the wind turbine 36.

The exploitation of wind turbines may adversely affect birds of prey that may continue to migrate in the vicinity. Birds of prey fly at various altitudes, in search of food can rise in thermal air currents to the area of impact of the rotor of a wind turbine, where the risk of collision and death increases. During the hatching, a wide variety of birds of prey feed in the PEA and adjacent areas, from common species such as western marsh harrier, Eurasian sparrowhawk, and common buzzard to rare species: lesser spotted eagle, European honey buzzard, Montagu's harrier. According to the observations, feeding areas, feeding routes of birds of prey and their favorite places were determined. When wind turbines are put into operation, feeding places may be lost due to the construction of buildings. The PEA area is dominated by perennial sea buckthorn crops, which cover an area of 1 km^2, wind turbines built and the road to them will occupy relatively small areas, therefore their population will not be significantly affected. The likelihood of feeding birds of prey colliding with the rotor wings remains. White-tailed eagles, merlins, hen harriers were observed during migration in the PEA or adjacent areas. One of the biggest threats to birds of prey is hitting a wind turbine. Birds that do not avoid wind turbines are usually killed in contact with wind turbines, but birds of prey have not been observed much during migrations, so the probability of a collision is not high. Possible measures to reduce or compensate for the adverse effects have been considered. Common crane is a common species in Lithuania, but it is sensitive to the impact of wind turbines, their collisions and disturbances. In the PEA area, where the planned wind farms do not have suitable hatching habitats, individual cranes can feed in these areas, fly more often from the hatching to feeding areas, or from one feeding area to another, accumulations were observed only in the adjacent area during migrations. Cranes flew at the height to the rotor blades during the observations, there are alternative areas for the formation of crane clusters, and therefore no significant impact on the cranes due to the PEA is expected. The conditions in the PEA area are favorable for grey partridges and quails, a common species adapted to the existing agricultural land and anthropogenic activities, therefore the PEA will not have a negative impact on galliformes. There are no water bodies, habitats for gulls and seagulls to hatch in the PEA territory, only isolated transits are observed, therefore no significant negative impact is expected. During migration, common peewits and European golden plovers are abundant, visiting the PEA territory, but not in large numbers. More abundant clusters of common peewits and European golden plovers are formed in the adjacent area, but the species are not very sensitive to the effects of wind turbines, so the expected negative impact will be minimal.

During the point surveys, the Passeriforme species were mostly recorded in the PEA, among which the usual species typical for the agrarian landscape predominate. The most common is Eurasian skylark, one of the most common and most deadly species due to wind turbines. During the hatching, a red-backed shrike was found in the PEA territory, a bird species to be protected in Europe, but it is often found in Lithuania. Due to the predominance of perennial sea buckthorn crops in the PEA area, agricultural land is favored by red-backed shrikes, which covers an area of 1 km^2, wind turbines built and the road to them will occupy relatively small areas, so their population will not be significantly affected. Migratory species of Passeriforme are common to migratory species, the most common being common chaffinch, and several less common northern species have been observed in the PEA. The average flight height of Passeriforme, Columbiforme birds flying in the Akmenė district is below the blades, therefore the PEA will not significantly affect the migration of Passeriforme, Columbiformes birds. Migratory Passeriforme birds are not very abundant in the PEA area and no additional measures are foreseen. The main flows of migratory birds run along the coast of the Baltic Sea, the Nemunas delta, the Curonian Spit. The location of the proposed economic activity is in the mainland, where migratory bird flows are insignificant. Passeriforme birds do not generate particularly high migratory flows. The planned economic activity in the PEA and adjacent area will not have a significant negative impact on ornithofauna, but additional protection or compensatory measures must be applied.

When reviewing the total impact of wind farms on birds, the nearest wind farms from the PEA site and in the PEA area are assessed. According to the VENBIS database, the closest wind farm to the PEA site is a 45-MW 19-turbine wind farm in Mažeikiai district municipality, Reivyčiai eldership, Buknaičiai village, UAB “Pamario elektrinių energija”. This wind farm is located 40 km northwest of the PEA. Between this wind farm and the planned site are the Kamanai swamp, the Venta river valley - areas important for Natura 2000 birds, the Venta regional park and other large forest arrays, which provide good conditions for migrating and hatching birds, the farms are far away, therefore, there will be no cumulative impact of these wind farms on birds. Another nearest wind farm according to the VENBIS database is a wind tyrbine of 250 kW of the farmer Sonata Vasiliauskienė, which is about 40 km east of Joniškis district municipality, Satkūnai eldership, Mitkūnai village. The wind farm is a long way away, so there will be no expected cumulative impact of this wind turbine on birds.

Currently, 1 wind turbine operates in the adjacent territory of UAB “Vėjo technologijos projektai”. Wind turbine projects of other economic entities are being developed in the PEA and adjacent territories. Wind turbines of Windfarm Akmenė One, UAB, UAB “Vėjo parkai”, UAB “Santix”, UAB “Ekoinversta”, another Windfarm Akmenė Two, UAB are planned in the PEA and adjacent territories. Wind turbines of Windfarm Akmenė One, UAB will operate on the western and southwestern side. Due to technical and environmental conditions, an average distance of 500 m is maintained between the planned and other wind turbine, which allows for the migration of migratory, feeding birds. It is considered that distances of less than 200 m between wind turbines create a barrier for flying birds and birds can avoid flying through such areas. With the

construction of wind turbines, some bird species may retreat, choosing alternative areas.
The Karpėnai limestone quarry is in operation in the north-eastern part. A reclamation project has been prepared and is being implemented in the Karpėnai quarry. Karpėnai limestone quarry is classified as a highly sensitive area due to abundant cluster of the common crane (Grus grus) species sensitive to wind turbines. The minimum size of a crane accumulation is 50 individuals, the maximum is 200 individuals. Behind the Karpėnai limestone quarry, in the cultivated fields of Vėlaičiai village, cranes form clusters. Accumulations of up to 600 individuals were observed to fly overnight into the Karpėnai limestone quarry. Cranes are also accumulating in the western part of the adjacent area, but in less large flocks. The planned wind turbines will not block the roads to the sleeping areas.

The area of 22 km^2 with the adjacent wind farms does not cover a very large area and, given the predominance of arable land in the PEA area, the absence of protected habitats and the usual bird species typical of the agrarian landscape, birds of prey fly only for food, the impact on bird populations will be small.

On bats:

Bat species survey in zone C1 conducted in June-September 2020 was carried out using Venbis and Eurobats methodological guidelines for bat surveys. Chiropterological studies (52 study hours using transectal and point accounting methods) in the PEA area (zone C1) revealed 3 species of bats: Eptesicus nilssonii, Nyctalus nactula and Pipistrellus nathusii. 16 data on the detection / transfronts of bat species in the study area were collected. No bat breeding colonies were detected in the planned zone C1 of the wind farm.

Zone C1 of wind turbines is not important for bats as feeding grounds, as it is dominated by agricultural land where monocultures are grown: oilseed rape, various cereals. Such habitats are unattractive to bats due to the poor diversity and abundance of species of Lepidoptera, Diptera, Coleoptera, etc. There are also no larger bodies of water in the WT area that are necessary for bat breeding colonies. The nearest feeding places according to the database of SRIS and the Society for the Conservation of Bats in Lithuania are determined in Šapnagiai village: northern bat (Eptesicus serotinus), in the quarry of Pakalniškiai: Daubenton’s bat (Myotis daubentonii), in the quarry of Menčių: common noctule (Nyctalus noctula) and Daubenton’s bat (Myotis daubentonii).

In summary, the installation of up to 6 wind turbines in the PEA area will have no or minimal negative impact on bats.

2.5.4. Measures to reduce significant negative impact

For landscape:

There are no specific recommendations.

For protected plants, fungi, and naturally valuable habitats:

The planned construction of a wind farm by Windfarm Akmenė Two, UAB in Akmenė district municipality, Kruopiai eldership will not have an inevitable, significant negative impact on protected plants, fungi and naturally valuable natural habitats. Wind turbines, new access roads and underground power cables are currently planned to be installed on agricultural plots, where cereals of low biological value are predominant and the sea buckthorn plantation is lightly exploited. The planned impact of the PEA on naturally valuable semi-natural or natural habitats in the Republic of Lithuania or the EC is potentially negative only in the event of a breakdown, collapse or fire in the operation of a WT. The installation and normal operation of the WT will in principle have a significantly lower negative impact on the vegetation and fungi of the analysed area than the current economic activities in the analysed area (crop rotation, deforestation, etc.). There are no valuable greenery and resources of greenery and genetic plants in the PEA territory. Increased spread of invasive and alien plants in the study area due to the PEA is not expected if the PEA-derived habitats with open soil or subsoil are sown or otherwise managed in a timely manner.

In order to preserve the fragments of the valuable forest habitat that have survived near the WT 35, it is recommended to leave a gap of 20 m between the service site and the forest boundary.

For mammals:

There are no specific recommendations for the examined mammal species - during the installation of WT it is necessary to change the environment as little as possible, to perform the work in the shortest possible time. It is recommended to limit noisy work during the breeding and rearing period of most mammalian species (May-June).

For ornithofauna:

The most efficient measure is the selection of wind turbine places. Prior to the design phase, the most important measure in selecting a wind turbine place is to avoid the most risky places where birds may collide with wind turbines, where thermal air currents form, where protected bird habitats may be destroyed, and avoid construction sites near nests. The following measures are envisaged:

1. It is planned to continue bird watching in the PEA and adjacent areas;
2. It is planned to prepare and approve a bird monitoring program before the start of construction of the wind turbines;
3. Birds will be observed during the operation of the wind turbines in accordance with the approved monitoring program;
4. Effective mitigation and compensatory measures will be applied in the event of significant adverse effects of wind farms during monitoring:

4.1 Stopping of wind turbines during hours of intensive bird migration;

4.2 Stopping of wind farms during the feeding and migration period of protected birds (birds of prey, black storks, other sensitive species);

5. Improvement conditions of corn crake, red-backed shrike, quail breeding, black stork, white stork, European honey buzzard, Montagu's harrier, western marsh harrier, lesser spotted eagle feeding habitats outside the wind farm, restoring to good environmental condition of the grassland (Extensive management of meadows by grazing, mowing,

felling of low-value shrubs and its maintenance. With 2 ha of meadow restoration per wind farm, total restoration of 12 ha of abandoned meadows);

6. support for other nature conservation projects, these measures shall be selected on a case-by-case basis according to the effects identified in the studies;
7. Considering that red-backed shrike, corncrakes and quails breed in the PEA, protected birds feed in the meadows during the hatching: black stork, white stork, European honey buzzard, Montagu's harrier, western marsh harrier, lesser spotted eagle, noisy, habitat-altering or habitat-destroying works will not take place during the construction of wind turbines during the breeding season (May-June).

For bats:

1. to prepare and approve a bird and bat monitoring program before the start of construction of wind turbines;
2. In order to improve breeding conditions, to allow bats to safely roam during migrations and to keep them at a safe distance from zone C1 in summer, special nests should be set up outside the wind farm. It is expedient to raise at least 9 nests, raising them 3 per tree (1 nursery area), giving priority to the territory of Akmenė district;
3. to carry out monitoring of bats during breeding and migration for 3 years after the installation of the wind farm. In addition to monitoring / flying, data on dead bats must be collected;
4. After evaluating the data from the 3 monitoring years, decide on the need for further monitoring and apply the revised necessary measures to reduce the impact on bats.

2.6. Material values

2.6.1. Current condition

The implementation of the PEA may affect these material values:

- plots of land. It is planned that the plots where the Wts will be located will be leased in parts, and the main use of the part of the plot will be changed to “Other” (territories of communication and engineering communications service facilities);
- land plots where special land use conditions will be legalized. Prior to the implementation of the WTs, a sanitary protection zone will be established - a special condition for land use - sanitary protection zones for industrial facilities (Chapter IV, Section 1). Written consents of the landowners will be obtained for the establishment of the sanitary protection zone;
- The existing roads along which the vehicles necessary for the implementation of the PEA solutions will be used will be reconstructed and strengthened as needed. Access roads to planned WTs may also be newly installed. If the land is damaged as a result of the construction work,

the damage will be eliminated or the owners will be compensated accordingly;
- in the related territory of the planned WT of other economic entities.

2.6.2. Expected significant impact

Access roads are planned to be installed or adapted during the PEA, the impact of such planned works on the environmental components is not expected or will be short-lived. Access roads to the planned WTs will not be located in protected areas, natural habitats of EC importance or sites. The PEA territory has been reclaimed, therefore the facilities are planned to be preserved or reconstructed/restored by preparing a part of the design of the reclamation structures damaged or being reconstructed due to the ongoing works at the stage of preparation of the technical project. It is expected that after the preparation and implementation of projects for the reconstruction of land reclamation structures, the owners of the surrounding land reclamation lands will not be affected.

Taking into account the material values present and planned in the territory (WTs of other economic entities, residential territories), it is assessed that no negative impact on them in terms of possible accidents is expected, as a safe distance is maintained between them and the planned WTs – e.g., the distance between the nearest existing Windfarm Akmenė One, UAB, WT 30 and the nearest WT 34 of the PEA is 612 m, the total height of thewind turbine of Windfarm Akmenė One, UAB is up to 230 m, and the maximum height of the WT of the PEA is 241 m, so collision is impossible; residential houses are 241 m away from the PEA, so a collision is also impossible. Even in the event of an emergency (e.g. mechanical deformation of the WT tower, blades or the fall of the WT itself), the PEA will not endanger the surrounding material values, as these WTs are more than 241 m away from the PE.

In order to determine the possible impact of the planned wind farm on the real estate value of nearby residential areas, an analysis of the foreign literature was performed, as no research has been conducted in Lithuania on the impact of WTs on the real estate market (limited to land price impact assessment).

Studies conducted abroad often show a negative or neutral impact of VE construction on the price of real estate. For example, in 2007 Researchers at Oxford Brookes University in the UK conducted the study [19] on the impact of wind turbines on property prices in the Cornwall area. The study concluded, however, that other reasons than the presence of WTs in the neighborhood were more significant in influencing the change in prices. In addition, the change in price was observed only for the sale of certain types of houses – i.e. semi-detached and terraced houses located approximately 1.5 km from WTs, while the change in the selling price of detached houses (not connected to each other) was practically not caused by the emergence of WTs in the neighborhood. The researchers conducted an analysis of the attitudes of real estate sales agents and found that more than half believed that the value of real estate falls if the home is near or visible to the WT. However, as many as 67% said that the biggest drop in the value of real estate is recorded only after the construction of a WT in the neighborhood begins and decreases over time. They also drew attention

[19] Source: https://www.st-andrews.ac.uk/media/estates/kenly-farm/images/RICS%20Property%20report.pdf

to another large-scale study carried out during the US REPP (renewable energy policy project). It was found that the emergence of WT not only did not have a negative impact on real estate prices, but, on the contrary, had a positive impact on them. The researchers also note other studies conducted in European countries, which found that those residents who benefited financially from WTs did not completely oppose the emergence of those wind turbines and did not complain about the decline in the price of real estate. The researchers concluded that it is difficult to unambiguously assess the relationship between WTs and the change in the price of real estate. Obvious differences in value are particularly reduced on a case-by-case basis. Nevertheless, the reasons for opposing the construction of the WTs are considered to be more ideological than those of genuine concern for the needs of the local population.

The average market value of real estate in Lithuania is determined by the State Enterprise Center of Registers. The average market value is calculated each year on the basis of actually available actual data collected by the State Enterprise Center of Registers. During the valuation, all material circumstances that significantly affect the value of the real estate are assessed. In order to assess concerns about the impact of wind turbines on the value of real estate, the PEA organizer reviewed data on average market values in other areas of Lithuania where wind turbines are already operating. After reviewing the data, no direct link was found between the wind turbines and the the value of real estate. Similarly, the PEA organizer contacted the State Enterprise Center of Registers by telephone with the question whether during the determination of the average market value a tendency was observed that the average market value of real estate is mainly dependent on wind turbines. According to the information provided by the State Enterprise Center of Registers, no such connection has been established so far. In summary, as no other negative impact on the average market value of real estate has been identified in other parts of Lithuania where a wind turbine has already been built, such an impact is also unlikely in the PEA area.

2.6.3. Measures to reduce significant negative impact

Access roads that will be available during the construction of the WTs will be coordinated with the Ministry of Transport and Communications or its subordinate institutions before the implementation of the PEA. It is planned that the condition of the roads that will be used to implement the PEA solutions will be assessed and recorded on visual material so that the damage caused after the construction can be restored or compensated.

In line with foreign best practice, the damage assessment and assessment process will involve: (i) road owner representatives, (ii) municipal representatives, (iii) community representatives, and (iv) Windfarm Akmenė Two representatives.

Before the start of construction, the representatives of the countries will record the condition of all the roads planned to be used using video recording equipment. In addition, a specific protocol will record specific existing road violations. After the completion of the construction, the representatives of the parties will record the actual condition of the used roads by reusing the video recording equipment and will identify the road violations, which Windfarm Akmenė Two undertakes to eliminate. This method will ensure that all road damage caused by Windfarm Akmenė Two is repaired or otherwise compensated.

In order to reduce the negative impact on the components of the environment, it is not planned to use Šapnagių st. from road No. 153 Joniškis – Žagarė – Naujoji Akmenė to the middle of Šapnagiai village, as the community expressed its position in 2020 that this section had been recently arranged and the community fears that the condition of the road will be damaged.

No other negative impact of the planned economic activity on material values is expected.

2.7. Immovable cultural heritage values

2.7.1. Current condition

There are no real cultural values in the territory of the PEA. The oldest cemetery in Viešučiai village is located closest to the PEA VE territories (see the table below).

Table 15. Objects of the nearest real estate values

Code	Name	Distance to the nearest WT, km
4165	Old cemetery in Viešučiai village	1,7

The PEA WTs do not fall into the sub-category of protection of immovable cultural values from physical impact and will not have a negative impact on the values. The layout of the WTs in regard to the nearest immovable cultural values is shown in the figure below.

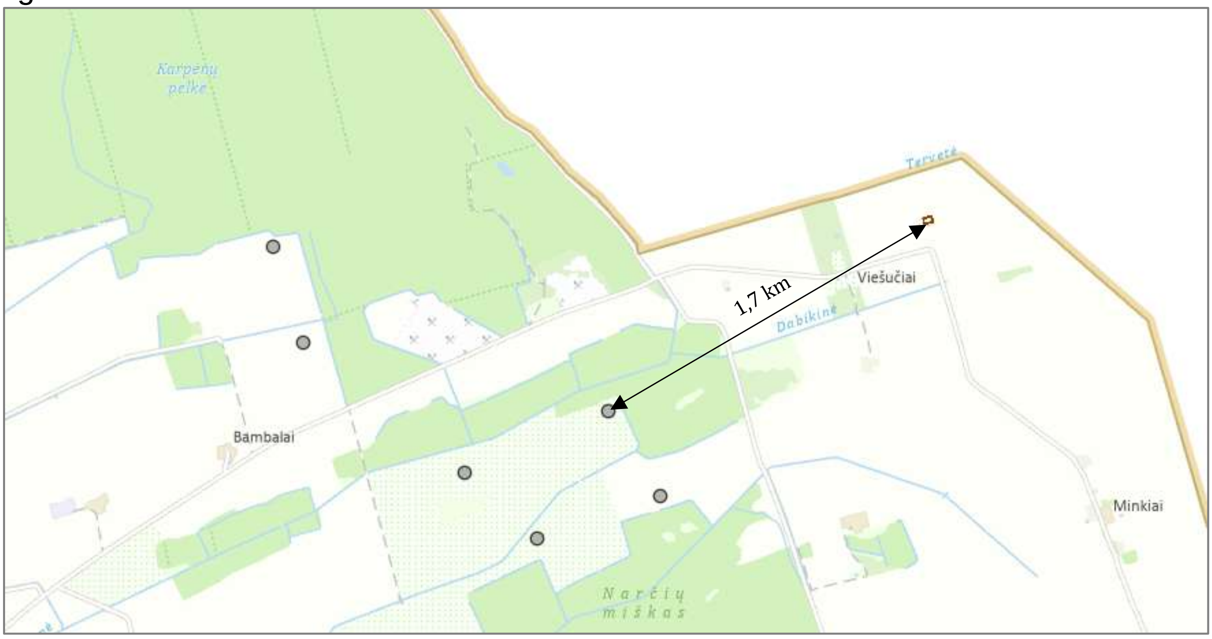


Fig. 57. The location of the PEA in regard to cultural values [20]

[20] Online access: http://www.geoportal.lt

2.7.2. Expected significant impact

PEA WTs do not fall into the sub-category of protection of immovable cultural values from physical impact and will not have a negative impact on values.

2.8. Public health

The purpose of the public health impact assessment is to identify, describe and assess the potential impact of the PEA on public health, to propose the elimination or reduction of harmful adverse effects on public health by appropriate measures and to justify the size of the PEA sanitary protection zone.

2.8.1. Current condition

PŪV location – Akmenė district municipality, Kruopių eldership, Bambalų village.

Kruopiai eldership belongs to Akmenė district municipality, therefore the report analyzes the indicators of Akmenė district municipality, which are compared with the indicators of Šiauliai County and Lithuania. The statistical data provided by the Lithuanian Department of Statistics and the Lithuanian Health Indicators Information System were used to assess the demographic and health indicators of the area. Based on them, an analysis of the state of public health was performed.

Demographic indicators of the region's population and their comparison with the data of the whole population

According to the Lithuanian Department of Statistics, the population of Lithuania is declining every year. The main reasons for the decline are emigration to foreign countries, low birth rates and relatively high mortality. At the beginning of 2021, there were 2795680 permanent residents in Lithuania. In Akmenė district municipality and Šiauliai County, the number of permanent residents decreased to 235 and 1516 inhabitants from 2020 to the beginning of 2021, respectively. In Akmenė district municipality, during the period 2007 - 2021, the number of permanent residents at the beginning of the year decreased by 8128 from 26665 (2007) to 18537 (2021) (table below).

Table 16. Number of permanent residents at the beginning of the year in Akmenė district municipality, Lithuania and Šiauliai County

Year	Akmenė district municipality	Šiauliai County	Republic of Lithuania
2021	18537	259936	2795680
2020	18772	261452	2794090
2019	19124	262487	2794184
2018	19606	265467	2808901
2017	20210	270482	2847904
2016	20824	276329	2888558
2015	21332	281632	2921262
2014	21677	285763	2943472

Year	Akmenė district municipality	Šiauliai County	Republic of Lithuania
2013	22210	290471	2971905
2012	22796	295824	3003641
2011	23460	303110	3052588
2010	24501	316278	3141976
2009	25310	323353	3183856
2008	25967	328699	3212605
2007	26665	335221	3249983

In 2020, 25,144 infants were born in Lithuania, i.e. 2,249 babies less than in 2019. In the country in 2020, 43,547 people died, 5,266 people less than in 2019. Gross indicator of natural population change (1 thousand population) in 2020 was negative (-6.6). In Akmenė district municipality, fewer babies were born and more people died in 2020 than in 2019 (figure below), the general indicator of natural population change was negative. In 2020, 159 persons were born in Akmenė district municipality, the birth rate was 8.5 per 1,000 of population, 391 persons died, and the mortality rate was 21/1000 residents (table below).

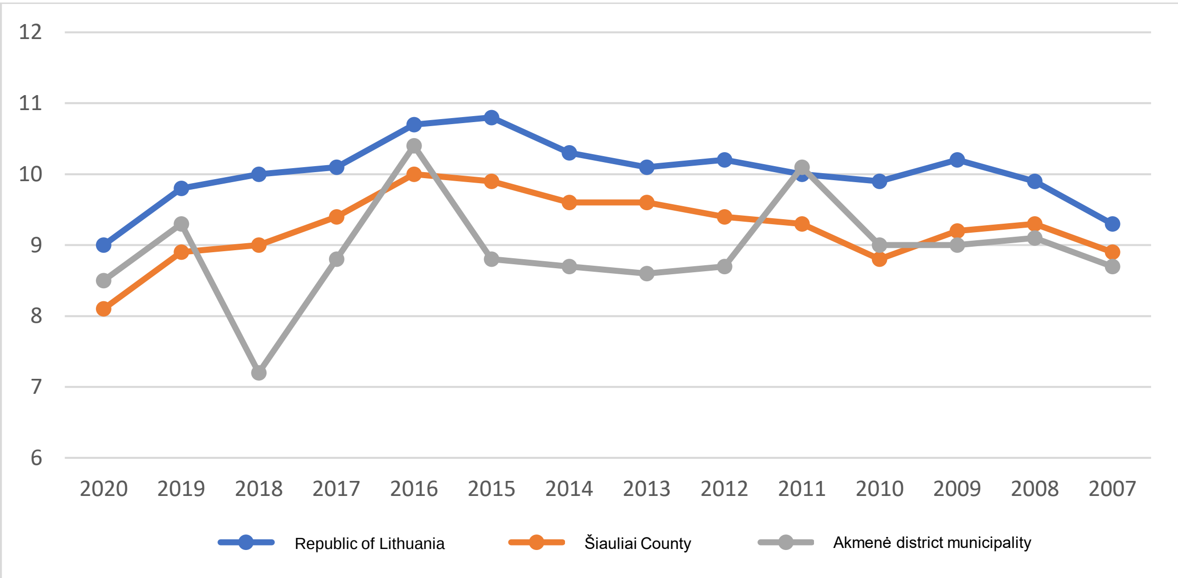


Fig. 58. Birth rate p er 1 000 res.

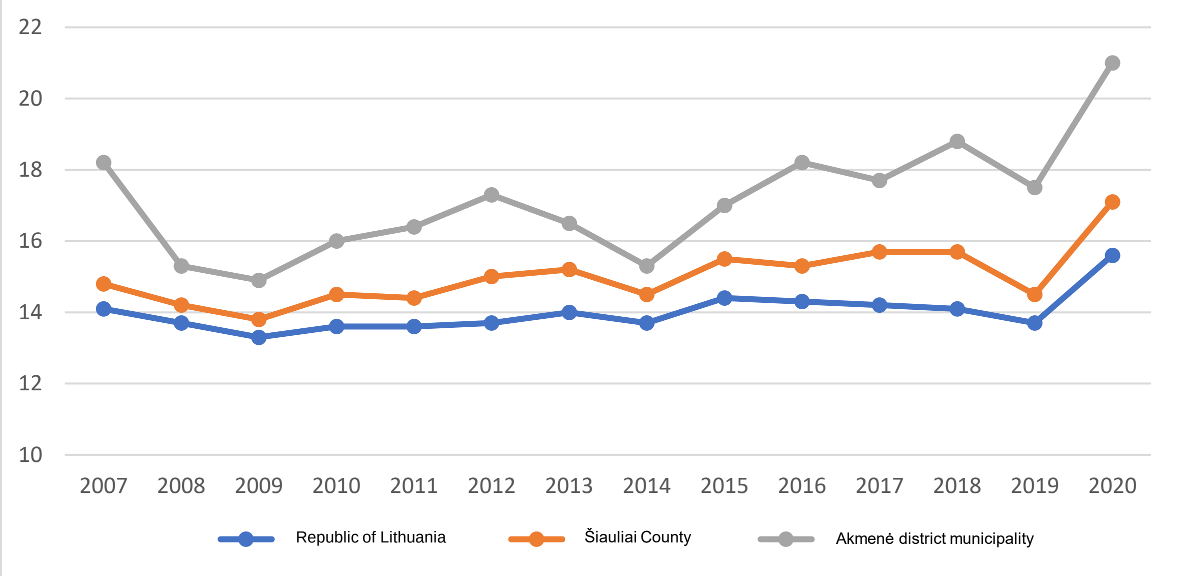


Fig. 59. Death rate per 1 000 res.

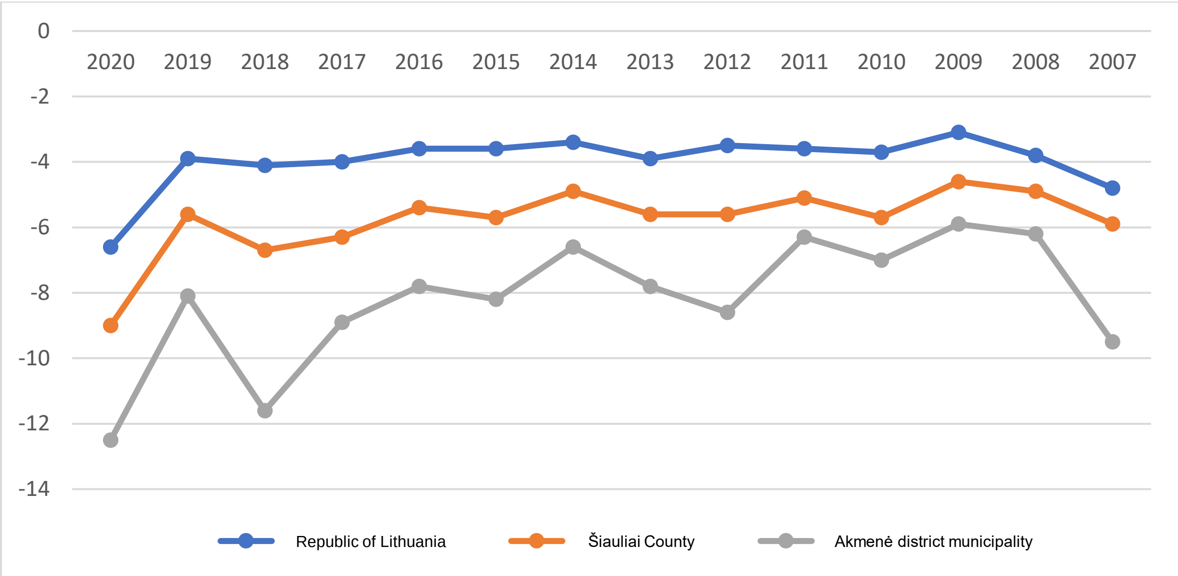


Fig. 60. Gross indicator of natural population change per 1 000 res.

Table 17. **Indicators of births, deaths and natural increase in Akmenė district municipality by year**

Year	Birth rate per 1000 residents	Number of live births	Death rate per 1000 residents	Number of deaths	Gross indicator of natural population change
2007	8,7	228	18,2	479	-9,5
2008	9,1	233	15,3	391	-6,2
2009	9	225	14,9	372	-5,9
2010	9	216	16	383	-7
2011	10,1	233	16,4	379	-6,3
2012	8,7	195	17,3	389	-8,6
2013	8,6	189	16,5	361	-7,8
2014	8,7	188	15,3	329	-6,6
2015	8,8	185	17	358	-8,2

2016	10,4	214	18,2	374	-7,8
2017	8,8	175	17,7	353	-8,9
2018	7,2	140	18,8	364	-11,6
2019	9,3	177	17,5	331	-8,1
2020	8,5	159	21	391	-12,5

The structure of causes of death in Akmenė district municipality is similar to that in Lithuania as a whole. In the first place according to the cause of death are diseases of the circulatory system, in the second place - malignant tumors, and in the third place - diseases of the digestive system.

According to the data of the Official Statistics Portal, in 2020 Akmenė district municipality more than half of people died from diseases of the circulatory system (68%), followed by malignancies (19%), third from external causes of death and diseases of the gastrointestinal tract (6%). The structure of causes of death in 2020 in Akmenė district municipality is presented in the figure below.

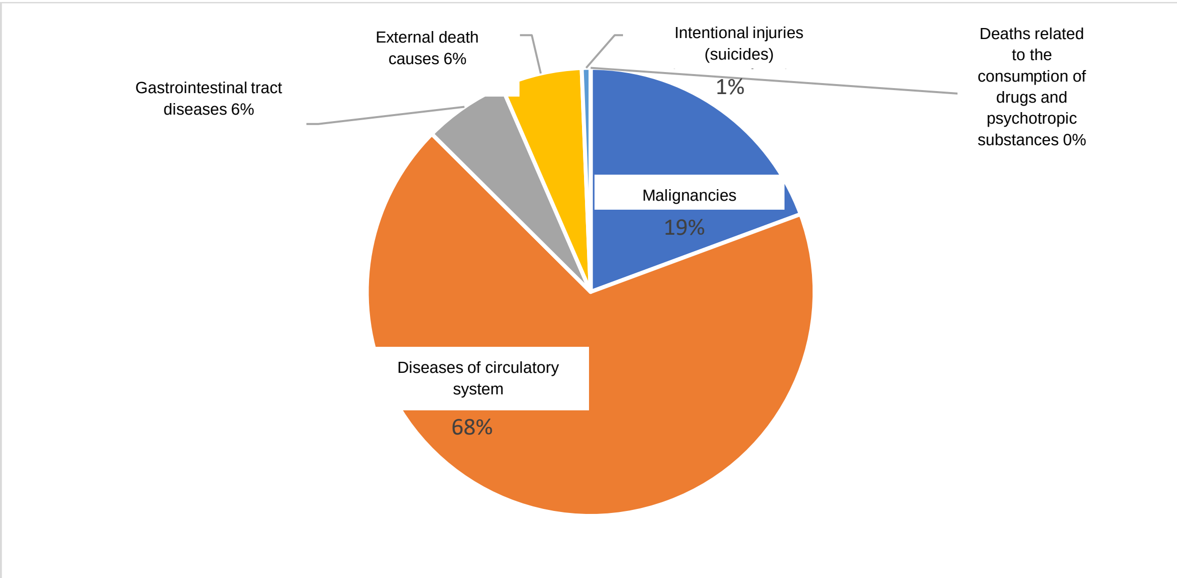


Fig. 61. Structure of causes of death in 2020 in Akmenė district municipality

The standardized death rate from malignant neoplasms in Akmenė district municipality in 2019 was higher than in the country and the county and reached 260.65 / 100000 population (fig. below).

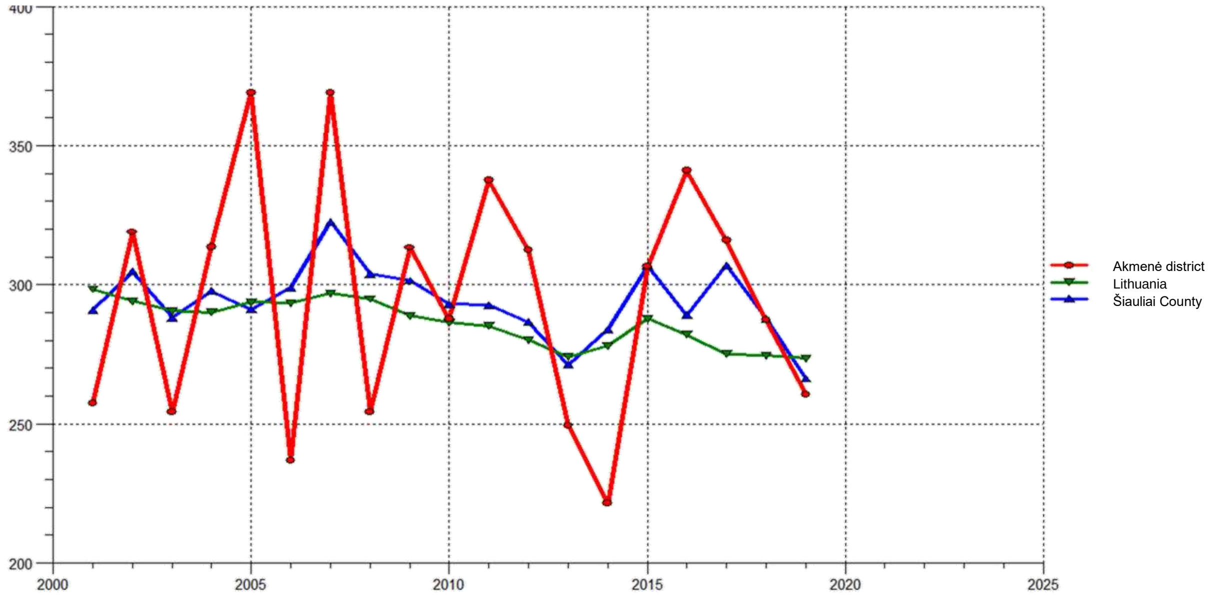


Fig. 62. Standardized death rate from malignant neoplasms

The standardized death rate from diseases of the circulatory system in Akmenė district municipality in 2019 was higher than in the country, but not outside Šiauliai County, and reached 769.67 / 100000 population (fig. below).

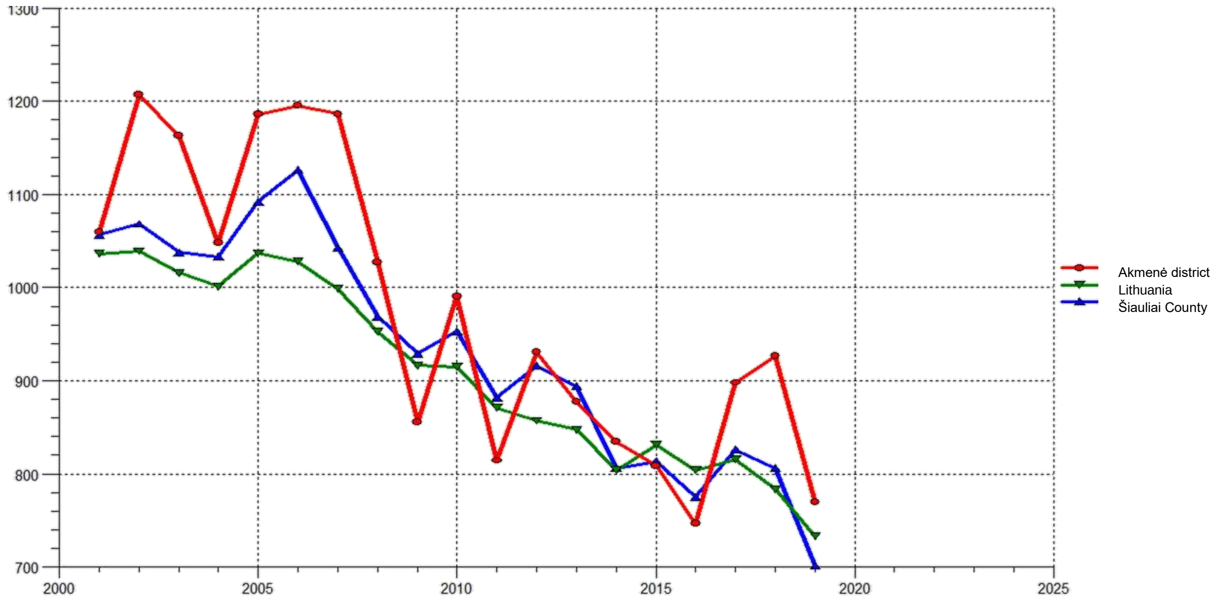


Fig. 63. Standardized death rate from diseases of the circulatory system

In 2019, the standardized death rate from respiratory diseases in Akmenė district municipality was higher than in the country and very similar to that of the county and reached 45.52 / 100000 population (fig. below).

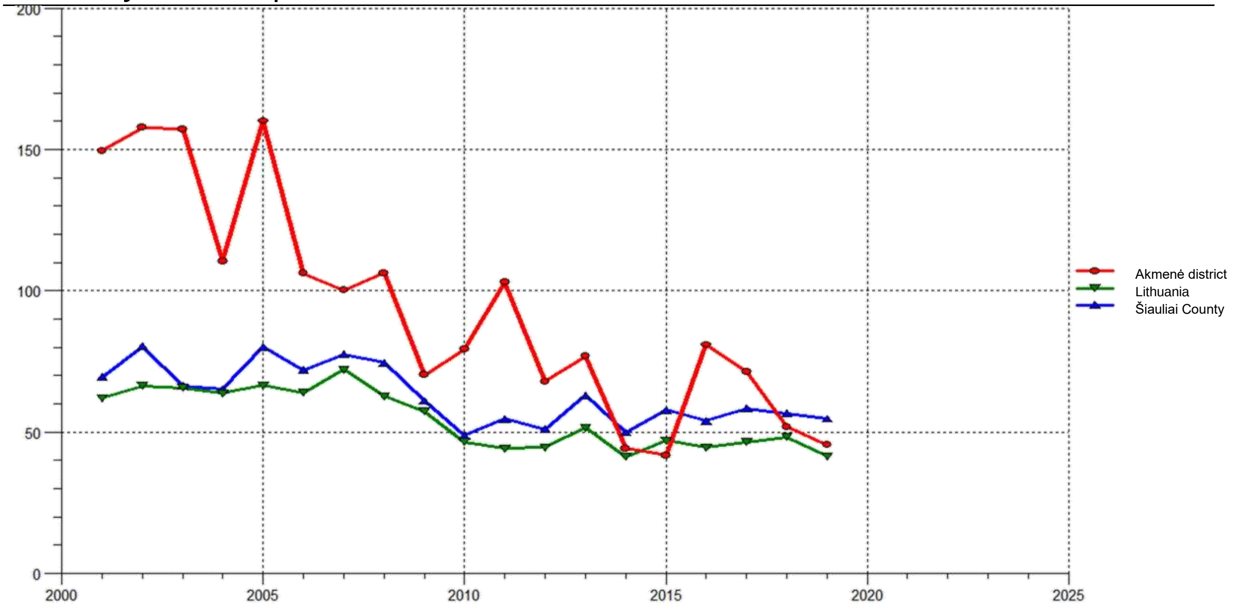


Fig. 64. Standardized death rate from respiratory diseases

The standardized death rate from diseases of the digestive system in Akmenė district municipality in 2019 was higher than in Šiauliai county and Lithuania, reaching 137.65 / 100000 population (see below).

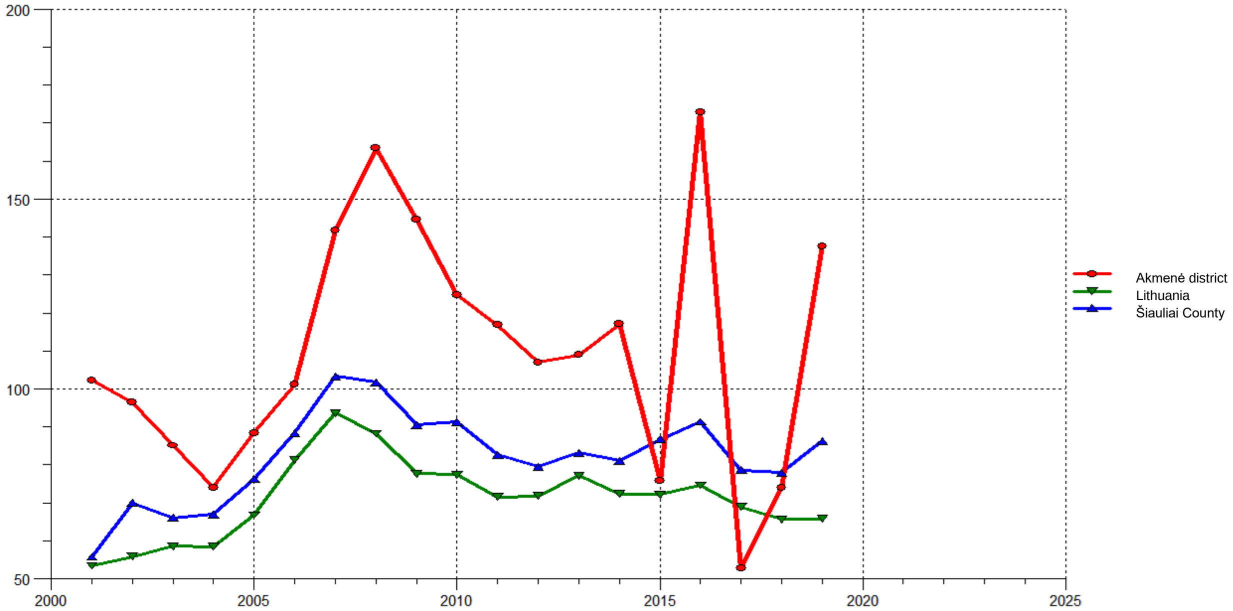


Fig. 65. Standardized death rate from diseases of the digestive system

Analysis of population morbidity rates and their comparison with data of the whole population

Morbidity is one of the most important indicators of health statistics, it is the number of newly diagnosed cases per year. Morbidity often limits people’s ability to work, causing significant social and economic losses.

In 2019, there were 23.97 doctors per 10,000 residents in Akmenė district municipality, of which 5.33 were family doctors, 815.47 visits per family doctors per 100 inhabitants were registered, and the hospital morbidity per 1,000 inhabitants was 231.42. Compared to the indicators of Lithuania, there were fewer doctors in Akmenė district municipality, the population visited the doctors of the family a little less, but the hospital morbidity was higher.

The sickness rate of diseases of the circulatory system in Akmenė district municipality in 2019 was lower than in the country and the county (fig. below). A clear increase in this indicator has been visible since 2012.

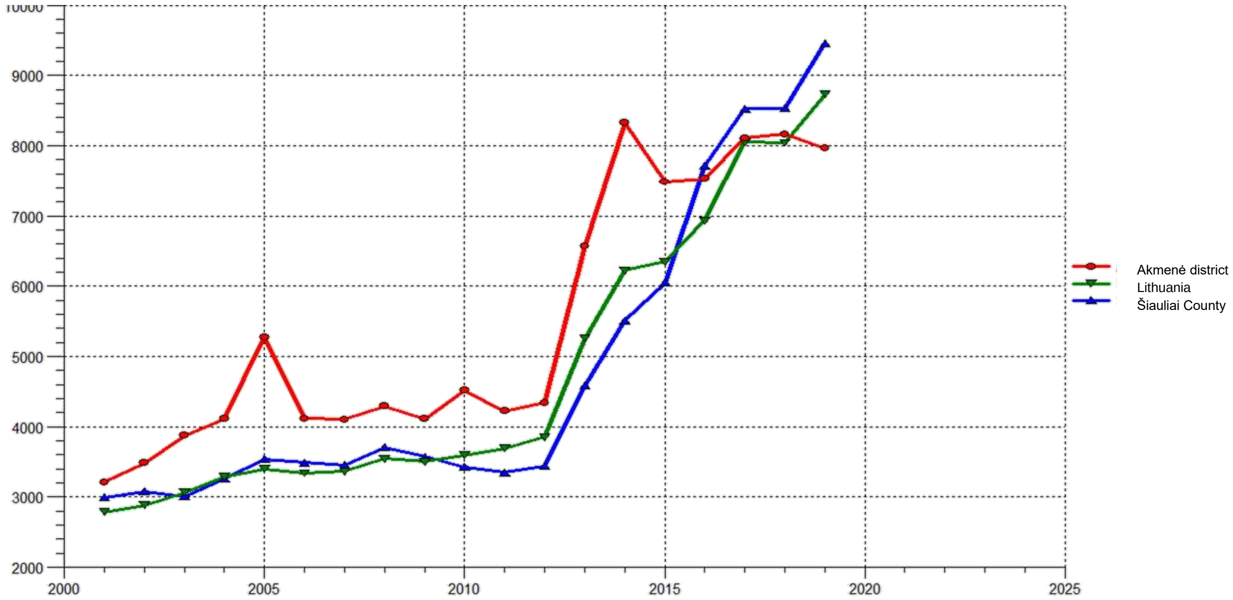


Fig. 66. Sickness rate of diseases of the circulatory system (I00-I99) 100 000 residents

In 2019, the sickness rate of respiratory diseases was higher in Akmenė district municipality than in Šiauliai County and Lithuania. Fluctuations of the sickness rate are also observed during the whole period of registration of the indicator: the lowest sickness rate in Akmenė district municipality was registered in 100,000 inhabitants in 2001, the highest in 2013. The morbidity of respiratory diseases in 2019 decreased compared to 2018 (fig. below).

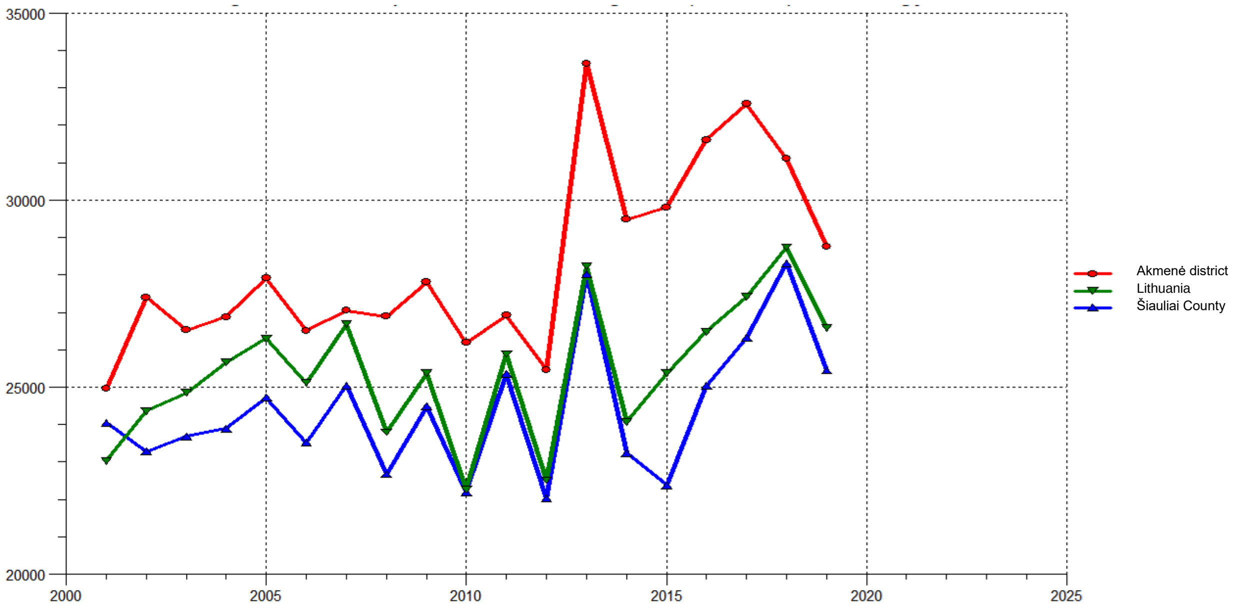


Fig. 67. Sickness rate of respiratory diseases (J00-J99) 100 000 residents

Since 2011, the sickness rate of gastrointestinal diseases has been on an upward trend. In 2019, this indicator in Akmenė district municipality was slightly higher than in the country, but lower than in the county (fig. below).

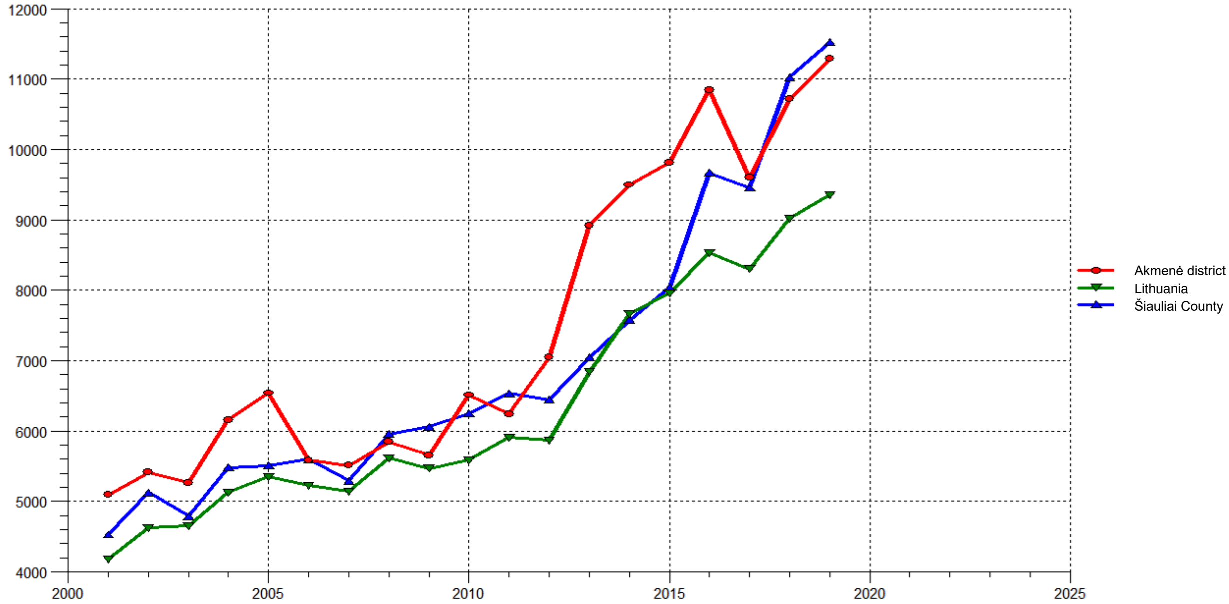


Fig. 68. Sickness rate of gastrointestinal diseases (K09-K93) 100 000 residents

In 2019, the number of paid days of temporary incapacity to work in Akmenė district municipality for one insured was almost equal to the country and slightly higher than in the county and amounted to 8.57 (fig. below).

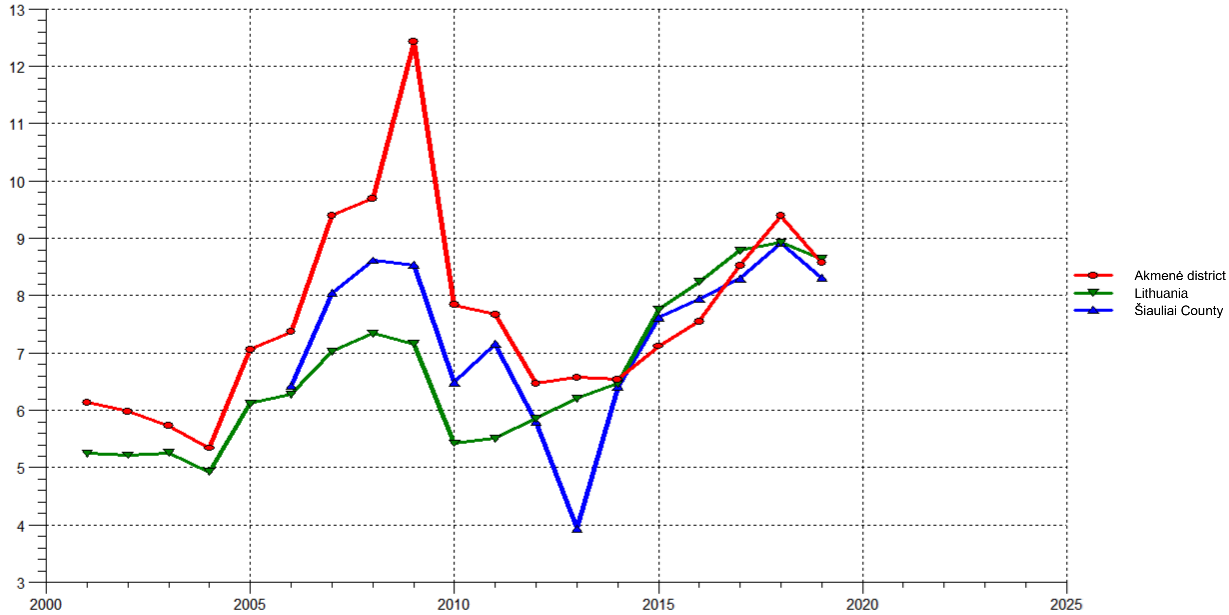


Fig. 69. Paid days of temporary incapacity to work for one insured

Noise may affect human health during planned economic activities. Noise affects the morbidity of circulatory, gastrointestinal and nervous system diseases. Morbidity of circulatory, gastrointestinal and nervous system diseases in Akmenė district municipality in 2019 is presented in the table below (data of the Lithuanian Health Indicators Information System).

Table 18. Morbidity of circulatory, gastrointestinal and nervous system diseases in Akmenė district municipality in 2019

Indicator	Rate
Morbidity of diseases of the nervous system (G00-G99) per 100000 residents	5478,15
Morbidity of nervous system diseases in the 0-17 age group per 100000 residents	1627,54
Morbidity in diseases of the nervous system in the age group over 65 years per 100000 residents	5978,49
Morbidity in diseases of the circulatory system (I00-I99) per 100000 residents	7963,9
Morbidity of the circulatory system in the 0-17 age group per 100000 residents	1220,66
Morbidity of the circulatory system in the age group over 65 years per 100000 residents	16365,6
Morbidity in hypertensive diseases (I10-I15) per 100000 residents	2158,54
Morbidity in myocardial infarction (I21-I22) per 100000 residents	300,82
Morbidity in diseases of the digestive system (K09-K93) per 100000 residents	11294,1
Morbidity in diseases of the digestive system in the 0-17 age group per 100000 residents	19342,7
Morbidity in diseases of the digestive system in the age group over 65 years per 100000 residents	10645,2
Morbidity of gastric and duodenal ulcers (K25-K28) per 100000 residents	459,15

Analysis of the population risk groups

The most sensitive (vulnerable) groups of population are:

- children;
- elderly people;
- people with chronic diseases;
- pregnant women;
- people with lower income;
- social risk group people (alcohol, drug users, people with no permanent residence, people living outdoors, etc.).

In 2019, the groups of the population aged 0-17 and older than 65 years in Akmenė district municipality together accounted for 41.4%. 16.86 per cent of the population aged 0-17 and 24.54 per cent of the population aged 65 and over. The ratio of the population aged 65 and over to the population aged 15-64 was 39.79%. In Akmenė district municipality, there is a tendency in decrease in the number of children and increase the number of elderly people.

The number of social risk families per 1000 population in Akmenė district municipality in 2018 was almost twice as high as in Lithuania. The number of recipients of social benefits per 1000 population is decreasing every year in both Akmenė district municipality and Lithuania, but in Akmenė district municipality it was more than twice as high and in 2019 reached 50.2 per 1000 population (table below).

Table 19. Number of social risk families and recipients of social benefits per 1000 population

Year	Number of cosial risk families per 1000 population		Number of recipients of social benefits per 1000 population	
	Akmenė district municipality	Lithuania	Akmenė district municipality	Lithuania
2014	5,58	3,39	80,4	47,78
2015	6,12	3,36	71,88	38,11
2016	6,4	3,4	68,8	30,6
2017	6,4	3,5	59,6	26,4
2018	6,1	3,3	55,6	25,4
2019	-	-	50,2	23,1

2.8.2. Expected significant impact

The emergence of wind turbines could lead to some dissatisfaction among local people. The reasons for this dissatisfaction are the psycho-emotional effects (tension, dissatisfaction, fear, etc.) caused by the population's fear, unjustified rejection of innovation, misinformation about the negative impact of wind turbines on the quality of life and health of the population.

The main risk to human health is due to physical pollution from WTs. Calculations of physical pollution (noise and shading) were performed during the planning of economic activities and the wind farm was arranged so as not to exceed the noise limit values in the residential environment. After evaluating the calculations of noise scattering and shading, according to the foreign literature, the analysis of vibrations of infrasound and low frequency sound, electromagnetic radiation, and vibration revealed that the PEA will not have a negative impact on public health in the immediate living environment. Noise emission calculations have shown that the noise limit value (45 dB (A)) in the nearest living environment will not be exceeded.

In order to prevent possible extreme events, the following safety and control systems will be installed in WTs: braking, lightning protection and control systems. A lighting system will also be installed at the WTs to alert aircraft of a potential obstacle.

2.8.3. Assessment of noise dispersion

Rotating wind turbine rotor blades generate aerodynamic noise, the sound level of which depends on the speed of rotation and the shape and characteristics of the wind turbine blades.

The predicted WT noise level is estimated from the equivalent sound pressure level L_{AeqT}. In Lithuania, noise limit values in residential and public buildings and their surroundings are regulated in accordance with the requirements of HN 33:2011 “Noise limit values in residential and public buildings and their surroundings” and the established limit values for the equivalent sound pressure level (see table below).

Table 20. Maximum permissible noise limits in and around residential and public buildings, according to HN 33:2011

Line No	Object name	Time of day*	Equivalent sound pressure level (L_{AeqT}), dBA	Maximum sound pressure level (L_{AFmax}), dBA
1	**2**	**3**	**4**	**5**
<...>				
4.	In the environment of residential and public buildings (excluding catering and cultural buildings), excluding traffic noise	daytime evening night	55 50 45	60 55 50

*The start and end hours of the time of day (day, evening and night) shall be understood as defined in the definitions of the dailtime noise indicator (L_{dienos}), evening noise indicator (L_{vakaro}) and night noise indicator ($L_{nakties}$) specified in Paragraphs 3, 9 and 28 of Article [1] 2 of the Law on Noise Management of the Republic of Lithuania.

Prior to the implementation of the WTs, a sanitary protection zone will be established - an area with special land use conditions that will ensure that the permissible noise standards in the environment of residential and public buildings are not exceeded.

WT noise in the planned area was calculated using windPRO 3.0.654 software. windPRO is intended to calculate, visualize, evaluate and predict the effects of WT noise. The calculation standard used in windPRO is ISO 9613-2 General.

Conditions and coefficients evaluated during noise dispersion modeling:

- Wind speed (in 10 m height) – 10,0 m/s. This parameter was selected in accordance with the letter No. (10.2.2.3-411) 10-8808 of the Ministry of Health of the Republic of Lithuania of 08-10-2014, which states that "The maximum value of the sound power level of a wind turbine operating in an environment with a wind speed of 6 to 10 m / s 10 m above the ground should be used for the prognostic calculations of wind turbines". The calculation of the noise dispersion was based on the maximum noise emitted by the wind turbine, which is technically achievable at a wind speed of 10 m / s;
- Ground attenuation: General, Ground attenuation factor – 0,9, was selected in accordance with Directive 2002/49 / EC of the European Parliament and of the Council of 25-06-2002 relating to the assessment and management of environmental noise, including its subsequent amendments, and expert assessment;
- Meteorological coefficient, C0 – 0,0 dB. The coefficient reflects the attenuation under special meteorological conditions. Noise attenuation due to special meteorological conditions was not taken into account;
- Type of demand in calculation – the noise generated by wind turbines is compared with a limit value set for noise receptors;
- Noise values in calculation – all noise values assessed in the PHIA (Public Health Impact Assessment) report are average values (Lwa) (normal parameter). The software only allows the evaluation of values that exceed a set limit value (special parameter) or average noise values;
- Pure tones – pure tone is sound with a sinusoidal waveform. The noise emitted by the WTs assessed in this PHIA does not contain pure tones, such tones may only occur in modern power plants in the event of a breakdown or other unusual conditions, but not during normal operation. Thus, the parameter does not affect the results of noise dispersion modeling;
- Height above ground level, when no value in NSA object – calculations were performed at a height of 1.5 m;

- Uncertainty margin – 0,0 dB, this is the limit to which values can be considered potentially erroneous. No uncertainty is identified in this PHIA report;
- Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive – 0,0 dB(A), this means that the deviation is not allowed (the legal acts of the Republic of Lithuania do not provide for the amounts of deviation).

During the noise dispersion assessment, the planned WT models Siemens Gamesa SG 6.0-170, Vestas V162-6.2 (tower heights 159 and 149 m), Vestas V162-6.8 (tower heights 159 and 149 m), Vestas V162-7.2 (tower heights 159 and 149 m), General Electric GE 6.1-158 and Nordex Delta4000 - N163 6.8 (see Table 1) with noise level dB - 104.5-107.0.

Background noise sources

According to the information published on the website of the Environmental Protection Agency https://aaa.lrv.lt/ and on the website of the National Public Health Center https://nvsc.lrv.lt/, UAB "Vėjo parkai", UAB "Santix", UAB "Saulės vėjo energija" (information is accepted on the basis of construction project data), UAB "Vėjo technologijų projektai", UAB "Ekoinversta", UAB "Windfarm Akmenė Two" and UAB "Windfarm Akmenė One" (information is accepted on the basis of construction project data) have prepared EIA and PHIA documents in the adjacent territory. Based on these documents, the background data used in the noise dispersion assessment (estimating the noisiest WTs) are presented in the table below.

Table 21. Data on backround noise sources

Organizer	Coordinates LKS	Model	Noise power dB(A)
UAB "Santix"	437205 6242132	N149/4.0-4.5	106,1
	436894 6242632	N149/4.0-4.5	106,1
UAB "Saulės vėjo energija"	436217 6242044	Nordex N90/2500	103,5
	435945 6242342	Nordex N90/2500	103,5
UAB "Vėjo parkai"	440594 6239423	Siemens Gamesa SG 6.2-170	106,0
	439909 6237291	Siemens Gamesa SG 6.2-170	106,0
	439439 6237238	Siemens Gamesa SG 6.2-170	106,0
	439822 6236701	Siemens Gamesa SG 6.2-170	106,0
	439917 6238180	Siemens Gamesa SG 6.2-170	106,0
	442748 6235292	Siemens Gamesa SG 6.2-170	106,0
UAB "Vėjo technologijų projektai" (existing built WT)	436467 6242486	ENERCON E-66/18.70	99,0
UAB "Windfarm Akmenė One"	438883 6238023	Vestas V162-6.2	104,8
	440630 6238767	Vestas V162-6.2	104,8
	439365 6239502	Vestas V162-6.2	104,8
	437732 6242608	Vestas V162-6.2	104,8
	439534 6241694	Vestas V162-6.2	104,8
	437317 6243164	Vestas V162-6.2	104,8
	436719 6243042	Vestas V162-6.2	104,8
	438456 6239538	Vestas V162-6.2	104,8
	438416 6242886	Vestas V162-6.2	104,8
	439012 6241800	Vestas V162-6.2	104,8
	440217 6241414	Vestas V162-6.2	104,8
	438230 6243267	Vestas V162-6.2	104,8
	438245 6238645	Siemens Gamesa SG 5.0-145	109,3

Organizer	Coordinates LKS	Model	Noise power dB(A)
UAB “Windfarm Akmenė One”	439084 6237509	Siemens Gamesa SG 5.0-145	109,3
	436585 6242096	Siemens Gamesa SG 5.0-145	109,3
UAB “Windfarm Akmenė Two”	441252 6235510	General Electric GE 6.1-158	107,0
	441716 6235075	General Electric GE 6.1-158	107,0
	440668 6235489	General Electric GE 6.1-158	107,0
	440878 6234931	General Electric GE 6.1-158	107,0
	441032 6234442	General Electric GE 6.1-158	107,0
	438129 6240455	General Electric GE 6.1-158	107,0
	440370 6239809	General Electric GE 6.1-158	107,0
	440942 6237733	General Electric GE 6.1-158	107,0
	440728 6238225	General Electric GE 6.1-158	107,0
	437459 6238265	General Electric GE 6.1-158	107,0
	442387 6236687	General Electric GE 6.1-158	107,0
UAB “Ekoinversta”	436730 6242089	Enercon E66	97,4

Noise dispersion simulation results

During the noise dispersion simulation, 10 noise dispersion calculations were performed:

- Option 1. PEA noise is calculated, if Siemens Gamesa SG 6.0-170 WT, with a noise level of 106,0 dB were built;
- Option 2. PEA noise is calculated, if Vestas V162-6.2 (tower height 159 m) WT, with a noise level of 104,8 dB were built;
- Option 3. PEA noise is calculated, if Vestas V162-6.2 (tower height 149 m) WT, with a noise level of 104,8 dB were built;
- Option 4. PEA noise is calculated, if Vestas V162-6.8 (tower height 159 m) WT, with a noise level of 104,5 dB were built;
- Option 5. PEA noise is calculated, if Vestas V162-6.8 (tower height 149 m) WT, with a noise level of 104,5 dB were built;
- Option 6. PEA noise is calculated, if Vestas V162-7.2 (tower height 159 m) WT, with a noise level of 105,5 dB were built;
- Option 7. PEA noise is calculated, if Vestas V162-7.2 (tower height 149 m) WT, with a noise level of 105,5 dB were built;
- Option 8. PEA noise is calculated, if General Electric GE 6.1-158 WT, with a noise level of 107,0 dB were built;
- Option 9. PEA noise is calculated, if Nordex Delta 4000 - N163 6.8 WT, with a noise level of 106,4 dB were built;
- Option 10. Noise generated by the PEA and other planned (see table above) WTs of other economic entities has been calculated. The noisiest wind turbines planned to be built are estimated in the total calculations (in this case, PEA wind turbines are estimated as General Electric GE 6.1-158 WTs with a noise level of 107.0 dB).

The results of the PEA WTs noise dispersion assessment, both after assessing the background data and assessing only the planned PEA WT noise, show that the maximum permissible noise limit values in residential and public buildings and their surroundings according to HN 33:2011 will not be exceeded.

Table 22. Results of PEA WT noise dispersion assessment

Living Environment. Marking on a noise map (see Annex 2)	Address (see fig. 5)	Noise level dB(A)									
		1	2	3	4	5	6	7	8	9	10
A	Akmenė district municipality, Kruopių eldership, Kviečlaukio village 2	20,5	19,3	19,3	19,0	19,0	20,0	20,0	21,5	20,9	36,9
B	Šapnagių village	26,0	24,8	24,8	24,5	24,5	25,5	25,5	27,0	26,4	39,8
C	Akmenė district municipality, Kruopių eldership, Bambalų village 1	31,3	30,1	30,1	29,8	29,8	30,8	30,8	32,3	31,7	39,6
D	Akmenė district municipality, Kruopių eldership, Kviečlaukio village 3	25,5	24,3	24,3	24,0	24,0	25,0	25,0	26,5	25,9	38,2
E	Akmenė district municipality, Kruopių eldership, Narčių village 1	26,5	25,3	25,3	25,0	25,0	26,0	26,0	27,5	26,9	39,3
F	Akmenė district municipality, Kruopių eldership, Narčių village 2	25,7	24,4	24,5	24,2	24,2	25,1	25,2	26,7	26,1	37,3
G	Akmenė district municipality, Kruopių eldership, Narčių village 3	25,2	24,0	24,0	23,7	23,7	24,7	24,7	26,2	25,6	36,1
H	Akmenė district municipality, Kruopių eldership, Pleikių village 3	21,6	20,4	20,4	20,1	20,1	21,1	21,1	22,6	22,0	40,3
I	Akmenė district municipality, Kruopių eldership, Šliupščių village 3	16,1	14,8	14,9	14,5	14,6	15,5	15,6	17,0	16,4	38,1
Y	Akmenė district municipality, Kruopių eldership, Pakalniškių village 11	16,9	15,7	15,8	15,4	15,5	16,4	16,5	17,9	17,3	33,2
J	Akmenė district municipality, Kruopių	15,9	14,7	14,8	14,4	14,5	15,4	15,5	16,9	16,3	38,2

Living Environment. Marking on a noise map (see Annex 2)	Address (see fig. 5)	Noise level dB(A)									
		1	2	3	4	5	6	7	8	9	10
	eldership, Laumėnų II village 3										
K	Akmenė district municipality, Kruopių eldership, Dovydžių village 7	14,4	13,2	13,3	12,9	13,0	13,9	14,0	15,4	14,8	39,5
L	Akmenė district municipality, Kruopių eldership, Dovydžių village 8	14,4	13,2	13,3	12,9	13,0	13,9	14,0	15,4	14,8	38,8
M	Akmenė district municipality, Kruopių eldership, Dovydžių village 5	13,7	12,5	12,5	12,2	12,2	13,2	13,2	14,6	14,1	36,4
N	Akmenė district municipality, Kruopių eldership, Dovydžių village 2	12,6	11,4	11,5	11,1	11,2	12,1	12,2	13,6	13,0	40,2
O	Akmenė district municipality, Kruopių eldership, Laumėnų II village 8	14,5	13,2	13,3	12,9	13,0	13,9	14,0	15,4	14,8	39,4
P	Akmenė district municipality, Kruopių eldership, Laumėnų II village 7	14,9	13,6	13,7	13,3	13,4	14,3	14,4	15,8	15,2	38,4
Q	Akmenė district municipality, Kruopių eldership, Dovydžių village 6	13,6	12,3	12,4	12,1	12,1	13,0	13,1	14,5	14,0	37,1
R	Akmenė district municipality, Kruopių eldership, Dovydžių village 4	13,1	11,9	12,0	11,6	11,7	12,6	16,7	14,1	13,5	35,8
S	Akmenė district municipality, Kruopių eldership, Pleikių village 6	20,6	19,4	19,4	19,1	19,1	20,1	20,1	21,6	21,0	40,8

Living Environment. Marking on a noise map (see Annex 2)	Address (see fig. 5)	Noise level dB(A)									
		1	2	3	4	5	6	7	8	9	10
T	Akmenė district municipality, Kruopių eldership, Pleikių village 1	20,3	19,1	19,1	18,8	18,8	19,8	19,8	21,3	20,7	40,1
U	Akmenė district municipality, Kruopių eldership, Gembūčių village 2	13,5	12,3	12,3	12,0	12,0	13,0	13,0	14,5	13,9	30,9
V	Kruopių town	12,7	11,4	11,5	11,1	11,2	12,1	12,2	13,6	13,0	31,5
W	Akmenė district municipality, Kruopių eldership, Pleikių village 2	19,8	18,6	18,6	18,3	18,3	19,3	19,3	20,8	20,2	39,4
X	Akmenė district municipality, Kruopių eldership, Pakalniškių village 10	17,0	15,7	15,8	15,4	15,5	16,4	16,5	17,9	17,3	32,9
Z	Akmenė district municipality, Kruopių eldership, Bambalų village 2	36,8	35,6	35,6	35,3	35,3	36,3	36,3	37,8	37,2	41,1
AB	Akmenė district municipality, Kruopių eldership, Jautmalkių village 4	22,5	21,3	21,3	21,0	21,0	22,0	22,0	23,5	22,9	33,5
AC	Akmenė district municipality, Kruopių eldership, Laumėnų II village 5	15,6	14,4	14,4	14,1	14,1	15,1	15,1	16,5	16,0	37,3
AD	Akmenė district municipality, Kruopių eldership, Laumėnų II village 6	15,1	13,9	14,0	13,6	13,7	14,6	14,7	16,1	15,5	37,6
AE	Akmenė district municipality, Kruopių eldership, Gembūčių village 1B	13,6	12,4	12,5	12,1	12,2	13,1	13,2	14,6	14,0	32,1
AF	Akmenė district municipality, Kruopių	32,1	30,8	30,9	30,5	30,6	31,5	31,6	33,0	32,5	36,6

Living Environment. Marking on a noise map (see Annex 2)	Address (see fig. 5)	Noise level dB(A)									
		1	2	3	4	5	6	7	8	9	10
	eldership, Bambalų village 3										

After the assessment of the PEA WTs, it has been established that the noise level without background noise sources in the area of the nearest living environment will reach 11.1-37.8 dB (A) and will not exceed the limit value of 45 dB (A) according to HN 33:2011. The assessment of the planned WTs in the surrounding area shows that the noise level with background noise sources in the area of the nearest living environment will reach 30.9-41.1 dB (A) and will also not exceed the limit value of 45 dB (A) according to HN 33:2011.

Noise dispersion maps are given in Annex 2.

2.8.4. Infrasound and low frequency sound

Low frequency sound and infrasound will be generated during PEA operation. Low-frequency sound is sound that spans one-third of an octave frequency band from 16 Hz to 200 Hz. Infrasound is sound that spans one-third of an octave of frequency up to 16 Hz. Usually a person does not hear this sound. WT emits more low-frequency sounds that are less absorbed in the external environment than high-frequency sounds. Due to the wavelength, it can travel a long distance and almost part of it can pass through the barriers. Infrasound is measured but not simulated.

WT-induced infrasound is difficult to detect because it is hard to distinguish it from the current infrasound level of wind or other sources. Infrasound is a natural factor in the natural environment caused by air turbulence, sea waves, and volcanic eruptions. Infrasound is also emitted by anthropogenic factors - the movement of airplanes, cars, and other mechanical equipment.

Based on research, it has been found that modern design wind turbines with wind turbine blades facing upwind produce very low levels of infrasound and bass frequency sound. Even at close proximity to these turbines, the infrasound and low-frequency sound levels are very low, including the limit of its perception (Jakobsen 2005; O'Neal et al. 2009). Studies have shown that there is no case in European countries for a WT project to be suspended due to non-compliance with infrasound and low-frequency sound requirements. Also, no cases were found that the operating WTs exceeded the established infrasound limit requirements. Infrasound and low-frequency noise generated by WTs in European countries is not discussed, as modern WTs are found to emit only infrasound of negligible intensity, which has no effect on human health.

According to the Bavarian State Environmental Protection Agency and the Bavarian State Agency for Health and Food Safety, extremely high levels of infrasound, i.e. infrasound in the human ear, can affect the circulatory system, both during animal experiments and human observation. Infrasound hearing in the human ear can also cause fatigue, reduced work efficiency, behavioral problems, dizziness, difficulty breathing, negative effects on sleep, morning fatigue, or other resonant health problems. However, the infrasound emitted by wind turbines in the environment is inaudible to humans because it is below the perceived limit - the noise emitted by wind turbines, even when measured near a wind turbine, is significantly below the established minimum hearing and perception threshold. A summary of the research carried out by the Bavarian State Environmental Protection Agency and the Bavarian State Agency for Health and Food Safety in 2019 confirms that the infrasound emitted by WT does not have any adverse effects on humans because it is beyond human hearing. Impacts on health are only observed at very high levels of infrasound that can be heard and felt by humans, but there is no evidence that WT infrasound below the perception threshold can have any effect.

In 2019, Finnish researchers conducted almost a year-long infrasound measurements near the operating wind farm and interviewed the population. The aim of the study was to determine whether infrasound has an effect on the health of the population. The research methods included a population survey to find out the predominant symptoms; infrasound measurements; provocative experiment with symptomatic and asymptomatic populations (psychoacoustic and psychophysiological evaluation). Long-term noise measurements have shown that the average noise and infrasound level in the wind farm environment is increased and is equal to the average noise level in the urban environment. Population-related symptoms intuitively associated with infrasound exposure are more common in the population living <2.5 km from the WF. Most of the symptoms (irritability, pain, poor sleep, etc.) were associated with audible noise, vibration, and electromagnetic radiation. The experiments showed that the symptomatic population did not differentiate in the infrasound noise samples and the infrasound noise samples did not disturb them more than in the asymptomatic population. Measurements of physiological parameters showed that there was no relationship between WT noise or infrasound and heart rate, skin characteristics, and other physiological parameters of the body. No evidence of a direct effect was found in either the symptomatic or non-symptomatic population (Maijala P. et al. 2019).

Recent research and data from Finland and Germany have not shown that low-frequency sound and infrasound from wind turbines have an effect on human health or mental condition.

2.8.5. Shading

WindPRO 3.0.654 software was used to predict shading, which allows to predict in which homesteads and how many hours per year the shading effect will be possible during the design of the wind turbine. The program calculates a realistic scenario using statistics and taking into account meteorological (wind directions, average solar radiation) and environmental conditions. In this way, the real potential risk of shadow exposure is assessed.

There are no methodologies or hygiene standards developed and approved in Lithuania for the assessment of the effects of shading. The permissible shading exposure limits recommended by German standards are adopted as the permissible shading level. Currently, only Germany has developed detailed guidelines for limit values and shadow modeling conditions (WindPRO user manual. Through Nielsen et al. Denmark. 1st edition January 2008).

The maximum permissible shading effect according to German regulations is:

- a maximum of 30 hours per year.

The windPRO sowtware allows you to estimate the shading time in the specified locations, determine the shading values for the worst case scenario, and recalculate them based on real meteorological conditions, estimating the expected shading time in the specified locations. When estimating the shading time the following are taken into account:

- The probability of sunny hours for each month;

- The operating hours of wind turbines according to wind directions;
- The difference between the wind direction and the angle of incidence of the sun.

Based on these parameters, the expected number of shading hours per year in each specified area is determined. This set number of shading hours per year must not exceed the maximum of 30 hours per year (according to German standards).

Remiantis apskaičiuota informacija sudaryti žemėlapiai, kuriuose atvaizduojama šešėliavimo poveikio zona, apribota šešėlių mirgėjimo 30 valandų per metus izolinija.

The input data required for windPRO 3.0.654 software are wind turbine model, height, rotor diameter (see Table 1) and other WT technical characteristics entered according to the technical characteristics provided by the manufacturer. The simulation was performed according to:

- WT location coordinates;
- layout coordinates of existing residential buildings;
- topographic map;
- diameter of blade system;
- WT height.

In order to maximize the assessment of whether the proposed economic activity may have an adverse effect on the immediate living environment and the health of the population, the shading assessment was performed assuming the simultaneous operation of all planned wind turbines with adjacent planned wind turbones. Taking into account the WT models planned to be built (see Table 1), the following WT models planned to be built were assessed during the shadow dispersion assessment: Siemens Gamesa SG 6.0-170, Vestas V162-6.2 (tower heights 159 and 149 m), Vestas V162-6.8 (tower heights 159 and 149 m), Vestas V162-7.2 (tower heights 159 and 149 m), General Electric GE 6.1-158 and Nordex Delta4000 - N163 6.8 (see Table 1).

Background noise sources

According to the information published on the website of the Environmental Protection Agency https://aaa.lrv.lt/ and on the website of the National Public Health Center https://nvsc.lrv.lt/ UAB “Vėjo parkai”, UAB “Santix”, UAB “Saulės vėjo energija” (nformation is accepted on the basis of construction project data), UAB “Vėjo technologijų projektai”, UAB “Ekoinversta”, UAB “Windfarm Akmenė Two” and UAB “Windfarm Akmenė One” (information is accepted on the basis of construction project data) have prepared EIA and PHIA documents in the adjacent territory. Based on these documents, the background data used for the noise scattering assessment (the highest ones with the highest rotor WT) are given in the table below.

Table 23. Background data of shadow sources

Organizer	Coordinates LKS	Model	Rotor diameter/tower height, m
UAB “Santix”	437205 6242132	VESTAS V150-4.0-4.000	150/166
	436894 6242632	VESTAS V150-4.0-4.000	150/166
UAB “Saulės vėjo energija”	436217 6242044	Nordex N90/2500	90/80
	435945 6242342	Nordex N90/2500	90/80
UAB “Vėjo parkai”	440594 6239423	Siemens Gamesa SG 6.2-170	170/145

Organizer	Coordinates LKS	Model	Rotor diameter/tower height, m
	439909 6237291	Siemens Gamesa SG 6.2-170	170/145
	439439 6237238	Siemens Gamesa SG 6.2-170	170/145
	439822 6236701	Siemens Gamesa SG 6.2-170	170/145
	439917 6238180	Siemens Gamesa SG 6.2-170	170/145
	442748 6235292	Siemens Gamesa SG 6.2-170	170/145
UAB “Vėjo technologijų projektai” (existing built WT)	436467 6242486	ENERCON E-66/18.70	70/63
UAB “Windfarm Akmenė One”	438883 6238023	Vestas V162-6.2	162/139
	440630 6238767	Vestas V162-6.2	162/139
	439365 6239502	Vestas V162-6.2	162/149
	437732 6242608	Vestas V162-6.2	162/149
	439534 6241694	Vestas V162-6.2	162/149
	437317 6243164	Vestas V162-6.2	162/149
	436719 6243042	Vestas V162-6.2	162/149
	438456 6239538	Vestas V162-6.2	162/149
	438416 6242886	Vestas V162-6.2	162/149
	439012 6241800	Vestas V162-6.2	162/149
	440217 6241414	Vestas V162-6.2	162/149
	438230 6243267	Vestas V162-6.2	162/149
UAB “Windfarm Akmenė One”	438245 6238645	Siemens Gamesa SG 5.0-145	145/157,5
	439084 6237509	Siemens Gamesa SG 6.0-170	135/170
	436585 6242096	Siemens Gamesa SG 5.0-145	145/157,5
UAB “Windfarm Akmenė Two”	441252 6235510	Siemens Gamesa SG 6.0-170	115/170
	441716 6235075	Siemens Gamesa SG 6.0-170	115/170
	440668 6235489	Siemens Gamesa SG 6.0-170	115/170
	440878 6234931	Siemens Gamesa SG 6.0-170	115/170
	441032 6234442	Siemens Gamesa SG 6.0-170	115/170
	438129 6240455	Siemens Gamesa SG 6.0-170	155/170
	440370 6239809	Siemens Gamesa SG 6.0-170	145/170
	440942 6237733	Siemens Gamesa SG 6.0-170	135/170
	440728 6238225	Siemens Gamesa SG 6.0-170	135/170
	437459 6238265	Siemens Gamesa SG 6.0-170	135/170
	442387 6236687	Siemens Gamesa SG 6.0-170	115/170
UAB “Ekoinversta”	436730 6242089	Enercon E66	70/65

Shading simulation results

The following calculations were performed during shadow dispersion simulation:

- Option 1. The resulting shading if Siemens Gamesa SG 6.0-170 WTs were built. During the calculations of this option, 3 calculations were performed:
    1) Only PEA WTs,
    2) WTs planned by the PEA and other economic entities (see table above),
    3) WTs planned by the PEA and other economic entities with mitigation measures;
- Option 2. The resulting shading if Vestas V162-6.2 (tower height 159 m) WTs were built. During the calculations of this option, 3 calculations were performed:
    1) Only PEA WTs,

2) WTs planned by the PEA and other economic entities,
3) WTs planned by the PEA and other economic entities with mitigation measures;

- Option 3. Calculated shading if Vestas V162-6.2 (tower height 149 m) WTs were built. During the calculations of this option, 3 calculations were performed:
  1) Only PEA WTs,
  2) WTs planned by the PEA and other economic entities,
  3) WTs planned by the PEA and other economic entities with mitigation measures;
- Option 4. Calculated shading if Vestas V162-6.8 (tower height 159 m) WTs were built. During the calculations of this option, 3 calculations were performed:
  1) Only PEA WTs,
  2) WTs planned by the PEA and other economic entities,
  3) WTs planned by the PEA and other economic entities with mitigation measures;
- Option 5. Calculated shading if Vestas V162-6.8 (tower height 149 m) WTs were built. During the calculations of this option, 3 calculations were performed:
  1) Only PEA WTs,
  2) WTs planned by the PEA and other economic entities,
  3) WTs planned by the PEA and other economic entities with mitigation measures;
- Option 6. Calculated shading if Vestas V162-7.2 (tower height 159 m) WTs were built. During the calculations of this option, 3 calculations were performed:
  1) Only PEA WTs,
  2) WTs planned by the PEA and other economic entities,
  3) WTs planned by the PEA and other economic entities with mitigation measures;
- Option 7. Calculated shading if Vestas V162-7.2 (tower height 149 m) WTs were built. During the calculations of this option, 3 calculations were performed:
  1) Only PEA WTs,
  2) WTs planned by the PEA and other economic entities,
  3) WTs planned by the PEA and other economic entities with mitigation measures;
- Option 8. Calculated shading if General Electric GE 6.1-158 WTs were built. During the calculations of this option, 3 calculations were performed:
  1) Only PEA WTs,
  2) WTs planned by the PEA and other economic entities,
  3) WTs planned by the PEA and other economic entities with mitigation measures;
- Option 9. Calculated shading if Nordex Delta 4000 - N163 6.8 WTs were built. During the calculations of this option, 3 calculations were performed:
  1) Only PEA WTs,
  2) WTs planned by the PEA and other economic entities,
  3) WTs planned by the PEA and other economic entities with mitigation measures.

Shadow dispersion modeling has shown that shading caused by the PEA WTs will only reach two residential areas after the implementation of any of the selected technological alternatives, i.e. houses in Akmenė district municipality, Kruopių eldership, Bambalų village 1 (marked C), and Bambalai village 1 (marked Z), the shading caused by the implementation of General Electric GE model 6.1-158 WT will also reach Šapnagių village (marked B), but the 30-hour annual shadow flicker duration due to the PEA will not be exceeded in any residential environment.

The shading caused by the PEA and other economic entities' planned VEs has shown that in the nearest residential areas in Akmenė district municipality, Kruopių eldership, Bambalai village 1 (marked C), and Bambala village 1 (marked Z), the annual shade flicker of 30 hours can be exceeded. In order to evaluate technical mitigation measures ("anti-flickering system") to ensure that the flicker of shadows in the living environment does not exceed 30 hours / year, an additional modeling was performed (planned WTs of the PEA and other economic entities with mitigation measures) Graphical maps of the shading modeling results are provided in Annex 1 and the results are presented in the tables below. It should be noted that the non-PEA 30-hour annual shadow flicker duration (e.g. in residential environments, marked E, H, N, O, P, T, W) is not considered for mitigation measures in this assessment as it should be analyzed in EIA reports prepared by other economic entities.

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Table 24. Duration of WT shading (PEA WTs only)

Living Environment. Marking on the shading map (see annex 1)	Address (see fig. 5)	Shading duration, hrs/year, (RV – 30 hrs.)								
		1	2	3	4	5	6	7	8	9
		PEA WTs only								
A	Akmenė district municipality, Kruopių eldership, Kviečlaukio village 2	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
B-B5	Šapnagių village	00:00	00:00	00:00	00:00	00:00	00:00	00:00	0:00-1:14	00:00
C	Akmenė district municipality, Kruopių eldership, Bambalų village 1	10:37	9:16	9:18	9:16	9:18	9:16	9:18	8:35	3:17
D	Akmenė district municipality, Kruopių eldership, Kviečlaukio village 3	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
E	Akmenė district municipality, Kruopių eldership, Narčių village 1	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
F	Akmenė district municipality, Kruopių eldership, Narčių village 2	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
G	Akmenė district municipality, Kruopių eldership, Narčių village 3	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
H	Akmenė district municipality, Kruopių eldership, Pleikių village 3	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
I	Akmenė district municipality, Kruopių eldership, Šliupščių village 3	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
Y	Akmenė district municipality, Kruopių eldership, Pakalniškių village 11	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
J	Akmenė district municipality, Kruopių eldership, Laumėnų II village 3	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00

Living Environment. Marking on the shading map (see annex 1)	Address (see fig. 5)	Shading duration, hrs/year, (RV – 30 hrs.)								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
		PEA WTs only								
K	Akmenė district municipality, Kruopių eldership, Dovydžių village 7	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
L	Akmenė district municipality, Kruopių eldership, Dovydžių village 8	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
M	Akmenė district municipality, Kruopių eldership, Dovydžių village 5	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
N	Akmenė district municipality, Kruopių eldership, Dovydžių village 2	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
O	Akmenė district municipality, Kruopių eldership, Laumėnų II village 8	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
P	Akmenė district municipality, Kruopių eldership, Laumėnų II village 7	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
Q	Akmenė district municipality, Kruopių eldership, Dovydžių village 6	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
R	Akmenė district municipality, Kruopių eldership, Dovydžių village 4	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
S	Akmenė district municipality, Kruopių eldership, Pleikių village 6	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
T	Akmenė district municipality, Kruopių eldership, Pleikių village 1	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
U	Akmenė district municipality, Kruopių eldership, Gembūčių village 2	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
V	Kruopių town	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00

Living Environment. Marking on the shading map (see annex 1)	Address (see fig. 5)	Shading duration, hrs/year, (RV – 30 hrs.)								
		1	2	3	4	5	6	7	8	9
		PEA WTs only								
W	Akmenė district municipality, Kruopių eldership, Pleikių village 2	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
X	Akmenė district municipality, Kruopių eldership, Pakalniškių village 10	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
Z	Akmenė district municipality, Kruopių eldership, Bambalų village 2	8:52	8:13	8:00	8:13	8:00	8:13	8:00	8:15	6:26
AB	Akmenė district municipality, Kruopių eldership, Jautmalkių village 4	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
AC	Akmenė district municipality, Kruopių eldership, Laumėnų II village 5	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
AD	Akmenė district municipality, Kruopių eldership, Laumėnų II village 6	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
AE	Akmenė district municipality, Kruopių eldership, Gembūčių village 1B	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
AF	Akmenė district municipality, Kruopių eldership, Bambalų village 3	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00

Table 25. Duration of shading caused by WTs (WTs planned by PEA and other economic entities)

Living Environment. Marking on the shading map (see annex 1)	Address (see fig. 5)	Shading duration, hrs/year, (RV – 30 hrs.)								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
		WTs planned by PEA and other economic entities								
A	Akmenė district municipality, Kruopių eldership, Kviečlaukio village 2	10:37	10:37	10:37	10:37	10:37	10:37	10:37	10:37	10:37
B-B5	Šapnagių village	1:15-18:42	1:15-18:42	1:15-18:42	1:15-18:42	1:15-18:42	1:15-18:42	1:15-18:42	1:15-19:52	1:15-18:42
C	Akmenė district municipality, Kruopių eldership, Bambalų village 1	**32:53**	**31:33**	**31:35**	**31:33**	**31:35**	**31:33**	**31:35**	**30:53**	25:38
D	Akmenė district municipality, Kruopių eldership, Kviečlaukio village 3	29:25	29:25	29:25	29:25	29:25	29:25	29:25	29:25	29:25
E	Akmenė district municipality, Kruopių eldership, Narčių village 1	31:46	31:46	31:46	31:46	31:46	31:46	31:46	31:46	31:46
F	Akmenė district municipality, Kruopių eldership, Narčių village 2	19:18	19:18	19:18	19:18	19:18	19:18	19:18	19:18	19:18
G	Akmenė district municipality, Kruopių eldership, Narčių village 3	15:46	15:46	15:46	15:46	15:46	15:46	15:46	15:46	15:46
H	Akmenė district municipality, Kruopių eldership, Pleikių village 3	39:22	39:22	39:22	39:22	39:22	39:22	39:22	39:22	39:22
I	Akmenė district municipality, Kruopių eldership, Šliupščių village 3	12:39	12:39	12:39	12:39	12:39	12:39	12:39	12:39	12:39
Y	Akmenė district municipality, Kruopių eldership, Pakalniškių village 11	4:48	4:48	4:48	4:48	4:48	4:48	4:48	4:48	4:48
J	Akmenė district municipality, Kruopių eldership, Laumėnų II village 3	17:58	17:58	17:58	17:58	17:58	17:58	17:58	17:58	17:58
K	Akmenė district municipality, Kruopių eldership, Dovydžių village 7	15:25	15:25	15:25	15:25	15:25	15:25	15:25	15:25	15:25

Living Environment. Marking on the shading map (see annex 1)	Address (see fig. 5)	Shading duration, hrs/year, (RV – 30 hrs.)								
		1	2	3	4	5	6	7	8	9
		WTs planned by PEA and other economic entities								
L	Akmenė district municipality, Kruopių eldership, Dovydžių village 8	9:13	9:13	9:13	9:13	9:13	9:13	9:13	9:13	9:13
M	Akmenė district municipality, Kruopių eldership, Dovydžių village 5	9:19	9:19	9:19	9:19	9:19	9:19	9:19	9:19	9:19
N	Akmenė district municipality, Kruopių eldership, Dovydžių village 2	43:24	43:24	43:24	43:24	43:24	43:24	43:24	43:24	43:24
O	Akmenė district municipality, Kruopių eldership, Lauménų II village 8	32:13	32:13	32:13	32:13	32:13	32:13	32:13	32:13	32:13
P	Akmenė district municipality, Kruopių eldership, Lauménų II village 7	46:44	46:44	46:44	46:44	46:44	46:44	46:44	46:44	46:44
Q	Akmenė district municipality, Kruopių eldership, Dovydžių village 6	13:52	13:52	13:52	13:52	13:52	13:52	13:52	13:52	13:52
R	Akmenė district municipality, Kruopių eldership, Dovydžių village 4	15:01	15:01	15:01	15:01	15:01	15:01	15:01	15:01	15:01
S	Akmenė district municipality, Kruopių eldership, Pleikių village 6	28:07	28:07	28:07	28:07	28:07	28:07	28:07	28:07	28:07
T	Akmenė district municipality, Kruopių eldership, Pleikių village 1	39:53	39:53	39:53	39:53	39:53	39:53	39:53	39:53	39:53
U	Akmenė district municipality, Kruopių eldership, Gembūčių village 2	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
V	Kruopių town	1:26	1:26	1:26	1:26	1:26	1:26	1:26	1:26	1:26
W	Akmenė district municipality, Kruopių eldership, Pleikių village 2	35:06	35:06	35:06	35:06	35:06	35:06	35:06	35:06	35:06

Living Environment. Marking on the shading map (see annex 1)	Address (see fig. 5)	Shading duration, hrs/year, (RV – 30 hrs.)								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
		WTs planned by PEA and other economic entities								
X	Akmenė district municipality, Kruopių eldership, Pakalniškių village 10	4:20	4:20	4:20	4:20	4:20	4:20	4:20	4:20	4:20
Z	Akmenė district municipality, Kruopių eldership, Bambalų village 2	**33:48**	**33:10**	**32:58**	**33:10**	**32:58**	**33:10**	**32:58**	**33:12**	**31:27**
AB	Akmenė district municipality, Kruopių eldership, Jautmalkių village 4	09:55	9:55	9:55	9:55	9:55	9:55	9:55	9:55	9:55
AC	Akmenė district municipality, Kruopių eldership, Laumėnų II village 5	15:19	15:19	15:19	15:19	15:19	15:19	15:19	15:19	15:19
AD	Akmenė district municipality, Kruopių eldership, Laumėnų II village 6	22:53	22:53	22:53	22:53	22:53	22:53	22:53	22:53	22:53
AE	Akmenė district municipality, Kruopių eldership, Gembūčių village 1B	03:48	3:48	3:48	3:48	3:48	3:48	3:48	3:48	3:48
AF	Akmenė district municipality, Kruopių eldership, Bambalų village 3	20:50	20:50	20:50	20:50	20:50	20:50	20:50	20:50	20:50

Table 26. Duration of shading caused by WTs (WTs planned by the PEA and other evonomic with mitigation measures)[21]

[21] Note: In windPRO software, a map is generated without shadow contour lines when calculating shading with mitigation measures.

Living Environment. Marking on the shading map (see annex 1)	Address (see fig. 5)	Shading duration, hrs./year, (RV – 30 hrs.)								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
		WTs planned by the PEA and other evonomic with mitigation measures								
A	Akmenė district municipality, Kruopių eldership, Kviečlaukio village 2	10:37	10:37	10:37	10:37	10:37	10:37	10:37	10:37	10:37
B-B5	Šapnagių village	1:15-18:42	1:15-18:42	1:15-18:42	1:15-18:42	1:15-18:42	1:15-18:42	1:15-18:42	1:15-19:52	1:15-18:42
C	Akmenė district municipality, Kruopių eldership, Bambalų village 1	**26:35**	**25:32**	**26:30**	**25:32**	**26:30**	**25:32**	**26:30**	**25:00**	25:38
D	Akmenė district municipality, Kruopių eldership, Kviečlaukio village 3	29:25	29:25	29:25	29:25	29:25	29:25	29:25	29:25	29:25
E	Akmenė district municipality, Kruopių eldership, Narčių village 1	31:46	31:46	31:46	31:46	31:46	31:46	31:46	31:46	31:46
F	Akmenė district municipality, Kruopių eldership, Narčių village 2	19:18	19:18	19:18	19:18	19:18	19:18	19:18	19:18	19:18
G	Akmenė district municipality, Kruopių eldership, Narčių village 3	15:46	15:46	15:46	15:46	15:46	15:46	15:46	15:46	15:46
H	Akmenė district municipality, Kruopių eldership, Pleikių village 3	39:22	39:22	39:22	39:22	39:22	39:22	39:22	39:22	39:22
I	Akmenė district municipality, Kruopių eldership, Šliupščių village 3	12:39	12:39	12:39	12:39	12:39	12:39	12:39	12:39	12:39
Y	Akmenė district municipality, Kruopių eldership, Pakalniškių village 11	4:48	4:48	4:48	4:48	4:48	4:48	4:48	4:48	4:48
J	Akmenė district municipality, Kruopių eldership, Laumėnų II village 3	17:58	17:58	17:58	17:58	17:58	17:58	17:58	17:58	17:58
K	Akmenė district municipality, Kruopių eldership, Dovydžių village 7	15:25	15:25	15:25	15:25	15:25	15:25	15:25	15:25	15:25

Living Environment. Marking on the shading map (see annex 1)	Address (see fig. 5)	Shading duration, hrs./year, (RV – 30 hrs.)								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
		WTs planned by the PEA and other evonomic with mitigation measures								
L	Akmenė district municipality, Kruopių eldership, Dovydžių village 8	9:13	9:13	9:13	9:13	9:13	9:13	9:13	9:13	9:13
M	Akmenė district municipality, Kruopių eldership, Dovydžių village 5	9:19	9:19	9:19	9:19	9:19	9:19	9:19	9:19	9:19
N	Akmenė district municipality, Kruopių eldership, Dovydžių village 2	43:24	43:24	43:24	43:24	43:24	43:24	43:24	43:24	43:24
O	Akmenė district municipality, Kruopių eldership, Laumėnų II village 8	32:13	32:13	32:13	32:13	32:13	32:13	32:13	32:13	32:13
P	Akmenė district municipality, Kruopių eldership, Laumėnų II village 7	46:44	46:44	46:44	46:44	46:44	46:44	46:44	46:44	46:44
Q	Akmenė district municipality, Kruopių eldership, Dovydžių village 6	13:52	13:52	13:52	13:52	13:52	13:52	13:52	13:52	13:52
R	Akmenė district municipality, Kruopių eldership, Dovydžių village 4	15:01	15:01	15:01	15:01	15:01	15:01	15:01	15:01	15:01
S	Akmenė district municipality, Kruopių eldership, Pleikių village 6	28:07	28:07	28:07	28:07	28:07	28:07	28:07	28:07	28:07
T	Akmenė district municipality, Kruopių eldership, Pleikių village 1	39:53	39:53	39:53	39:53	39:53	39:53	39:53	39:53	39:53
U	Akmenė district municipality, Kruopių eldership, Gembūčių village 2	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
V	Kruopių town	1:26	1:26	1:26	1:26	1:26	1:26	1:26	1:26	1:26
W	Akmenė district municipality, Kruopių eldership, Pleikių village 2	35:06	35:06	35:06	35:06	35:06	35:06	35:06	35:06	35:06

Living Environment. Marking on the shading map (see annex 1)	Address (see fig. 5)	Shading duration, hrs./year, (RV – 30 hrs.)								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
		WTs planned by the PEA and other evonomic with mitigation measures								
X	Akmenė district municipality, Kruopių eldership, Pakalniškių village 10	4:20	4:20	4:20	4:20	4:20	4:20	4:20	4:20	4:20
Z	Akmenė district municipality, Kruopių eldership, Bambalų village 2	**29:08**	**28:55**	**28:43**	**28:55**	**28:43**	**28:55**	**28:43**	**29:48**	**27:09**
AB	Akmenė district municipality, Kruopių eldership, Jautmalkių village 4	09:55	9:55	9:55	9:55	9:55	9:55	9:55	9:55	9:55
AC	Akmenė district municipality, Kruopių eldership, Laumėnų II village 5	15:19	15:19	15:19	15:19	15:19	15:19	15:19	15:19	15:19
AD	Akmenė district municipality, Kruopių eldership, Laumėnų II village 6	22:53	22:53	22:53	22:53	22:53	22:53	22:53	22:53	22:53
AE	Akmenė district municipality, Kruopių eldership, Gembūčių village 1B	03:48	3:48	3:48	3:48	3:48	3:48	3:48	3:48	3:48
AF	Akmenė district municipality, Kruopių eldership, Bambalų village 3	20:50	20:50	20:50	20:50	20:50	20:50	20:50	20:50	20:50

An anti-flickering system will be implemented to ensure that the 30-year annual shadow flicker is not exceeded during the PEA operation. "Anti-flickering system" technical measure ensures that shadows in the living environment do not exceed 30 hours/year. This control system stops the WT when the measured values of the installed sensors exceed the applicable values. After stopping, the WT starts automatically at least 10 minutes after the current lighting conditions prevent the formation of intense shadow flicker.

It is important to note that during the implementation of the PEA, not only a specific WT model will be selected, but also a specific wind turbine or turbines with mitigation measures to ensure that the permitted flicker in the living environment is not exceeded, depending on the situation during the project. Therefore, it is concluded that after evaluating the planned WT shadowing in the PEA, the 30-hour annual shade flicker duration will not be exceeded in the vicinity of the nearest residential environments (Akmenė district municipality, Kruopių eldership, Bambalai village 1 (marked C) and Bambalų village 1 (marked Z)), where shadowing may occur due to PEA WT.

2.8.6. Electromagnetic radiation

The strongest electromagnetic radiation is usually generated by high-voltage power lines. The strength of the magnetic field in the line environment depends on the line load, i.e. from the current flowing from it. The magnetic induction generated under the line is about 10 mT per kiloampere of current per wire and has a rather complex structure. According to HN 104:2011 (Order No. V-552 of the Minister of Health of the Republic of Lithuania of 30 May 2011 "On Approval of the Lithuanian Hygiene Standard HN 104:2011 "Safety of the Population from Electromagnetic Fields Generated by Power Lines") the permissible values of the electromagnetic field parameters of power lines in the premises and living environment of residential and public buildings shall not exceed the permissible values specified in the table below.

Table 27. Permissible values for electromagnetic field parameters

Line No.	Object name	Permissible values for electromagnetic field parameters (no more than)		
		Electric field strength (E), kV/m	Magnetic field strength (H), A/m	Magnetic flow density (B), μT
1.	Premises of residential and public buildings	0,5	16,0	20,0
2.	Living Environment	1,0	32,0	40,0

Pursuant to Order No. 2 of 2 March 2011 of the Minister of Health of the Republic of Lithuania "On the approval of Lithuanian Hygiene Standard HN 80: 2011" Electromagnetic Field in Workplaces and Living Environment. Normalized values of the parameters and measurement requirements in the 10 kHz to 300 GHz frequency band" maximum values for electromagnetic field strength parameters in the residential environment: magnetic field strengths in the 50 MHz to 0,3 GHz radio frequency bands are non-standardized.

According to the technical data of analogous WTs, the energy flow density (SLV) of a generator operating at full power is 24 μW/cm^2. This density is measured at a distance of 1 m from the generator. As the generator is located in a gondola, 115-157.5 m above the ground, the strength of the electromagnetic field, which varies according to the cubic distance dependence, will not affect the environment, as it will not exceed the permissible norm - will not reach 0.5 kV / m according to HN 104:2011.

For the reasons set out above, it is considered that the spread of electromagnetic field from wind turbines is not considered to be a public health aspect due to the very low electromagnetic field emitted by wind turbines. Therefore, adverse effects on human health due to electromagnetic radiation are not expected.

2.8.7. Vibration

Vibration can be caused by WT generators, rotating blades, and other moving parts when there is an unbalanced rotational movement of the individual parts. Vibration can also be caused by improper positioning of individual parts of the unit or by failures to balance the work of rotating parts. The vibration of the devices can be reduced by special insulating gaskets by balancing the rotating parts. WTs have vibration sensors that stop wind turbines if vibration intensifies, e.g. due to hydrometeorological conditions.

WT vibration studies are usually performed to determine the effect of structural vibration on its operating efficiency and the strength of structures and mechanisms. The vibration of the WT structure is too weak to be felt in the nearest residential buildings (Styles et al. 2005). Accordingly, there is no effect of WT vibration on human health.

2.8.8. Sanitary protection zone

According to the Law on Special Land Use Conditions of the Republic of Lithuania (hereinafter - the Law on SLUC), a sanitary protection zone is an area around a stationary pollution source or several sources where the special land use conditions established by the Law on SLUC apply due to possible adverse effects on public health. The size of sanitary protection zones is specified in the Law on SLUC or determined by the choice of the person planning the economic activity - in this case this size is determined after the public health impact assessment of the planned economic activity or environmental impact assessment documents. If a public health impact assessment has been carried out, the size of the sanitary protection zone determined in accordance with the public health impact assessment documents shall be applied in determining the sanitary protection zone. When determining sanitary protection zones, the pollution of the environment caused by economic activities, emissions, discharges, noise and other physical factors harmful to human health outside the sanitary protection zones must not exceed the pollution (or other) limit values established for the environment of residential buildings (homes), hotels, science, leisure, medical buildings, accommodation-related special-purpose buildings, recreational facilities.

According to the law on SLUC, the following are prohibited in the PEA within the SPZ:

1) construction of garden houses, residential, hotel, cultural buildings, general education, vocational, higher education, kindergarten, nursery education buildings for educational purposes, other scientific buildings for non-formal

education for recreation, treatment, sports and religious purposes buildings, special purpose buildings related to accommodation (barracks buildings, prisons, correctional colonies, remand centers);

2) to install premises for the purpose specified in clause 1 in buildings for other purposes and (or) during the reconstruction or repair of buildings;
3) to change the purpose of buildings and/or premises to the purpose specified in clause 1;
4) to plan territories for recreation and construction of objects specified in clause 1, except in cases when these objects are used only for the needs of safety and health of economic activity and/or employees of a farmer or enterprise operating in sanitary protection zones in permitted purpose buildings (premises).

The purpose of the public health impact assessment is to assess the impact of the specific WT models of the PEA and, based on the results obtained, to determine the sanitary boundaries of the protection zone. The PEA was planned in such a way that no residential house and/or residential area, public buildings would enter the SPZ.

In this EIA report, the boundaries of the SPZ are determined by modeling the noise propagation of the planned 6 WTs according to the selected WT models: Siemens Gamesa SG 6.0-170, Vestas V162-6.2 (tower heights 159 and 149 m), Vestas V162-6.8 (tower heights 159 and 149 m) , Vestas V162-7.2 (tower heights 159 and 149 m), VE of General Electric GE 6.1-158 and Nordex Delta4000 - N163 6.8 (see Table 1) with noise level dB - 104.5-107.0.

It is important to note that after the implementation of PEA, the noise emission during the day, in the evening and at night outside the revised SPZs may not exceed the norms established in HN 33:2011 in the environment of residential buildings and public buildings (except catering and cultural buildings), except for traffic noise.

Noise dispersion simulation has shown that the planned 6 WTs in the immediate living environment will not exceed the noise limit values. Therefore, the size of the formed SPZs must be equated to a noise contour line of 45 dB (A).

The boundary area of the SPZ varies from 47.46 to 132.58 ha, depending on the planned WT models. The boundary of the SPZ is at a distance of about 135-360 m from the planned WT.

2.9. Risk analysis and its assessment

Only technical accidents due to mechanical damage to the WT elements: collapse of the rotor or blades, collapse of the tower, etc. shall be considered as events that may occur during the operation of the WT and have a direct impact on the surrounding environment. This mechanical damage can be caused by anthropogenic and natural factors (storms, hurricanes, seismic movements, etc.). Extremely severe icing could cause very unlikely blade accidents if the calculation of the blade resistance did not take into account the possible increase in the weight of the blades when they were covered with ice.

No natural risk factors (landslides, seismic movements) or external technical factors (nearby adjacent objects) that could cause extreme events have been identified in the PEA area.

The PEA territory, based on the scheme for determining the territories of wind power plants in the GP of Akmenė district municipality, is allocated for the construction territories of the WTs.

Taking into account the material values present and planned in the territory (WTs of other economic entities, residential territories), it is assessed that no negative impact on them in terms of possible accidents is expected, as a safe distance is maintained between them and the planned WTs – for example, there is a distance of 612 m between the nearest existing Windfarm Akmenė One, UAB, WT 30 and the nearest WT 34 of the PEA, the total height of the Windfarm Akmenė One, UAB is up to 230 m, and the maximum height of the WT is 241 m therefore, a collision is impossible; residential houses are 241 m away from the PEA, so a collisio is also impossible. Even in the event of an emergency (e.g. mechanical deformation of the WT tower, blades or the fall of the WT itself), the PEA will not endanger the surrounding material values, as these PEA WTs are more than 241 m away.

Potential hazards to workers include various accidents during the installation and maintenance of wind turbines. The risk of accidents should not be high if safety precautions are used properly and safety rules are observed. Employees must be trained and provided with all necessary protective equipment.

Potential impact

Although wind power plants are particularly tall structures, they are not classified as risk objects in accordance with the “Recommendations for the Risk Assessment of Potential Accidents in Proposed Economic Activities R 41-02” approved by Order No. 367 of the Minister of the Environment. No hazardous materials will be used during the PEA operation. Even in the unlikely event of a wind turbine collapse, the population would not be in danger, as the nearest residential house is 0.6 km away and the danger zone reaches the planned height of the wind turbine - 241 m.

The probability of an accident and the probability of such an accident with consequences for nature, material values and public health is extremely low, therefore WT is not classified as a risk object.

Accident prevention measures

WT sites are selected taking into account possible emergency situations, taking into account the area of direct impact in the event of a collapse and thus maintaining a sufficient distance from residential areas.

The technical requirements of WT structural elements ensure sufficient resistance to deformations that may cause emergency situations in the existing natural conditions.

The following safety and management systems will be installed in WTs in order to prevent possible emergencies:

- Braking system. The WR rotor rotates when the wind speed reaches 3-25 m/s. In case of stronger winds, the wind turbine must be stopped. Braking is performed by turning the rotor blades to the appropriate position so that the wind gust cannot turn them due to the resulting aerodynamic properties. The rotor is never completely stopped, even when the WT is completely off, it rotates at very low speed. When the rotor is idling, it can be stopped completely by activating the mechanical brakes. The rotor is completely stopped only in emergencies and routine repairs.
- Lightning protection system. WTs are designed to protect against lightning strikes. The corners and ends of the WT blades are covered with an aluminum profile which is connected to the aluminum ring at the blade attachment points by the rotor. The lightning discharge is absorbed by these aluminum profiles and further directed through the entire tower to its ground foundation and ground. The rear of the stator is also protected from lightning, which leads to discharge to the ground.
- Control system. WT is controlled by a microprocessor remotely. It sets all the necessary commands for the WT control elements, taking into account the received sensor information: wind speed, wind direction. The WT system starts when the appropriate wind speed is maintained for at least 3 minutes. During WT operation, the system measures the incoming loads, regulates the rotor speed and the angle of rotation of the blades, taking into account the changing wind conditions. If the system fails, its operation is taken over by a mechanical safety system.
- The WT is also equipped with a lighting system that warns the aircraft of a possible obstacle.

According to the fire resistance category, WT equipment must be installed in accordance with the construction technical regulation STR 2.01.01 (2):1999 “Essential requirements for construction works. Fire Safety ”, approved by Order No. 422 of the Minister of Environment of the Republic of Lithuania of 27-12-1999 and Order No. 1-338 of 07-12-2010 of the Director of the Fire Protection and Rescue Department under the Ministry of the Interior.

WT service personnel (steeplejacks) are allowed to work only after acquiring special knowledge, practical skills and a certificate. Steeplejacks working with WTs must use various protective equipment (helmets, goggles, work gloves, knee pads, belts, ropes, carbines, restraint systems, etc.).

2.10. Analysis of alternatives and their assessment

2.10.1. PEA locations and technological alternatives

At this stage of the PEA, specific technological alternatives of WTs have already been evaluated, selected and named, taking into account the models offered in the market of wind turbine producers, delivery possibilities, and compliance of the models with the climatic conditions of Akmenė district. The EIA procedure assesses the potential environmental impact of the selected technological alternatives by assessing the maximum (worst case scenario) criterion and comparing it with 0 alternative when the PEA is not implemented.

These alternatives are assessed and analyzed:

- Wind farm of 6 WTs Akmenė district municipality, Kruopių eldership Bambalai village, WT types:
  - rotor diameter of one wind turbine – 170 m, tower height – 155 m, total height – 240 m, noise emission – 106,0 dB(A);
  - rotor diameter of one wind turbine – 162 m, tower height – 149, 159 m, total height – 230, 240 m, noise emission – 104,8 dB(A);
  - rotor diameter of one wind turbine – 162 m, tower height – 149, 159 m, total height – 230, 240 m, noise emission – 104,5 dB(A);
  - rotor diameter of one wind turbine – 162 m, tower height – 149, 159 m, total height – 230, 240 m, noise emission – 105,5 dB(A);
  - rotor diameter of one wind turbine – 158 m, tower height – 161 m, total height – 240 m, noise emission – 107,0 dB(A);
  - rotor diameter of one wind turbine – 163 m, tower height – 159 m, total height – 240,5 m, noise emission – 106,4 dB(A).
- 0 alternative – PEA is not developed and implemented; the current situation is described for the situation in 2021-2022.

Taking into account the decisions of state institutions and in order to minimize the impact on the landscape, but maintaining the strategic goals set in the Energy Strategy to use the latest technologies and develop the wind farm without state and electricity consumer subsidies/support, it was decided during the EIA, that the height of the WTs will be limited in the selected development area of the wind farm, therefore the height of the WTs will not exceed 241 m.

2.10.2. Comparison of PEA with “0 activity alternative”

In order to compare the project implementation alternative with the “0 activity alternative”, an analysis of the alternatives was performed based on the methodology provided by the European Environment Agency (EEA) and a multi-criteria analysis - the Leopold matrix. The multi-criteria analysis assesses the potential for significant direct, indirect, short-term, medium-term, long-term, permanent, temporary, positive and negative effects on the components of the environment. The results of the analysis are presented in Section 2.10.

The following are compared using multicriteria analysis:

- “0 activity alternative” – current situation, the project is not being implemented;
- Windfarm Akmenė Two, UAB project of a wind farm with up to 6 wind turbines is being implemented.

A key aspect of this methodology is the setting of significance criteria for each consequence (table below), as well as different 'weighting factors' for individual effects to better reflect the significance of the effects (e.g. landscape effects are more important than drinking water pollution). The result of the multicriteria analysis is effects on individual components expressed in numerical terms.

Table 28. Impact significance criteria

Significance criterion for environmental impact	Description of environmental impact	Definition	Degree of impact (weighted average)
0	Very insignificant or no	The impact can be measured, but it has no noticeable consequences.	**0.01-0.15**
1	Insignificant	An impact that makes a noticeable change in the environment but does not adversely affect its sensitivity.	**0.16-0.30**
3	Average	An impact that changes the nature of the environment, changes are not in line with current trends.	**0.31-0.40**
5	Significant	An impact that, by its magnitude, nature and intensity, alters sensitive environmental aspects.	**0.41-0.45**
9	Very significant	An impact that has a significant positive or negative effect on the components of the environment (e.g. destroys, damages sensitive components of the environment).	**0.6 and more**

The impact over time is described and divided into:

- temporary (lasting a year or less);
- short-term (lasting from one to seven years);
- of medium length (lasting from seven to fifteen years);
- long-term (lasting from fifteen to thirty years);
- permanent (lasting over thirty years).

When comparing the PEA and the “0 activity alternatives”, the Leopold matrix assigns different “weight coefficients” to the individual effects, depending on the specifics of the economic activity:

Table 29. “Weight coefficients” for individual effects

1	- geology: physical effects of soil used for earthworks; - soil: occupied area, possible chemical pollution, mechanical and physical effects, waste; - surface water: physical pollution, increased water turbidity, water use, waste; - biodiversity: logging, noise; - cultural heritage: visual impact; - public health: waste, vibration.
2	- geology: possible chemical pollution; - groundwater: possible chemical pollution, changes in water regime; - surface waters: possible chemical pollution, changes in water regime; - ambient air: air pollution, CO_2; - biodiversity: migration routes, disturbance of the hatching period, physical impact on habitats; - Landscape: changing the natural environment;

	- cultural heritage: physical effects; - Socio-economic impact: land use restrictions, smooth operation of electricity systems and security of electricity supply, jobs created.
3	- protected areas: all components; - public health: noise, safety.

One of the most important aspects of this evaluation is expert evaluation. For the sake of objectivity, the resulting Leopold matrix was completed separately by several environmental experts, who individually assigned significance and "weight coefficients" to the individual effects. The results obtained by the experts are discussed together, adjusted by consensus and a final evaluation matrix is prepared, where the weighted average obtained describes the impact on a given environmental component.

The results of the analysis are shown in the figures below.

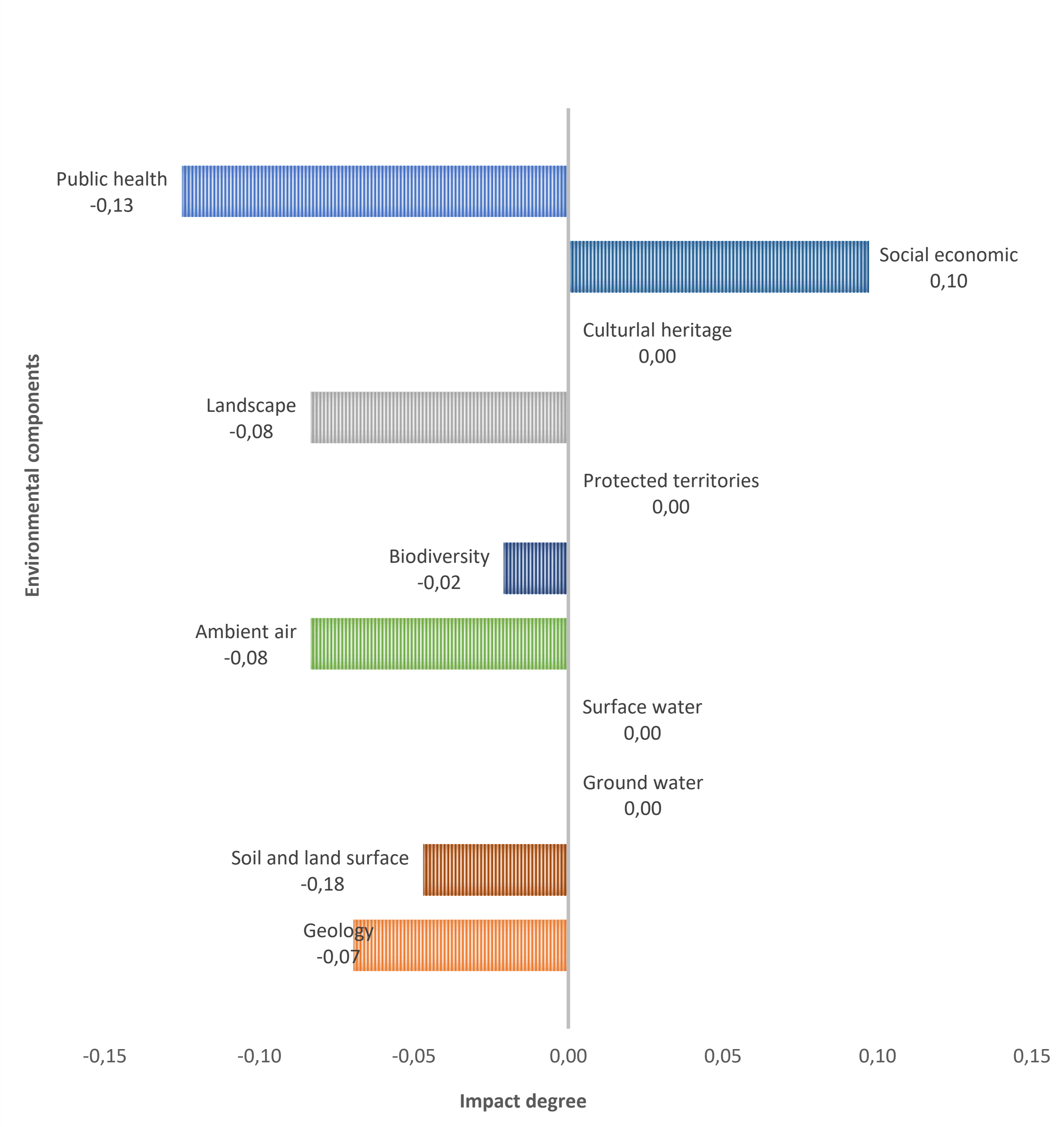

Fig. 70. Consequences of PEA implementation for individual environmental components during construction works

The weighted averages for the degree of exposure shown in the figure above show that there is a potential for very minor negative impact during construction on public health, the landscape, biodiversity and ambient air (due to increased traffic, noise, vibration and air pollution during construction), geology and demolition works, soil used, chemical pollution from construction tools) and minor negative impact on soil and land surface. The positive socio-economic impact due to the jobs created is also expected. These impacts are temporary.

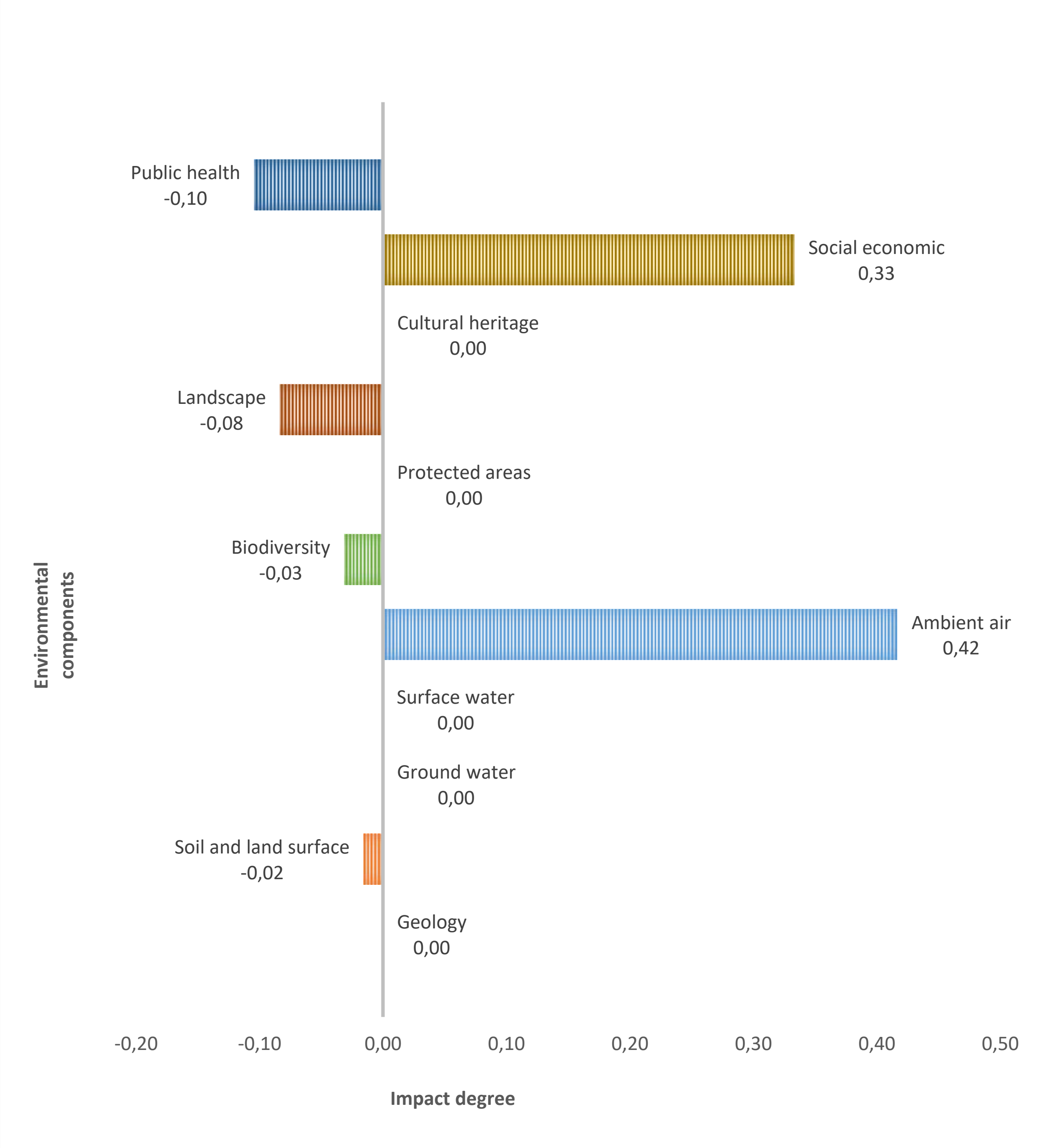

Fig. 71. Consequences of PEA implementation for individual environmental components during operation

According to the results presented in the figure, it is possible that during the PEA operation there are very insignificant negative effects on public health (due to noise during the operation of the WT), landscape (due to changes in the natural environment), biodiversity (possible minor adverse effects due to changes in the environment, noise with wind farms), soil and land surface (due to land area). However, a moderate positive socio-economic impact is expected, as it would create additional jobs and ensure the smooth operation and security of electricity supply. It is also important to note the indirect significant positive effects of the PEA on ambient air quality. Wind energy is one of the renewable energy sources and its use reduces the consumption of fossil fuels and, at the same time, the emissions of CO_2 and other pollutants into the ambient air. Therefore, the use of wind power and the development of wind farms is an important factor in solving environmental problems and will ensure the partial implementation of the strategic energy goals of the Republic of Lithuania.

Failure to implement the PEA is expected to have a medium negative socio-economic impact - the smooth operation of electricity systems and reliable electricity supply will not be ensured, and no additional jobs will be created. Significant negative impacts on ambient air quality are also assessed, as the non-implementation of the PEA will not reduce the consumption of fossil fuels and, consequently, the associated emissions to the ambient air.

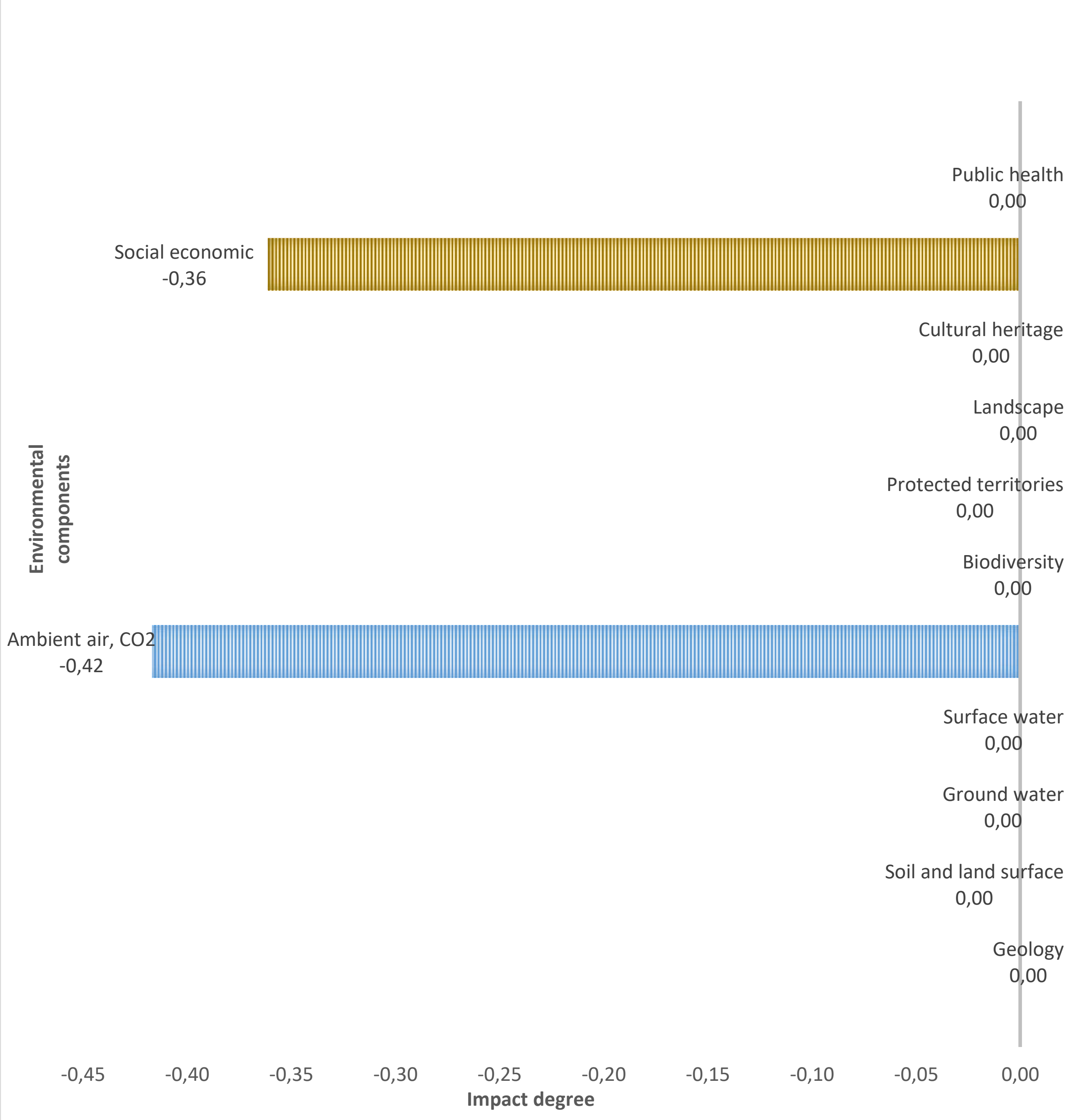

Fig. 72. “0 activity alternative” consequences for individual components of the environment

2.11. Monitoring

Outline of monitoring of dying birds

The total estimated period for the monitoring of dying birds is 3 years. The accounting period may be extended if significant effects of wind turbines on birds are identified. In the case of significant effects, monitoring shall be continued for up to 5 years, measures shall be taken to protect the dying birds or to compensate for the adverse effect. The intensity of bird searches depends on the intensity of bird overflights, which vary from season to season. Dead bird counts shall be carried out at the intervals specified in the table below.

Table 30. Periodicity of accounting for dead bird

Period	Number of accounts (periodicity)	Target overflights of birds
March 15- May 15	7 (every week or every two weeks)	Spring migration of birds
May 16- August 1	5 (every two weeks)	Feeding, chick flights
August 2 – November 1	12 (every week or every two weeks)	Autumn migration of birds
November 2 – March 14	4 (every month)	Overflights of wintering birds

The surveys are carried out by walking transects within a radius of 80 m around each of the selected wind turbines. The width of the transect depends on the viewing conditions, on average every 5 meters. It is planned to select at least 50% of wind turbines, taking into account the nature of economic activity of a particular plot and the possibilities to perform searches. Due to the deterioration of search conditions (e.g. due to land use change), the plots of wind turbines to be searched may change during the season.

An observer who finds a dead bird shall record the data in a data collection table indicating the date, time, coordinates, species and, if possible, sex and age. It is also necessary to determine the cause of death of the bird or bat, the nature of the injury, the distance from the nearest wind turbine, mark the location on a map, assessing its position not only in relation to wind turbines but also in relation to other objects such as power lines or towers.

In the case of hatching birds, 0.1 and 0.5 per cent of the total breeding population of a given species in a given wind farm shall be considered as a weighting. A significant impact on hatching birds is if the wind farm depletes 5% (die or avoids this area) of the weighted maximum of a specific species per year, i.e. 0.5% of the national population of that species. If an average of one or more individuals of rare breeding species die within three years of monitoring (3 and more in three years), the effect is considered significant.

A significant impact on migratory birds is if the activity of the wind turbines depletes 5% (die or avoids these areas) of the weighted maximum indicator (accumulation maximum) of a specific species per year. If the value of this 5% indicator is one individual, it is proposed to assess the situation also in the context of several years, and if on average one or more rare migratory species die within three monitoring years (3 and more in three years), the effect is considered significant.

Measures are being taken to reduce the significant impact of wind farms: mitigation measures must be applied once the significant impact of wind turbines has been clarified, and the application of the measures must be monitored next year. When it is clarified that there is a critical period at a certain time of the year, when a disproportionate number of birds die, the wind farms stop working early in the morning (1 hour before sunrise - 4 hours after sunrise) and in the evening (3 hours before sunset up to 1 hour after it). If significant mortality (killing of at least one individual of this species) of hatchling birds such as lesser spotted eagle, white-tailed eagle, red kite and black kite, black stork, common kestrel due to wind turbines was established, to raise 3 artificial nests per dead bird for compensating for the effect.

Outline of the bat monitoring plan

Search periods and periodicity: the total estimated monitoring period is 3 years and an additional recurring monitoring date is 5 years after the date of wind turbine installation. The accounting period may be extended if significant impacts of wind turbines on bats are identified. The requirements for monitoring the breeding and seasonal migration of bats are set out in the table below.

Table 31. Requirements for the monitoring of bat breeding and seasonal migrations

Period	Number of accounts	Target overflights of bats
April 15-May 15	7 (every week or every two weeks)	Spring migration of bats
May 16- August 1	5 (every two weeks)	Bat feeding overflights
August 2 – November 1	12 (every week or every two weeks)	Autumn migration of bats

Accounting is performed throughout the wind farm and the adjacent area. Observations should include analysis of both local populations that overwinter, feed and/or breed near wind turbines and species that migrate through the wind farm area. Bat accounting is performed with ultrasonic detectors, which can be portable or stationary. Ultrasonic detectors used for bat research must be calibrated and standardized during monitoring and must operate in the range from the lowest to the highest ultrasound emitted by bats. Ideally, the detector would record GPS coordinates on registered bats. Bats should be observed in calm weather, away from strong winds and rain, at a temperature not below + 7°C (recommended to exceed + 10°C at night).

Bat counts during juvenile rearing are carried out from mid-May to mid-August, once every 2 weeks, with overnight observation. Accounting is performed using a portable ultrasonic detector, passing through transects, which should include different elements of the landscape (tree strips, shores of water bodies, shrubs, meadows, etc.) and different distances from wind turbines.

Bat records must be implemented in the planned or operating wind farm and adjacent area. Potential places suitable for daytime and feeding bats must also be checked during the surveys. The search for breeding colonies and nesting sites should cover a distance of at least 1 km from the site of the proposed economic activity. Known colonies up to 5 km away should also be examined. Greater attention must be paid to species that feed high above the foliage of trees, such as pipistrelle, noctule, bats, western barbastelle and parti-coloured bat. Bat research should also cover the construction sites of small wind turbines, as even individual wind turbines built in sensitive areas, e.g. near tree lines, ponds, or bushes can pose no less of a danger than an entire wind farm. If technically possible, bats may be monitored by stationary ultrasonic detectors. Stationary detectors are mounted on tall poles or meteorological towers and left to operate overnight, thus gathering information about bats flying at that altitude. Stationary detectors are often used to collect information on bat activity at rotor rotation heights by at least 40 meters above the ground. The altitude of 40 to 200 m is potentially the most dangerous due to the direct death of bats. If possible, stationary detectors in the wind farm area can be left in operation throughout the season.

Migratory bats are surveyed in spring and autumn. Autumn migration is more intense and risky for bats than spring, so more attention needs to be paid to observations from the second half of summer. Observations are made: if wintering sites are known, they are observed during the spring from mid-April to mid-May to determine bat activity. Observations are made every 10 days, in the first half of the night. During the autumn migration from mid-August to early October every 10 days, observing overnight. The surveys must be carried out in the entire territory of the wind farm and in the adjacent territory up to 1 km. Accounting is performed using a portable ultrasonic detector, passing through transects that must cover different elements of the landscape (tree strips, shores of water bodies, shrubs, meadows, etc.) and different distances from wind turbines.

Records of dead bats are carried out every 5 days during periods of intensive seasonal migration of birds and bats - in April-May and August-October. Records of bats dying during the winter and summer months are necessary when the area is identified as being used by sensitive species. The surveys are carried out with transects within a radius of 50 m around each of the selected wind farms. The width of the transect depends on the conditions of visibility: in case of snow or low vegetation - 5 meters, in case of damaged vegetation - 3 meters. If the surveys are carried out in a wind farm where it is not possible to survey the areas under all the wind turbines, a part of the wind turbines shall be selected for the survey of dead birds and bats, evenly distributed over the whole area and taking into account the nature of the economic activity and search possibilities. For each specific wind turbine, the expert assessment shall determine the number of wind turbines sufficient for the correct assessment of dying bats, but at least 40% of the wind turbines shall be selected. If the search conditions deteriorate (e.g. due to a change in land use), it is possible to change the searched wind turbine plot during the season. When an observer finds a dead bat, the observer shall record the data in a data collection table indicating the date, time, coordinates, species and, if possible, sex and age. It is also necessary to determine the cause of the bat's death, the nature of the injury, the distance from the nearest wind turbine, and mark the location on a map, assessing its position not only in relation to wind turbines but also in relation to other objects such as power lines or towers. All dead bats found are recommended to be handed over to Kaunas T. Ivanauskas Museum of Zoology or, if they refuse to take over, to another scientific or educational institution.

Based on the scientific literature and published reports on the impact of wind turbines, quite different methodologies are used to assess potentially dying birds and animals in different countries and in different wind farms. The main parameters used are the actual number of animals found dead, estimates of the effectiveness of the searcher and the scale of predator activity, and the part of the park where the searches were carried out. Some methodologies include additional parameters such as probability of survival of animals (Kostecke et al., 2001), bird flight parameters (Farfan et al., 2009), frequency of searches (Huso, 2010; Korner-Nievergelt et al., 2011), and so on. Some authors use models to help estimate the number of birds that may die from the current abundance of birds in the area. Some estimates also include changes in air parameters (Young, et al., 2012). One of the simplest formulas that has already been applied to estimate the number of dead bats in Lithuanian wind farms is this (based on Koford et al., 2004; Everaert and Stienen, 2007):

$$A = \frac{a}{B \cdot C \cdot D},$$

where: A - number of dead bats, a - number of dead bats found, B - the proportion of bait not taken by predators within 7 days, C - the proportion of baits found by searchers, D - the proportion of the number of WTs searched from the total number of WTs in the park.

In the case of hatching birds, 0.1 and 0.5 per cent of the total breeding population of a given species in a given wind farm shall be considered as a weighting. A significant impact on bats is if the wind farm declines (kills or makes avoid) 5% of the weighted maximum for a particular species per year, i.e. 0.5 percent of the national population of that species. If an average of one or more rare bat species (3 and more in three years) die within three years of monitoring, the effect is considered significant.

Conclusions:

- prepare and approve a bird and bat monitoring program before the start of construction of wind turbines.
- Birds and bats will be monitored for at least 3 years during the operation of the wind turbines according to the approved monitoring program.

3. Cross-border impact

The Environmental Protection Agency, as the responsible institution in the EIA process, has become acquainted with the information of the prepared EIA program, and taking into account that the planned construction of the WTs is within a short distance from the border of the Republic of Latvia and this may affect the Republic of Latvia, pursuant to the Article 9 of the Law on Environmental Assessment, Item 32 of the Description of the Procedure for Environmental Impact Assessment of a Proposed Economic Activity, letter No. (30.2) -A4E-5478 of 23-06-2020 applied to the Ministry of Environment of the Republic of Lithuania regarding the application of the PEA cross-border EIA procedures.

The Ministry of Environment of the Republic of Lithuania informed by letter No. (10) - D8 (E) -6020 of 27-10-2020 that the Ministry of Environment of the Republic of Lithuania had received a letter No. 5-01 / 961 from the State Environmental Protection Bureau of Latvia dated 19-10-2020 expressing a wish to continue participating in the cross-border EIA process of the PEA of “Windfarm Akmenė Two”, UAB, Windfarm of up to 6 wind turbines in Akmenė district municipality, Kruopių eldership, C1 zone”.

3.1. Review of current situation

The territories of the nearest wind farm of the planned economic activity are located at a distance of about 0.8-1.2 km to the west-southwest from the Lithuanian-Latvian border (see Figure 1).

According to the territorial plan of the Auce region for 2013–2025, the village of Ukri is the closest inhabited area to the planned wind farm. Land plots near the Lithuanian-Latvian border are used for forests and agriculture. The nearest area where residential construction is allowed in the future is 2 km from the Lithuanian-Latvian border (marked in yellow below). This territorial plan mentions a very valuable tree (Strāču linden), located 1.5 km from the Lithuanian-Latvian border.

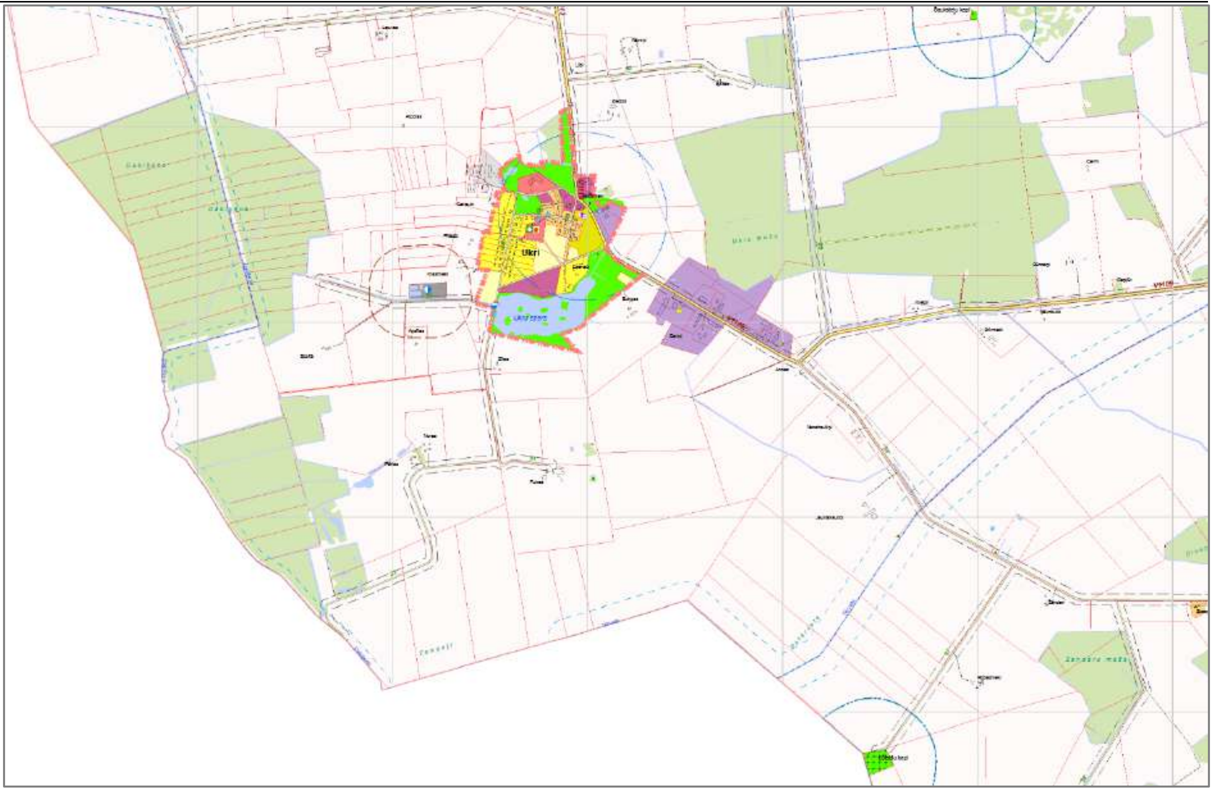

Fig. 73. Ukri village territorial planning[22]

Nearest residential houses from the Lithuanian-Latvian border (from the nearest point in the direction of WTs):

- house “Noras” – within the distance of 1,25 km (uninhabited);
- house “Putras” – within the distance of 1,4 km;
- house “Stūrīši” – within the distance of 1,74 km (uninhabited);
- house “Zīles” – within the distance of 1,74 km (uninhabited);
- house “Apsītes” – within the distance of 1,8 km.

The nearest densely built-up area - the village of Ukri - is 2 km from the Lithuanian-Latvian border and about 3 km from the nearest planned wind turbine (see figure below).

[22] Online access: http://www.auce.lv/pasvaldiba/dokumenti/teritorijas-planojums/index.php?cmd=get&cid=1163

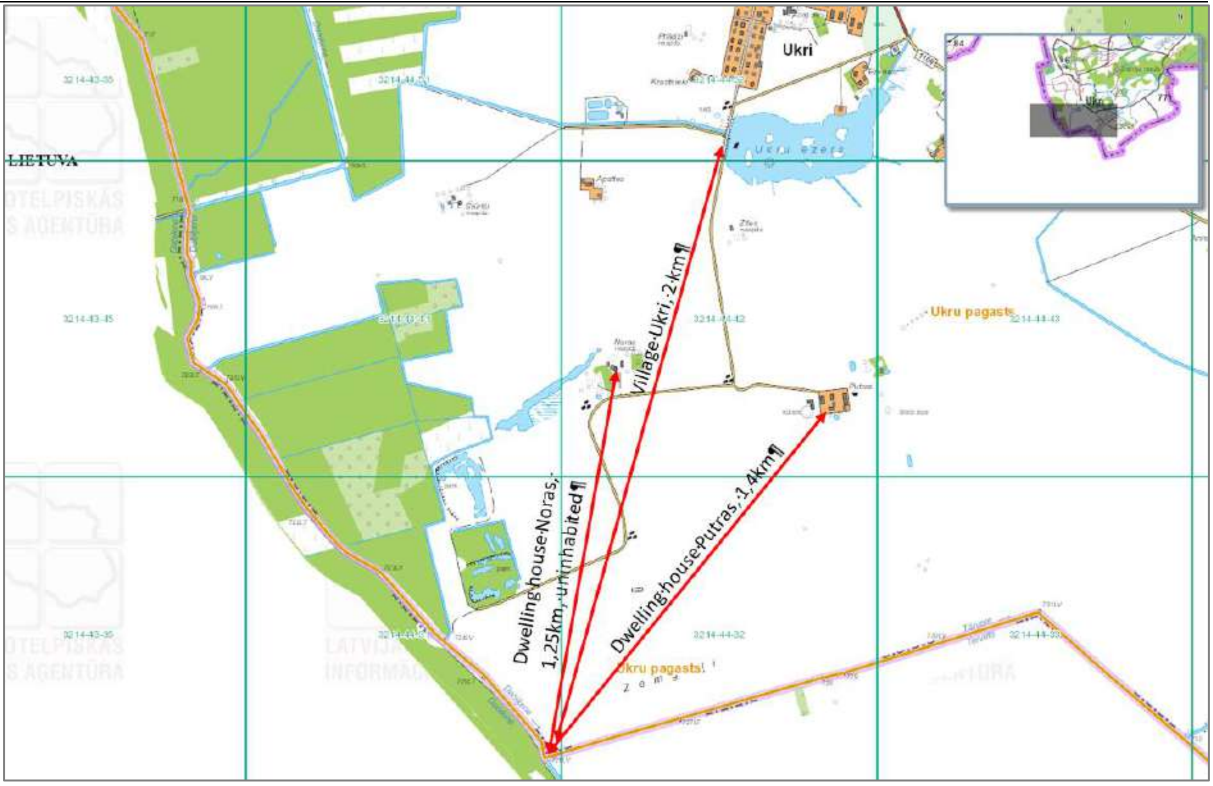

Fig. 74. Distance to the nearest residential areas in the territory of Latvia

According to the data of 01.01.2020, 348 people live in Ukri village. There are no schools or kindergartens in the village. There is a medical point, a library, two shops and a post office [23].

The total size of the rural area of Ukri is 9445.6 ha. Of the total territory of the parish, 2.4 ha are occupied by low-rise single-family dwelling houses, and 3.6 ha are multi-apartment houses. Approximately 27.1 ha are occupied by various public buildings, 1.1 ha - commercial buildings. 5.0 ha are occupied by industrial and production facilities. 79.6 ha are occupied by traffic infrastructure objects, 11.6 ha - land for engineering network supply objects. 8025.1 ha is agricultural land, 1.7 ha is natural land and land of recreational significance. 1288.4 ha are forestry land and protected nature areas [24].

The terrain of the rural area of Ukri is slightly undulating. The western part of the parish is higher, formed by the Linkuva embankment - the natural boundary between the Žemgale plain and the Vadakste plain.

The only nearby cultural heritage site is the Ukru Vēsture Room, located in the center of the village of Ukri and about 2.5 km from the border with the Republic of Lithuania (see figure below).

[23] Online access: http://www.auce.lv/novads/pagasti/ukri
[24] Online access: http://www.auce.lv/pasvaldiba/dokumenti/teritorijas-planojums/index.php?cmd=get&cid=1183

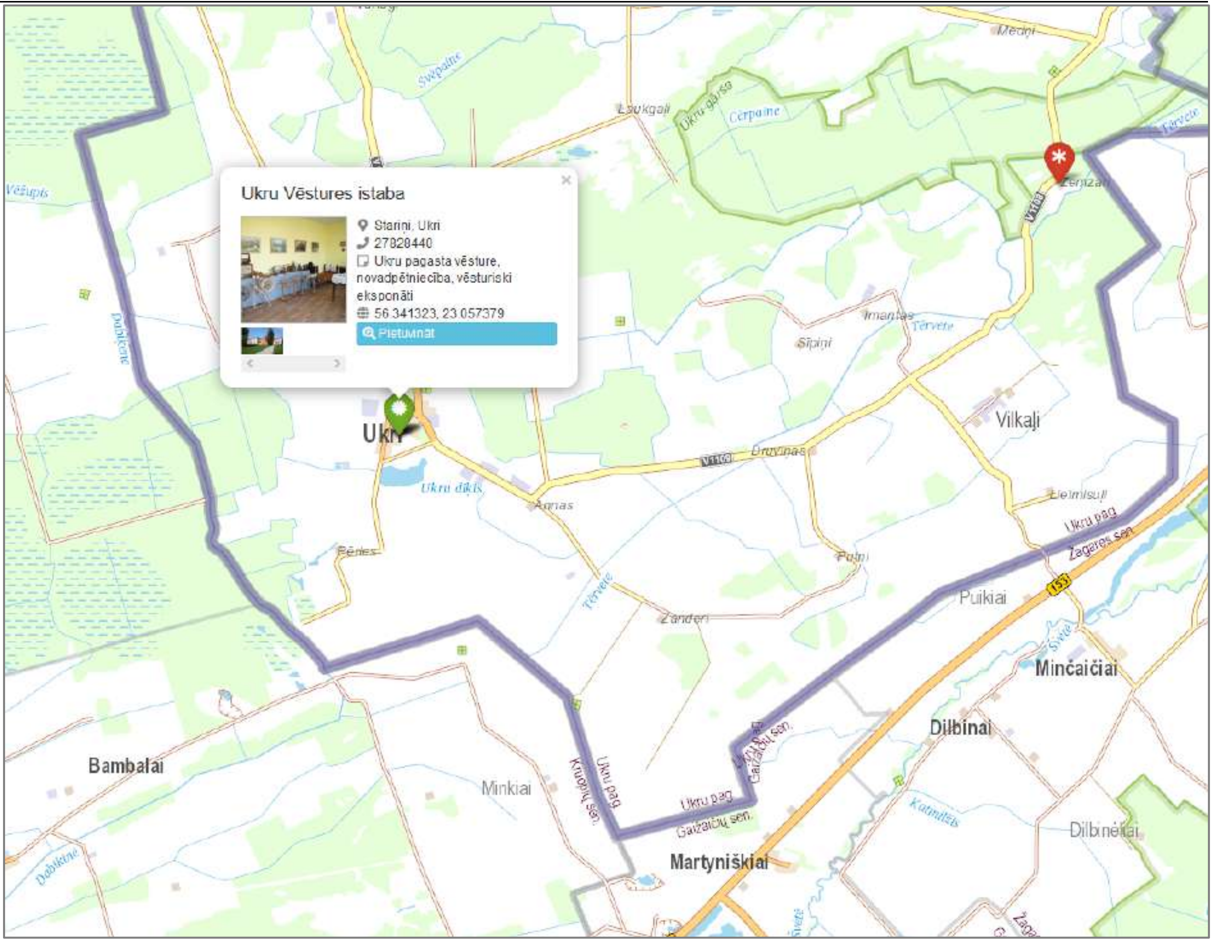

Fig. 75. The nearest cultural heritage site is the "Ukru Vēsture istaba" in the territory of Latvia

There are no other significant objects, such as cognitive trails, observation towers, tourist attractions in the territory of the rural parish of Ukri. The nearest nearest cultural heritage site is the Vītiņu kaļķu ceplis (Vītiņu lime kiln), located approximately 15 km from the planned wind farm (see figure below).

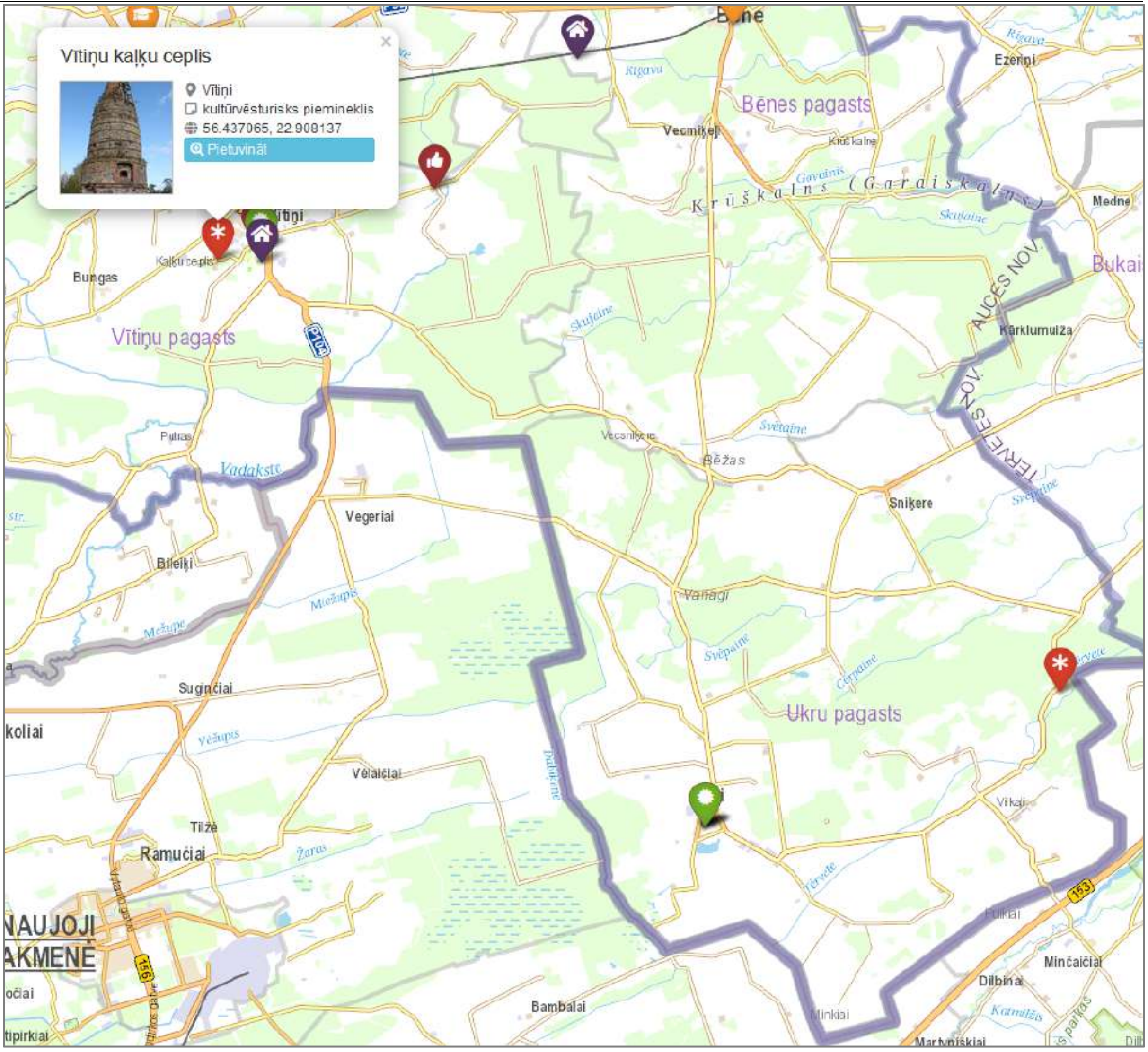

Fig. 76. The nearest object of real cultural heritage values in the territory of Latvia

Data from the Nature Protection Agency of the Republic of Latvia show that there are no protected areas near the Lithuanian-Latvian border and the planned wind farm. The nearest protected nature sites are very valuable trees at 1.5 km and 2.5 km from the border and an alluvial forest at 2.7 km from the border (see figure below).

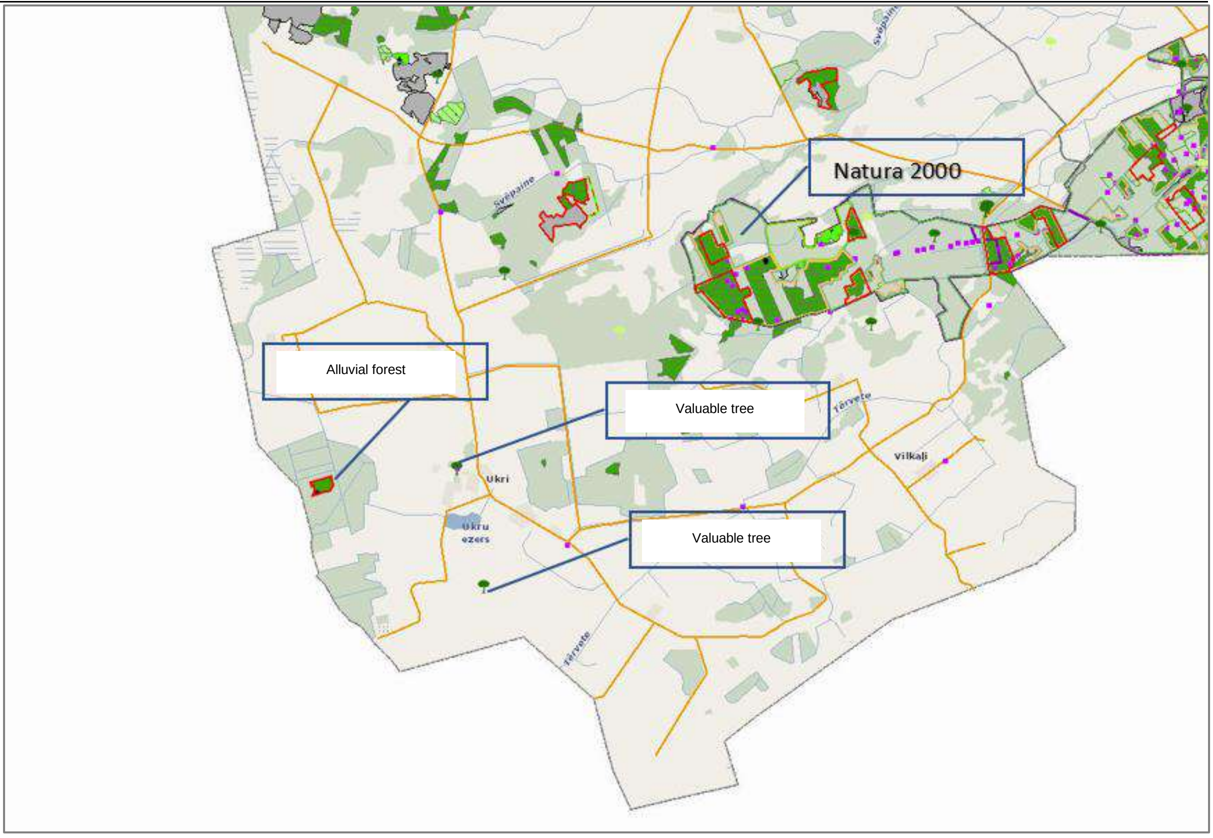

Fig. 77. The nearest protected natural objects in the territory of Latvia

In the territory of Ukri village parish there is Natura2000 nature reserve “Ukru gārša” (code LV0523200), located about 6 km from the Lithuanian-Latvian border in the direction of the planned wind farm (see figure below). There is a great variety of protected plants here, which is one of the greatest natural values of the Republic of Latvia. Several plant species here have a northern range in Latvia and are rarely found in the rest of Latvia. Here is the “Nature and Forest Science Trail”, which is recommended to be accompanied by a guide. In the summer, you can watch birds, see protected plants, and see large oaks, hunt trophies and weapons in the nature reserve[25]. The purpose of assigning “Ukru Gārša” to the Natura 2000 network is to conserve the following species: lesser spotted eagle (*Clanga pomarina*), European honey buzzard (*Pernis apivorus*), hazel grouse (*Bonasa bonasa*), black stork (*Ciconia nigra*), corn crake (*Crex crex*), white-backed woodpecker (*Dendrocopos leucotos*), middle spotted woodpecker (Dendrocopos medius), black woodpecker (Dryocopus martius), red-breasted flycatcher (*Ficedula parva*), Eurasian pygmy owl (*Glaucidium passerinum*), common crane (*Grus grus*), red-backed shrike (*Lanius collurio*).

[25] Online access: http://www.auce.lv/turisms/apskates-objekti/dabas-objekti/

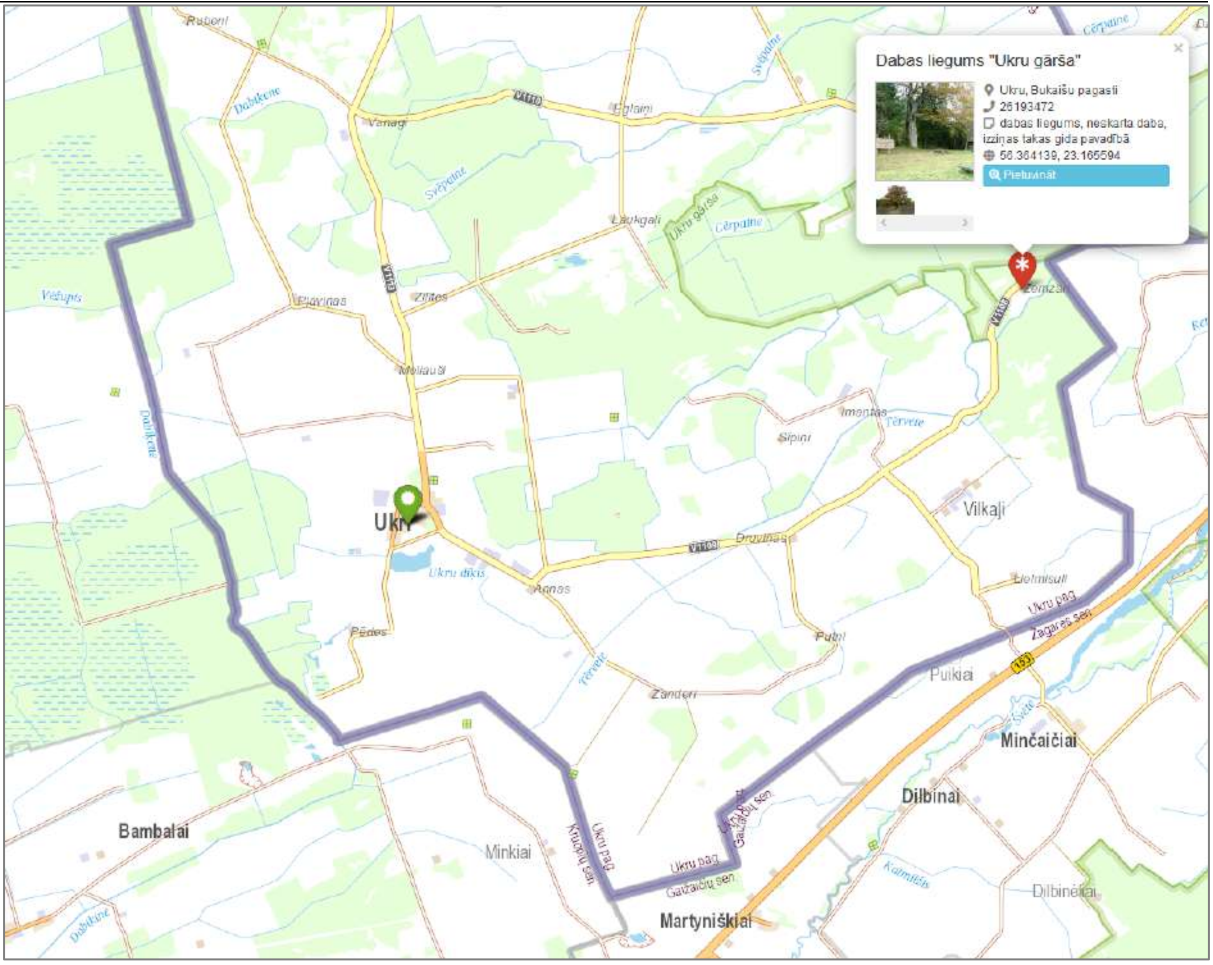

Fig. 78. "Ukru Garsa" Nature Reserve in the territory of Latvia

3.2. Impact on environmental components and public health

The impact of the proposed economic activity (incl. cumulative impact) on the Republic of Latvia is assessed by assessing the impact on the components of the environment and public health.

Water

No domestic or industrial wastewater will be generated during the operation of the PEA wind farm. Surface (rain) water from WT service sites will be drained to adjacent surfaces (disorganized).

The PEA will not have a negative impact on the surface water bodies of the Republic of Latvia, their hydrological regime, water resources, therefore no negative impact on the environment is expected.

Ambient air and climate

During the construction and operation of the planned economic activity, chemical pollution may occur only due to the arrival of vehicles with internal combustion engines serving WTs. Following the implementation of the PEA WTs, it is expected that a maximum of one vehicle will service 1 wind turbine per day. It is estimated that the amount of pollutants generated from motor vehicles will be insignificant and local, therefore no negative impact on the environment of the Republic of Latvia is expected.

Land (its surface and depths), soil

Įgyvendinant PŪV, didelės apimties žemės kasimo darbai nebus atliekami. Žemės judinimo darbai bus atliekami tik VE, elektros kabelių ir transformatorinės įrengimo vietose. Nuimtas derlingo dirvožemio sluoksnis bus sandėliuojamas tam skirtoje vietoje. Nukastas gruntas ir/ar derlingasis dirvožemio sluoksnis vėliau bus grąžinimas į sutvarkomą teritoriją.

Given the volume of construction works in the PEA, it is estimated that there will be no impact on the land (surface and depths) and soil of the Republic of Latvia.

Landscape and biodiversity

The projected wind turbines are close to the territory of the Republic of Latvia - the distance from the mentioned power turbines to the Lithuanian-Latvian border is 0.8-1.5 km.

Landscape architect Dr. J. Abromas, during the visual impact assessment of the landscape, determined that the impact of the planned wind turbines on the territories of Latvia will not be significant. Wind turbines towards the territory of Latvia are surrounded by a large area of Karpėnai, Lydmiškis and Narčiai forest massifs, which will significantly reduce the visibility of the planned wind turbines.

The closest to the planned wind turbines in the Republic of Latvia is only the settlement of Ukri - the distance to the nearest planned wind turbine is 3 km. Due to the mentioned observation distance and the existing forest massifs, the planned wind turbines from a part of the outlying settlement will be visible as landscape highlights[26].

From the settlement of Ukri to the border with the Republic of Lithuania, solid agricultural areas dominate. There are no sightseeing areas in the surrounding area, such as nature trails, observation towers or other tourist attractions.

The PEA, including the total impact of wind farms, will not have a negative impact on protected plants and fungi, habitats of EC importance, forests, shoemakers and perennial grasses, valuable greenery, mammal habitats in the territory of the Republic of Latvia, as WTs will be built and operated only in the territory of the Republic of Lithuania, only here roads or electric cables will be used or installed on the plots, therefore there will be no destruction or damage of habitats in the part of the territory of the Republic of Latvia.

Ornithologist A. Narbutas performed ornithological research in the planned area of Windfarm Akmenė Two, UAB, windfarm of up to 6 wind turbines in Akmenė district

[26] Highlight area (3-7 km.). Wind turbines are clearly visible but no longer visually undesirable. The wind turbine is noticeable as an element of the landscape. The movement is noticeable in good visibility. The wind turbines appear small in the general field of view. Some (due to power plants) changes in the landscape are appropriate. Monitoring is greatly determined by weather conditions.

municipality, Kruopių eldership, C1 zone and surrounding areas. During the research, the birds feeding in the territory, the feeding areas of the birds, the areas of migration, the migration routes were identified, the sensitivity of the territory was determined, and the total impact was assessed.

Studies have shown that:

- Anseriformes, Pelecaniformes, Podicipediformes do not have suitable habitats for hatching and feeding in the PEA territory; no geese and swans were recorded in the PEA during the migrations;
- white storks did not migrate in the adjacent environment; observations of a black stork that was resting in the PEA area were recorded, but were not included in the impact areas of wind turbines;
- Birds of prey that may continue to migrate in the vicinity may be adversely affected by the exploitation of wind turbines – birds of prey fly at different altitudes, in search of food may be exposed to thermal air currents in the area affected by the rotor of the wind turbine, where the risk of collision and death is increased, but birds of prey have been poorly observed, so the risk of collision is not high
  In the PEA area, the hatching habitats for common crane are not suitable, individual cranes can feed in these areas, more often fly from the hatching to feeding areas, or from one feeding area to another, and accumulations during migrations were observed only in the adjacent environment. During the observations, cranes flew at an altitude up to the rotor blades, there are alternative areas for the formation of crane accumulations, therefore no significant impact on cranes due to the PEA is expected;
- The conditions in the PEA area are favorable for partridges and quails, a common species adapted to the existing agricultural land and anthropogenic activities, therefore the PEA will not have a negative impact on Galliformes;
- There are no water bodies, habitats for gulls and seagulls in the PEA territory, only isolated transits are observed, therefore no significant negative impact is expected;
- Common peewits and European golden plover are common during migrations, but visit the PEA area sparingly. More abundant clusters of common peewits and European golden plover form in the adjacent area, but the species are not very sensitive to the effects of wind turbines, so the expected negative impact will be minimal;
- During the point surveys, the most common Passeriformes species were recorded in the PEA area, among which the usual species typical for the agrarian landscape predominate. The most common is the Eurasian skylark, which is one of the most common and abundant species due to wind turbines. During the hatching, red-backed shrike was found in the PEA territory, a bird species to be protected in Europe, but it is often found in Lithuania. Due to the predominance of perennial sea buckthorn crops in the PEA area, the red-backed shrike favors wind turbines with an area of 1 km^2, wind turbines built and the road to them will occupy relatively small areas, so their population will not be significantly affected. Migratory species of Passeriformes are common to migratory species, with common

chaffinch being the most abundant, with several less common northern species observed in the PEA. The average flight height of Passeriformes and Columbiformes flying in Akmenė district is below the blades, therefore the PEA will not significantly affect the migration of Passeriformes, Columbiformes;

- The main flows of migratory birds run along the Baltic Sea coast, the Nemunas delta, the Curonian lagoon. The location of the proposed economic activity is in the mainland, where migratory bird flows are insignificant.

From the observations it was established that the migration of birds of prey in the PEA territory is low, no large geese overflights have been observed, and not very large flocks of European golden plover and common pigeons are observed. Passeriformes do not generate particularly large migratory flows. Ornithofauna will not be significantly affected in the analyzed and adjacent areas of the PEA (including the Republic of Latvia), observations will be made, and additional protection or compensatory measures will be applied if necessary.

Given that WTs of other operators currently operate and are planned in the adjacent area, between which, due to technical and environmental conditions, an average distance of 500 m is maintained, no greater cumulative negative impact is expected, as this distance facilitates the migration of migratory, feeding birds.

Bat expert, chairman of the Society for the Protection of Bats in Lithuania, biologist D. Makavičius carried out research on bats and prepared an assessment in the PEA territory.

Bat species in Zone C1 were surveyed using the Venbis and Eurobats methodological guidelines for bat surveys. Chiropterological studies in the PEA area (zone C1) (52 study hours using transectal and point accounting methods) identified 3 species of bats: Eptesicus nilssonii, Nyctalus nactula and Pipistrellus nathusii. 16 data on the detection/overflight of bat species in the study area were collected. No bat breeding colonies were detected in the planned zone C1 of the wind farm.

Zone C1 of wind farms is not important for bats as feeding grounds, as it is dominated by agricultural land where monocultures are grown: oilseed rape, various cereals. Such habitats are unattractive to bats due to the poor diversity and abundance of species of Lepidoptera, Diptera, Coleoptera, etc. There are also no larger bodies of water in the WT area that are necessary for bat breeding colonies. The nearest feeding places according to the database of SRIS and the Society for the Conservation of Bats in Lithuania are determined in Šapnagiai village: northern bat (Eptesicus serotinus) in the quarry of Pakalniškiai: Daubenton's bat (Myotis daubentonii) Shoulders: common noctule (Nyctalus noctula) and Daubenton's bat (Myotis daubentonii).

Summarizing the results of the research, it is stated that the installation of up to 6 wind turbines in the PEA and the surrounding area, including the territory of the Republic of Latvia, will not have a negative impact on bats.

Material values

The implementation of the PEA may affect these material values:

- land plots where VE will be built and SPZs will be established;
- The existing roads on which the vehicles necessary for the implementation of the PEA solutions will travel;
- in the related territory of the planned WTs of other economic entities.

Due to the fact that no WTs will be built in the Republic of Latvia, no SPZ will be established here either (according to the Law on Protection Zones of the Republic of Latvia, the width of the protection zone around the wind turbine is 1.5 times greater than its total height - in this case, the size of the protection zone should be at least 361.5 m (241 m x 1.5); as the planned wind farms will be no closer than 0.8 km to the border of the Republic of Latvia, the requirements of the protection zone do not apply to the PEA), no roads will be used, there are no existing or planned wind turbines in the surrounding areas, it is estimated that there will be no impact on material values.

Immovable cultural heritage values

The only nearby cultural heritage site in the Republic of Latvia is the "Ukru Vēsture istaba" (Ukru history Room), located in the center of the village of Ukri and about 2.5 km from the border with the Republic of Lithuania. The next nearest heritage site is the "Vītiņu kaļķu ceplis" (Vītiņu lime kiln), located about 15 km from the planned wind turbine. Given the distance to the immovable cultural heritage values, it is estimated that the impact on them due to the implementation of the PEA is not expected.

Public health

Based on the maps of the results of the noise and shadow dispersion simulation (see Annexes 1 and 2), it is estimated that the limit values will not be reached in this area and will not be exceeded in the nearest residential environments (more than 2 km away from the PEA). Therefore, no adverse effects on public health in the Republic of Latvia are foreseen.

Impact of the PEA on the environmental components and public health of the Republic of Latvia according to the Leopold Matrix methodology

Based on the Leopold Matrix methodology, the potential impact on the environmental components and public health of the Republic of Latvia during the PEA operation is assessed. It should be noted that no effects on these components are expected during construction and during the "0 activity alternatives" and were therefore not assessed. The environmental significance criteria and "weighting coefficients" used in the Leopold matrix are described in section 2.10.2.

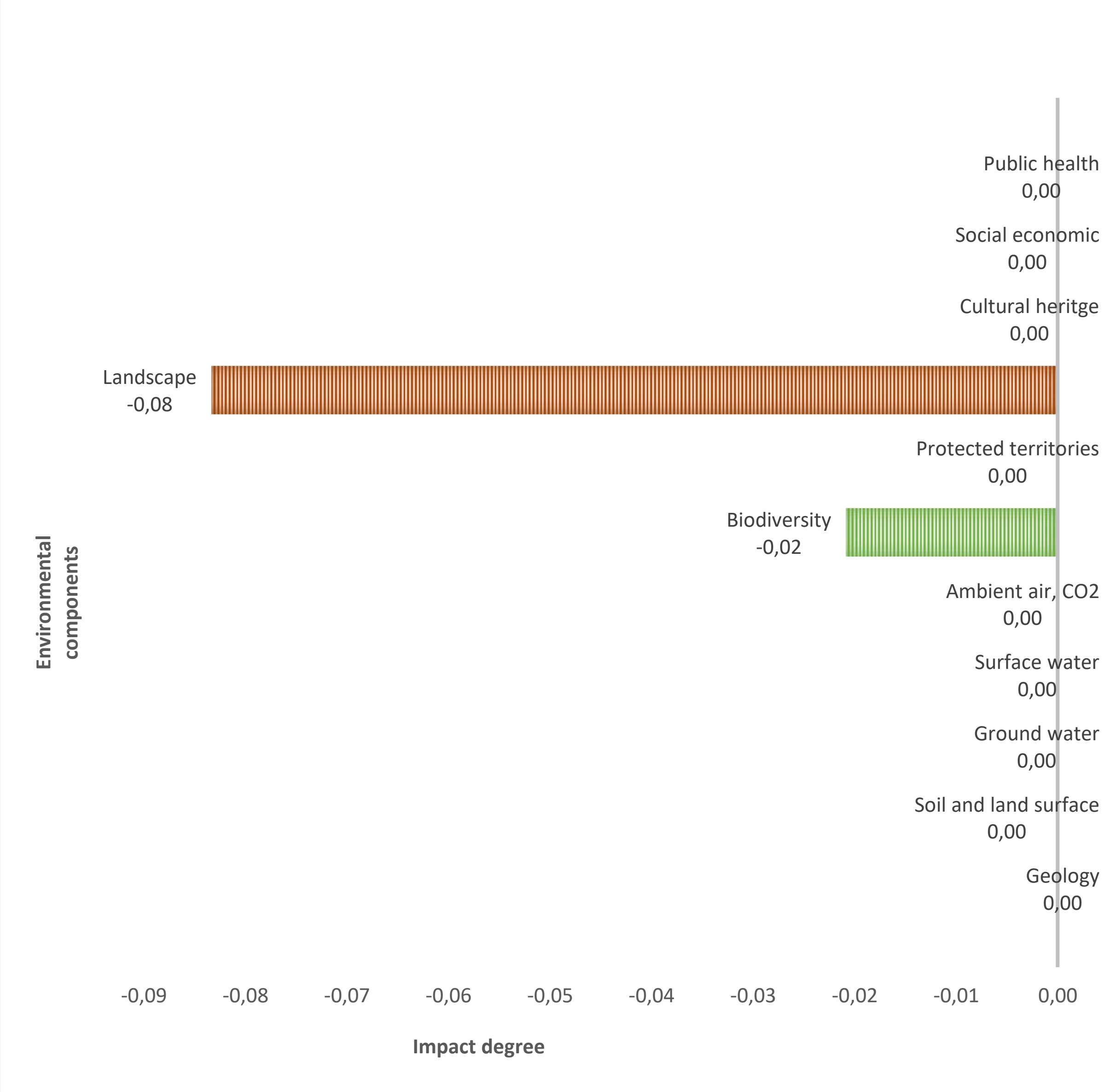

Fig. 79. Consequences of PEA implementation for individual environmental components of the Republic of Latvia during the PEA operation

According to the results presented in the figure, it can be seen that during the PEA operation there are very minor negative impacts on biological diversity (due to changes in existing migration routes) and landscape (due to changes in the environment from the border of the Republic of Latvia). No effects on other components of the environment and public health are anticipated.

The transboundary environmental impact assessment did not identify any adverse effects on the components of the environment and public health, therefore no mitigation measures are analyzed.

4. A description of the forecasting techniques used to identify and assess significant effects on the environment, including problems

The modeling of the projected noise and shadow dispersion is performed using windPRO software. windPRO is designed to calculate, visualize, evaluate and predict the effects of WT noise and shading. The calculation standard used in windPRO is ISO 9613-2 General.

Potential impacts on biological diversity, habitats during construction and operation are assessed through expert studies (field studies and analysis of recent biodiversity studies).

The potential impact on the landscape was assessed by modeling (visualizing) the intended image, i.e. the photo shows a visualization of WTs.

Based on the data of the Lithuanian Health Indicators Information System, the EIA report presents an analysis of the current public health status of Akmenė District: the morbidity indicators of the population, the risk group in the population were assessed, and the demographic and health indicators of the population were compared with the data of the whole population. Based on the results of modeling of air pollution, noise and odor dispersion, the impact of the planned economic activity on the state of public health was assessed.

The analysis of technological alternatives in comparison of the PEA with the “0 activity alternative” is performed on the basis of the methodology provided by the European Environment Agency (EEA) and the multi-criteria analysis - Leopold matrix. Multi-criteria analysis assesses the potential for significant direct, indirect, short-term, medium-term, long-term, permanent, temporary, positive and negative effects on the components of the environment.

A key aspect of this methodology is the establishment of significance criteria for each endpoint, as well as different “weighting coefficients” for individual effects, which will help to better reflect the significance of the impacts (e.g. drinking water pollution is more important than impact on landscape). The result of the multicriteria analysis is the effects on the individual components are expressed in numerical terms.

One of the most important aspects of this evaluation is expert evaluation. For the sake of objectivity, the Leopold matrix is completed separately by several environmental experts, who have individually assigned significance and "weighting coefficients" for individual effects. The results obtained by the experts are discussed together, adjusted by consensus and a final evaluation matrix is prepared, where the weighted average obtained describes the impact on a given environmental component.

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Annexes

Annex 1. Shadow dispersion simulation results

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Calculated:
2022-04-12 11:42/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 1 v.

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

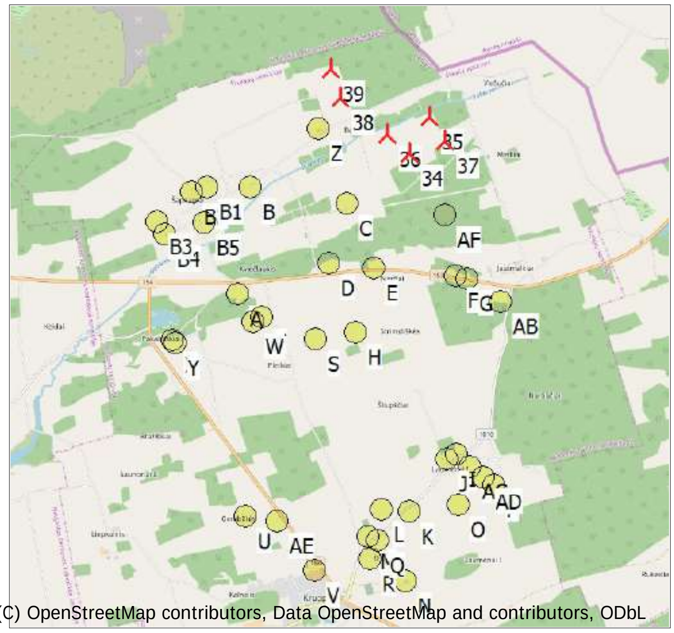
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
34	440 449	6 241 981	75,0	Siemens Gamesa SG 6.0-...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
35	440 792	6 242 597	76,1	Siemens Gamesa SG 6.0-...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
36	440 096	6 242 301	75,0	Siemens Gamesa SG 6.0-...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
37	441 041	6 242 183	75,0	Siemens Gamesa SG 6.0-...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
38	439 317	6 242 928	77,4	Siemens Gamesa SG 6.0-...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
39	439 169	6 243 391	78,1	Siemens Gamesa SG 6.0-...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

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2022-04-12 11:42/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 1 v.

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No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year [h/year]
A	0:00
AB	0:00
AC	0:00
AD	0:00
AE	0:00
AF	0:00
B	0:00
B1	0:00
B2	0:00
B3	0:00
B4	0:00
B5	0:00
C	10:37
D	0:00
E	0:00
F	0:00
G	0:00
H	0:00
I	0:00
J	0:00
K	0:00
L	0:00
M	0:00
N	0:00
O	0:00
P	0:00
Q	0:00
R	0:00
S	0:00
T	0:00
U	0:00
V	0:00
W	0:00
X	0:00
Y	0:00
Z	8:52

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
34	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (443)	22:53	6:21
35	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (444)	7:03	1:57
36	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (448)	19:18	4:48

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SHADOW - Main Result

Calculation: Še š eliai 1 v.

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No.	Name	Worst case [h/year]	Expected [h/year]
37	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (445)	18:47	6:23
38	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (446)	0:00	0:00
39	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (447)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Šešeliai 1 v.

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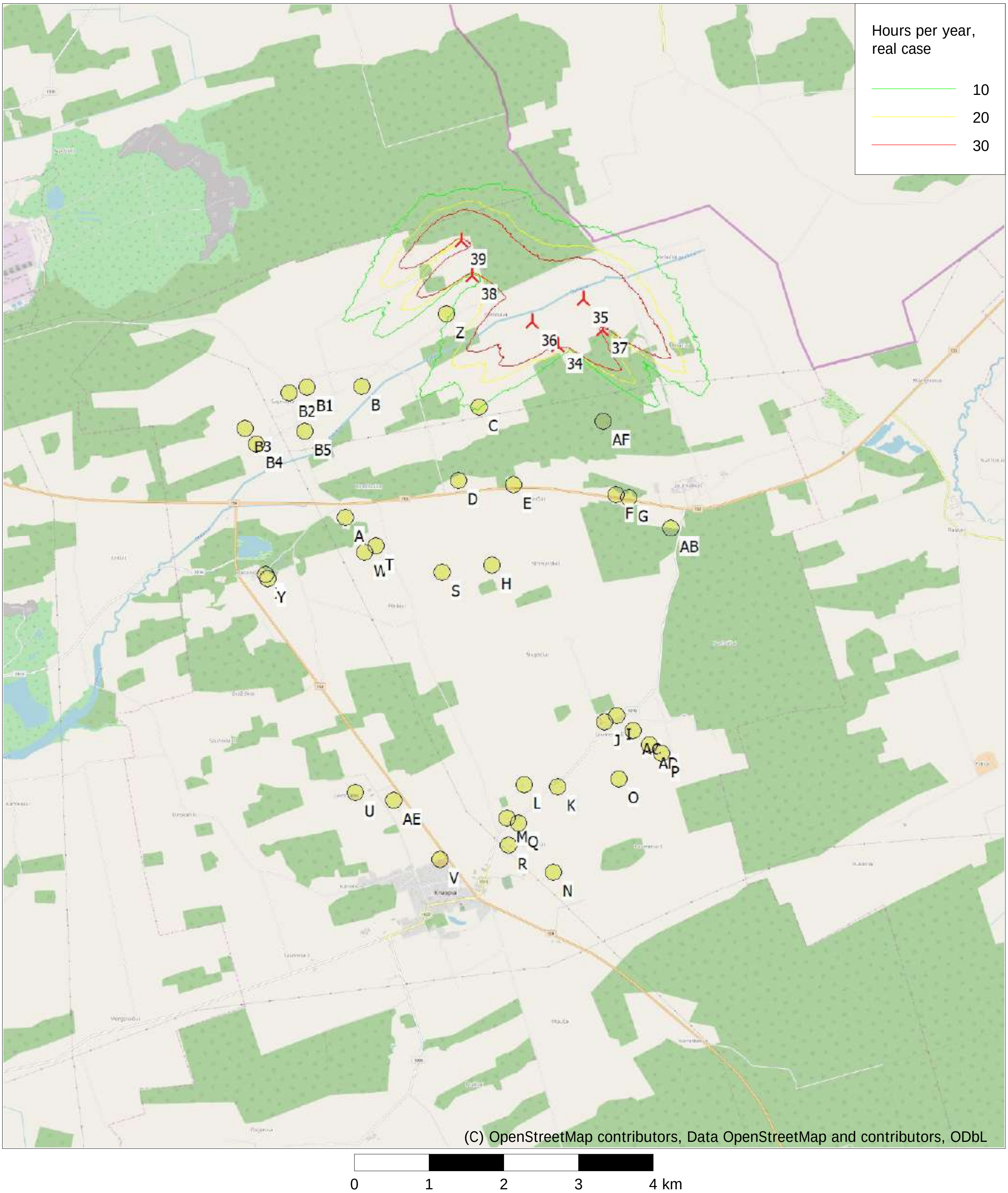
Calculated:
2022-04-12 11:42/3.4.424

SHADOW - Map

Calculation: Šešeliai 1 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-12 14:01/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 1 v. suminis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

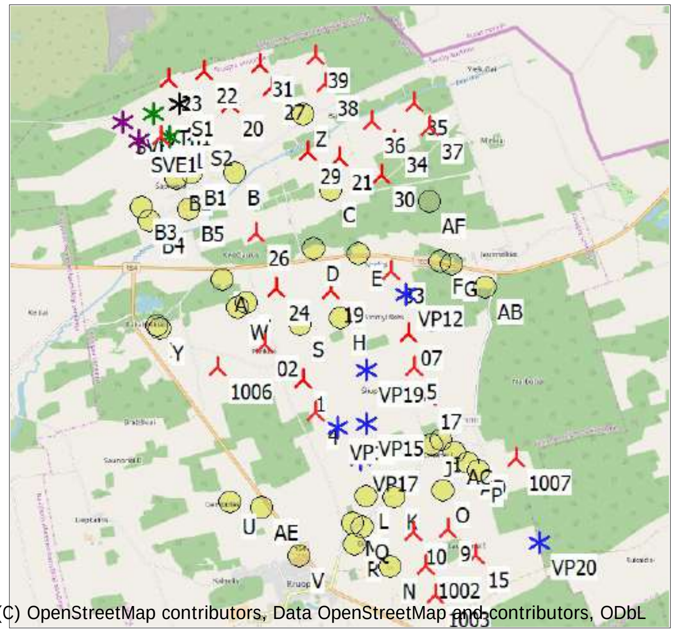
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

					WTG type						Shadow data	
	Y	X	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
35	440 792	6 242 597	76,1	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
36	440 096	6 242 301	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
37	441 041	6 242 183	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
38	439 317	6 242 928	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
39	439 169	6 243 391	78,1	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4

To be continued on next page...

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Calculated:
2022-04-12 14:01/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 1 v. suminis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year
	[h/year]
A	10:37
AB	9:55
AC	15:19
AD	22:53
AE	3:48

To be continued on next page...

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Calculated:
2022-04-12 14:01/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 1 v. suminis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]
AF	20:50
B	18:42
B1	11:36
B2	1:44
B3	1:15
B4	1:46
B5	4:33
C	32:53
D	29:25
E	31:46
F	19:18
G	15:46
H	39:22
I	12:39
J	17:58
K	15:25
L	9:13
M	9:19
N	43:24
O	32:13
P	46:44
Q	13:52
R	15:01
S	28:07
T	39:53
U	0:00
V	1:26
W	35:06
X	4:20
Y	4:48
Z	33:48

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39	29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41	14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12	10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57	46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04	33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17	8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57	11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51	61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16	8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14	0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17	23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09	4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17	10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46	3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00	0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21	56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13	28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00	0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57	6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24	18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10	33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00	0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38	42:05
34	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (443)	22:53	6:21
35	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (444)	7:03	1:57
36	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (448)	19:18	4:48
37	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (445)	18:47	6:23
38	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (446)	0:00	0:00

To be continued on next page...

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Calculated:
2022-04-12 14:01/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 1 v. suminis

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
39	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (447)	0:00	0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06	1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50	4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57	38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19	0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00	0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15	1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17	5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15	2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51	35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44	15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04	4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27	18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17	7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00	3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

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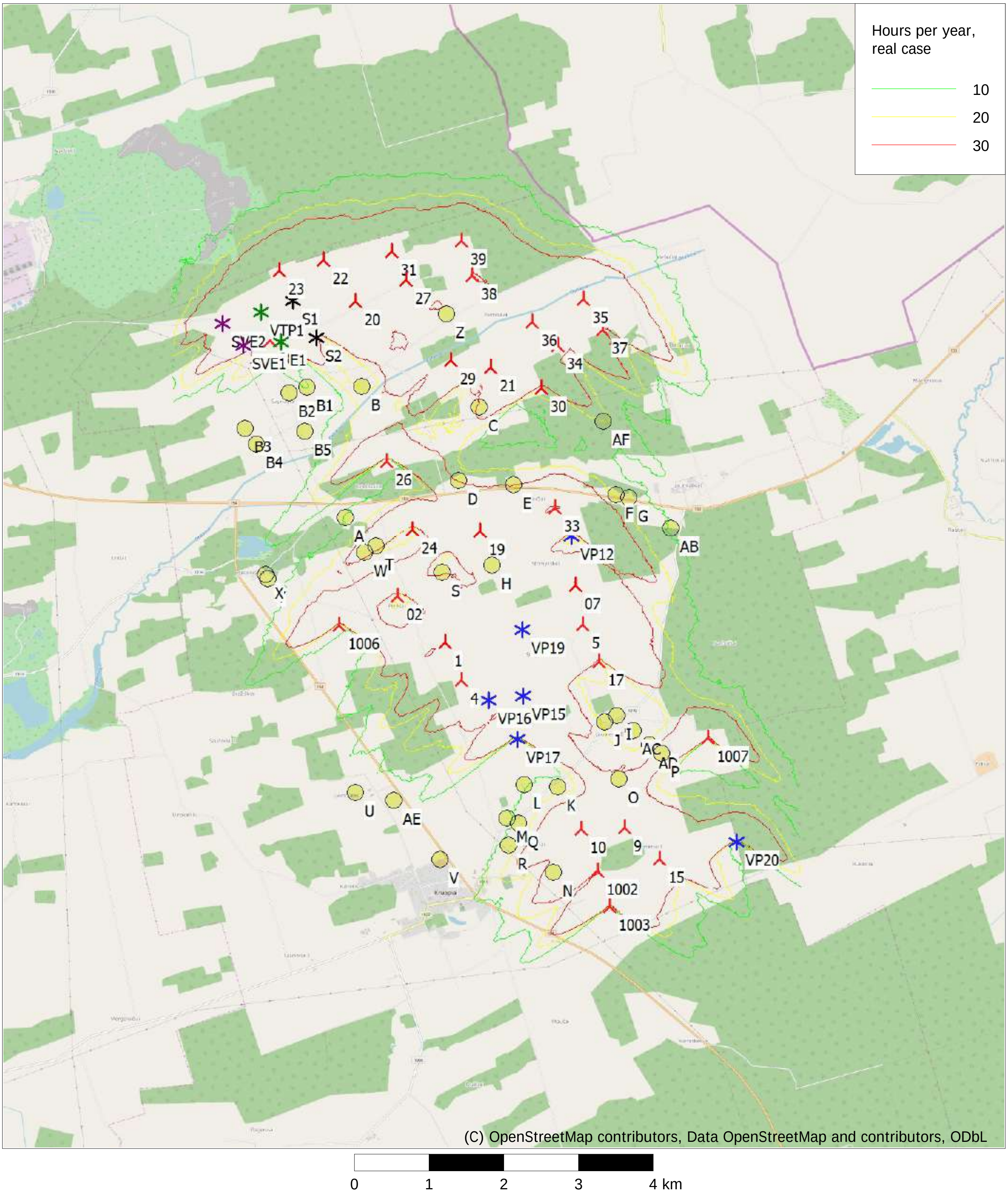
Calculated:
2022-04-12 14:01/3.4.424

SHADOW - Map

Calculation: Šešeliai 1 v. suminis



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Existing WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project:
Akmene

Description:
Šešeliai 1 v. suminis su priemonemis

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Calculated:
2022-04-13 12:03/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 1 v. suminis su priemonemis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

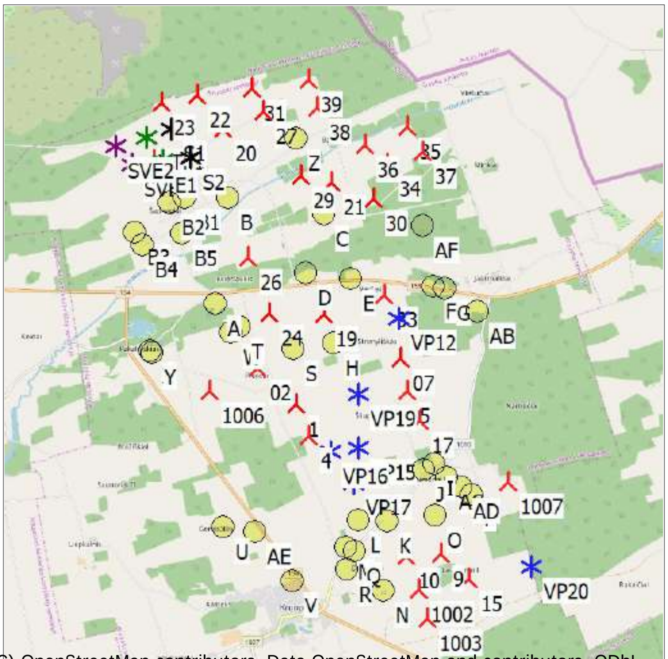
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

Flicker curtailment by stopping specific turbines

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



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Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

					WTG type						Shadow data	
	Y	X	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
35	440 792	6 242 597	76,1	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
36	440 096	6 242 301	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
37	441 041	6 242 183	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
38	439 317	6 242 928	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
39	439 169	6 243 391	78,1	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0

To be continued on next page...

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Calculated:
2022-04-13 12:03/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 1 v. suminis su priemonemis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year	Avoided hours per year
	[h/year]	[h/year]
A	10:37	
AB	9:55	
AC	15:19	

To be continued on next page...

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Calculated:
2022-04-13 12:03/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 1 v. suminis su priemonemis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]	Avoided hours per year [h/year]
AD	22:53	
AE	3:48	
AF	20:50	
B	18:42	
B1	11:36	
B2	1:44	
B3	1:15	
B4	1:46	
B5	4:33	
C*	26:35	6:23
D	29:25	
E	31:46	
F	19:18	
G	15:46	
H	39:22	
I	12:39	
J	17:58	
K	15:25	
L	9:13	
M	9:19	
N	43:24	
O	32:13	
P	46:44	
Q	13:52	
R	15:01	
S	28:07	
T	39:53	
U	0:00	
V	1:26	
W	35:06	
X	4:20	
Y	4:48	
Z*	29:08	4:48

* Receptors where shadow flicker is reduced by curtailment

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39		29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41		14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12		10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57		46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04		33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17		8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57		11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51		61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16		8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14		0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17		23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09		4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17		10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46		3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00		0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21		56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13		28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00		0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57		6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24		18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10		33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00		0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38		42:05
34	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (443)	22:53		6:21

To be continued on next page...

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Calculated:
2022-04-13 12:03/3.4.424

SHADOW - Main Result

Calculation: Še š eliai 1 v. suminis su priemonemis

...continued from previous page

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
35	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (444)	7:03		1:57
36	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (448)	0:00	19:18	0:00
37	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (445)	0:00	18:47	0:00
38	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (446)	0:00		0:00
39	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (447)	0:00		0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06		1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50		4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57		38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19		0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00		0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15		1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17		5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15		2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51		35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44		15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04		4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27		18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17		7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00		3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00		0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Šešeliai 1 v. suminis su priemonemis

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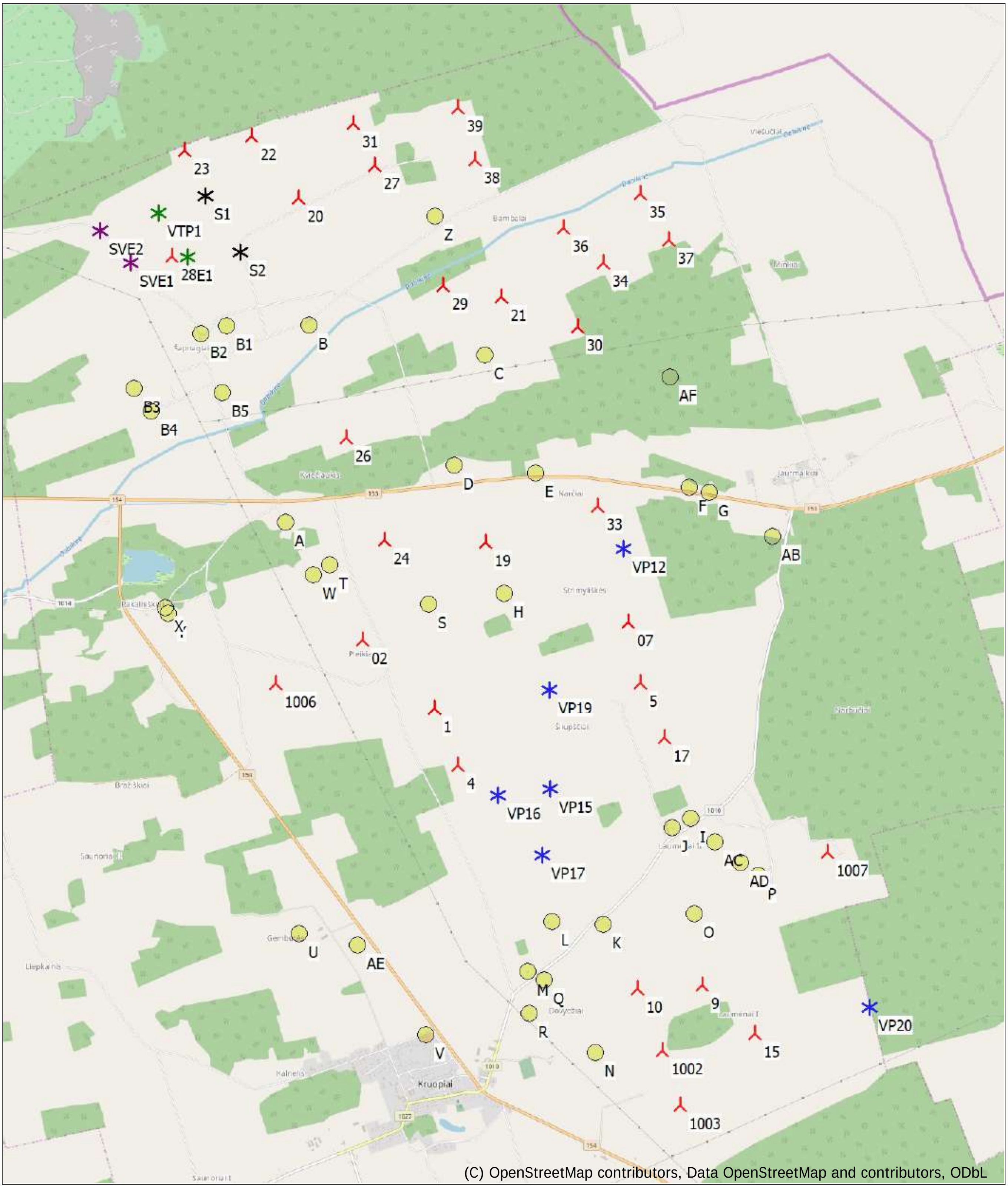
Calculated:
2022-04-13 12:03/3.4.424

SHADOW - Map

Calculation: Šešeliai 1 v. suminis su priemonemis



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 347 North: 6 238 916

New WTG — Existing WTG — Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-12 11:49/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 2 v.

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

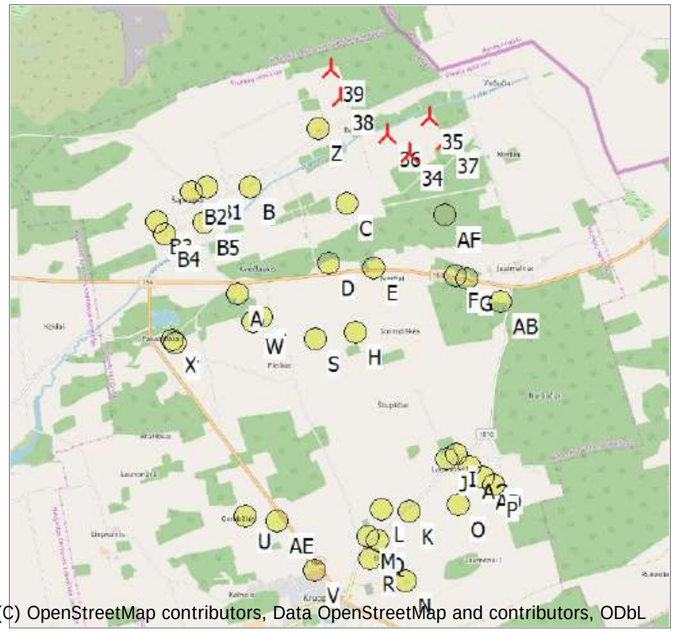
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG　　Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
34	440 449	6 241 981	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

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Calculated:
2022-04-12 11:49/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 2 v.

...continued from previous page

No.	Y	X	Z [m]	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year [h/year]
A	0:00
AB	0:00
AC	0:00
AD	0:00
AE	0:00
AF	0:00
B	0:00
B1	0:00
B2	0:00
B3	0:00
B4	0:00
B5	0:00
C	9:16
D	0:00
E	0:00
F	0:00
G	0:00
H	0:00
I	0:00
J	0:00
K	0:00
L	0:00
M	0:00
N	0:00
O	0:00
P	0:00
Q	0:00
R	0:00
S	0:00
T	0:00
U	0:00
V	0:00
W	0:00
X	0:00
Y	0:00
Z	8:13

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
34	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (719)	19:07	5:11
35	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (720)	6:43	1:51
36	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (724)	17:32	4:22

To be continued on next page...

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Calculated:
2022-04-12 11:49/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 2 v.

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
37	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (721)	17:55	6:05
38	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (722)	0:00	0:00
39	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (723)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Š e š eliai 2 v.

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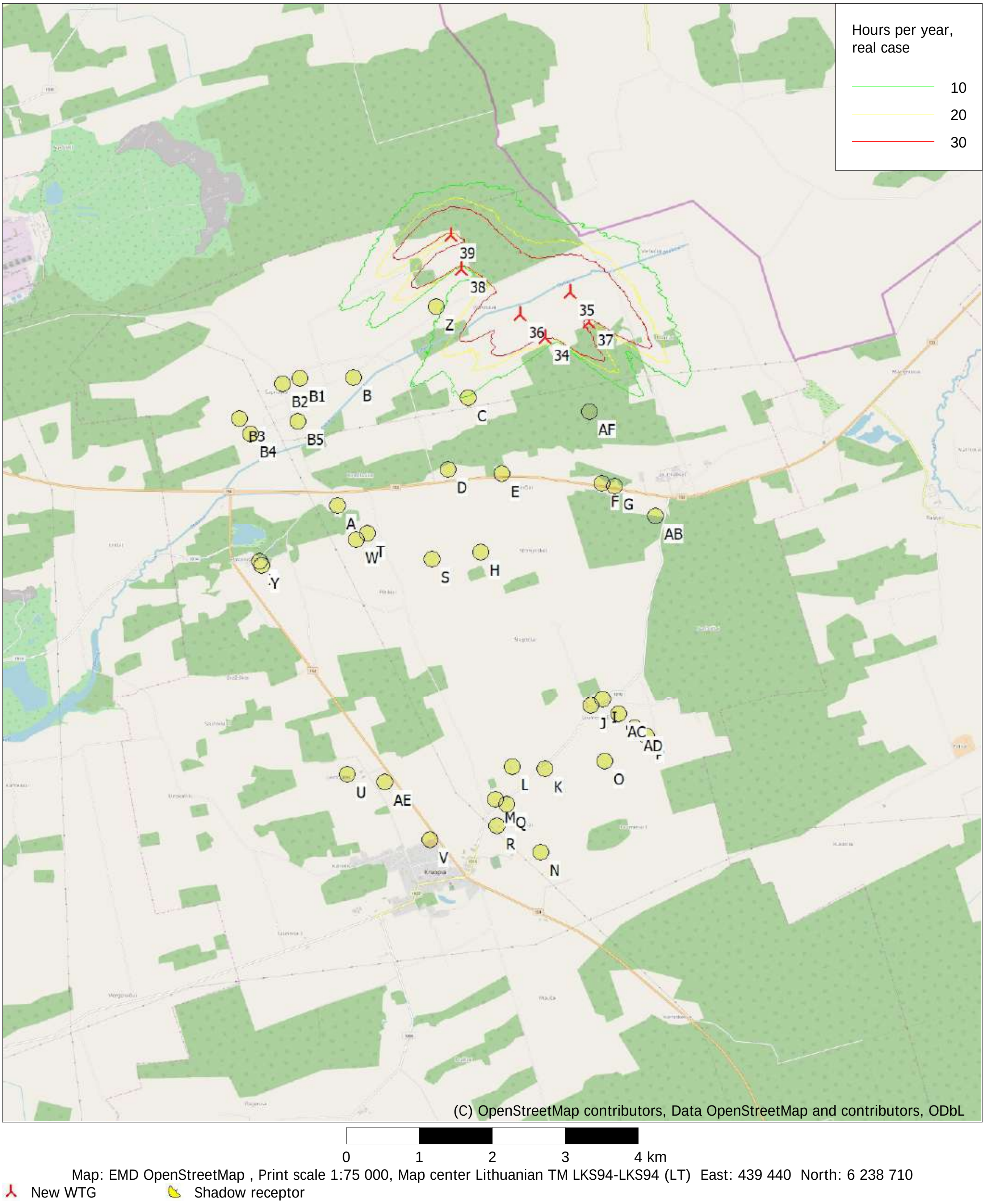
Calculated:
2022-04-12 11:49/3.4.424

SHADOW - Map

Calculation: Š e š eliai 2 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project: Akmene

Description: Šešeliai 2 v. suminis

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Calculated:
2022-04-12 15:13/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 2 v. suminis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

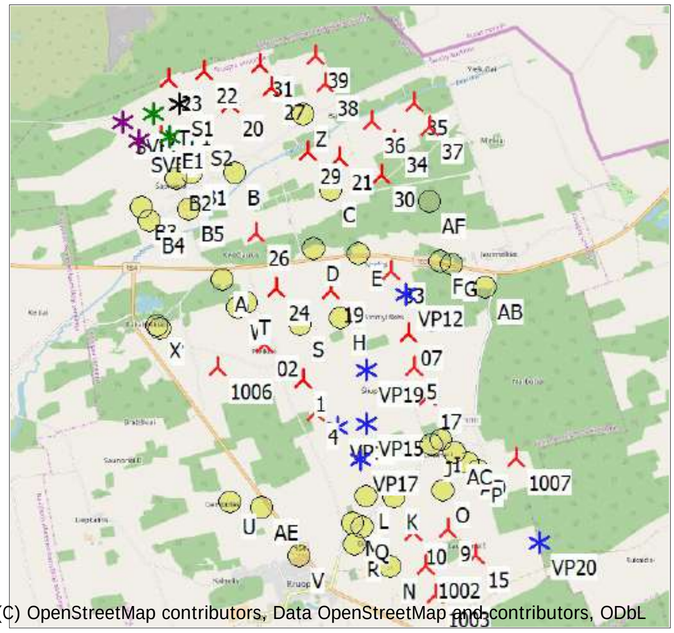
Sunshine probability S (Average daily sunshine hours) [KAUNAS]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4

To be continued on next page...

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Calculated:
2022-04-12 15:13/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 2 v. suminis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year
	[h/year]
A	10:37
AB	9:55
AC	15:19
AD	22:53
AE	3:48

To be continued on next page...

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Calculated:
2022-04-12 15:13/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 2 v. suminis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]
AF	20:50
B	18:42
B1	11:36
B2	1:44
B3	1:15
B4	1:46
B5	4:33
C	31:33
D	29:25
E	31:46
F	19:18
G	15:46
H	39:22
I	12:39
J	17:58
K	15:25
L	9:13
M	9:19
N	43:24
O	32:13
P	46:44
Q	13:52
R	15:01
S	28:07
T	39:53
U	0:00
V	1:26
W	35:06
X	4:20
Y	4:48
Z	33:10

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39	29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41	14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12	10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57	46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04	33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17	8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57	11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51	61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16	8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14	0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17	23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09	4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17	10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46	3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00	0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21	56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13	28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00	0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57	6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24	18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10	33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00	0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38	42:05
34	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (719)	19:07	5:11
35	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (720)	6:43	1:51
36	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (724)	17:32	4:22
37	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (721)	17:55	6:05
38	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (722)	0:00	0:00

To be continued on next page...

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2022-04-12 15:13/3.4.424

SHADOW - Main Result

Calculation: Še š eliai 2 v. suminis

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
39	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (723)	0:00	0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06	1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50	4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57	38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19	0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00	0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15	1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17	5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15	2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51	35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44	15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04	4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27	18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17	7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00	3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Šešeliai 2 v. suminis

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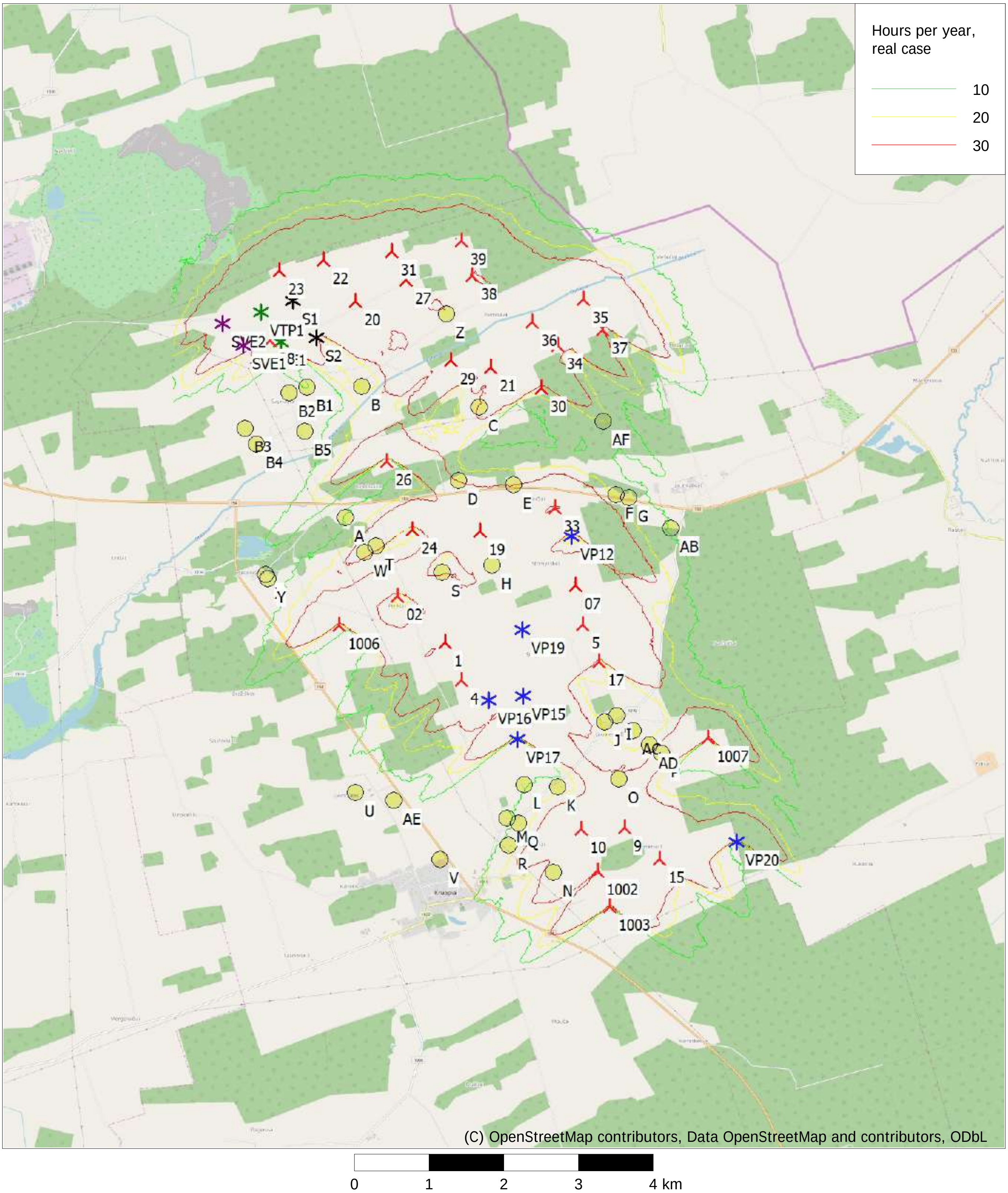
Calculated:
2022-04-12 15:13/3.4.424

SHADOW - Map

Calculation: Šešeliai 2 v. suminis



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG Existing WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-13 12:11/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 2 v. suminis su priemonemis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

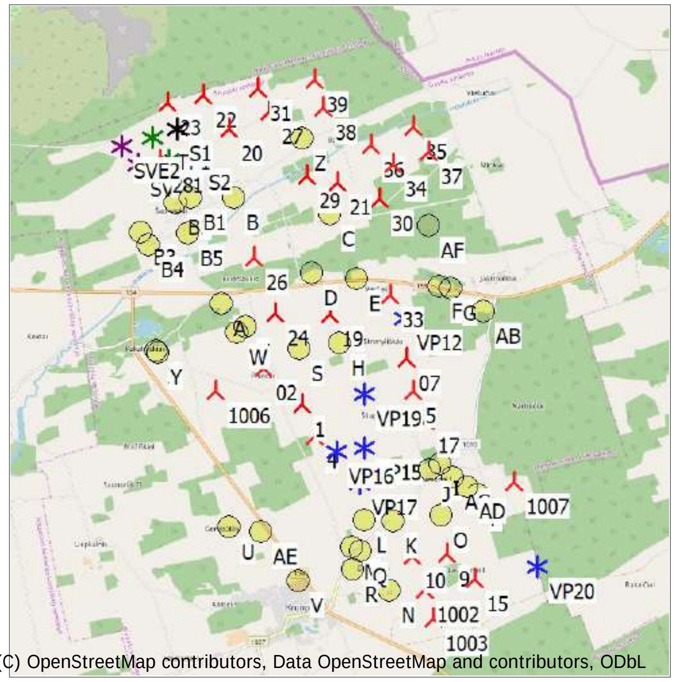
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

Flicker curtailment by stopping specific turbines

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	2 038	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0

To be continued on next page...

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Calculated:
2022-04-13 12:11/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 2 v. suminis su priemonemis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year	Avoided hours per year
	[h/year]	[h/year]
A	10:37	
AB	9:55	
AC	15:19	

To be continued on next page...

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Calculated:
2022-04-13 12:11/3.4.424

SHADOW - Main Result

Calculation: Še š eliai 2 v. suminis su priemonemis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]	Avoided hours per year [h/year]
AD	22:53	
AE	3:48	
AF	20:50	
B	18:42	
B1	11:36	
B2	1:44	
B3	1:15	
B4	1:46	
B5	4:33	
C*	25:32	6:05
D	29:25	
E	31:46	
F	19:18	
G	15:46	
H	39:22	
I	12:39	
J	17:58	
K	15:25	
L	9:13	
M	9:19	
N	43:24	
O	32:13	
P	46:44	
Q	13:52	
R	15:01	
S	28:07	
T	39:53	
U	0:00	
V	1:26	
W	35:06	
X	4:20	
Y	4:48	
Z*	28:55	4:22

* Receptors where shadow flicker is reduced by curtailment

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39		29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41		14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12		10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57		46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04		33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17		8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57		11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51		61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16		8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14		0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17		23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09		4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17		10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46		3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00		0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21		56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13		28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00		0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57		6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24		18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10		33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00		0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38		42:05
34	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (719)	19:07		5:11

To be continued on next page...

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Calculated:
2022-04-13 12:11/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 2 v. suminis su priemonemis

...continued from previous page

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
35	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (720)	6:43		1:51
36	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (724)	0:00	17:32	0:00
37	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (721)	0:00	17:55	0:00
38	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (722)	0:00		0:00
39	VESTAS V162-6.2 6200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (723)	0:00		0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06		1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50		4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57		38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19		0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00		0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15		1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17		5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15		2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51		35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44		15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04		4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27		18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17		7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00		3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00		0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Š e š eliai 2 v. suminis su priemonemis

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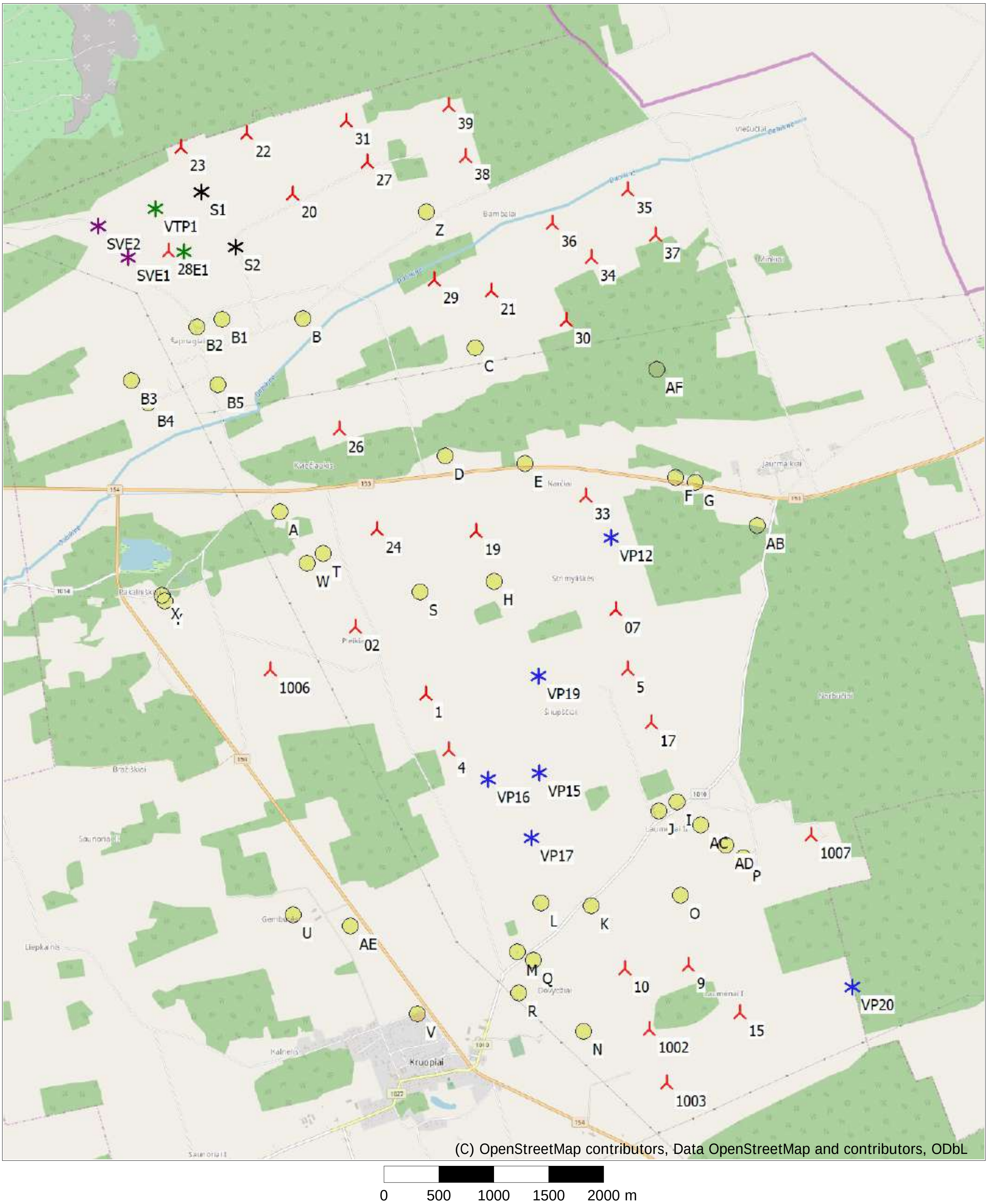
2022-04-13 12:11/3.4.424

SHADOW - Map

Calculation: Š e š eliai 2 v. suminis su priemonemis



Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 347 North: 6 238 916

New WTG | Existing WTG | Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project: Akmene

Description: Šešeliai 3 v.

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Calculated:
2022-04-12 12:03/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 3 v.

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

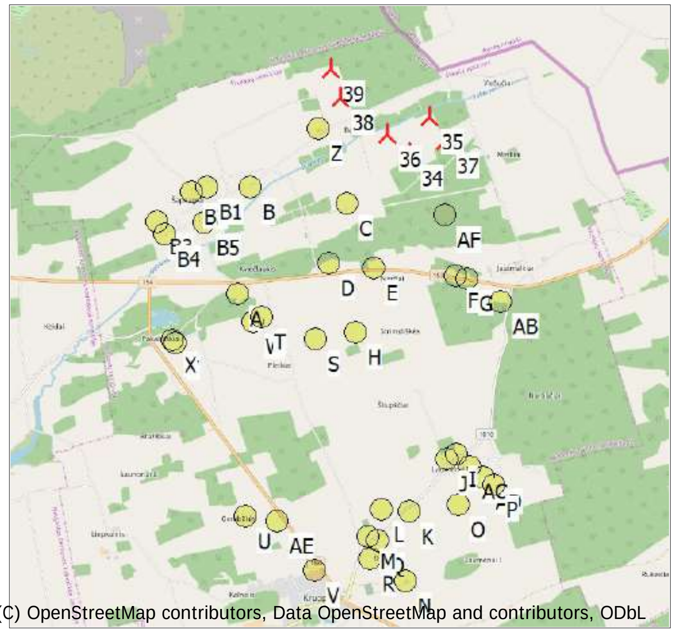
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000

New WTG   Shadow receptor

WTGs

					WTG type						Shadow data	
	Y	X	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
34	440 449	6 241 981	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

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2022-04-12 12:03/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 3 v.

...continued from previous page

No.	Y	X	Z [m]	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year [h/year]
A	0:00
AB	0:00
AC	0:00
AD	0:00
AE	0:00
AF	0:00
B	0:00
B1	0:00
B2	0:00
B3	0:00
B4	0:00
B5	0:00
C	9:18
D	0:00
E	0:00
F	0:00
G	0:00
H	0:00
I	0:00
J	0:00
K	0:00
L	0:00
M	0:00
N	0:00
O	0:00
P	0:00
Q	0:00
R	0:00
S	0:00
T	0:00
U	0:00
V	0:00
W	0:00
X	0:00
Y	0:00
Z	8:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
34	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (725)	21:39	6:04
35	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (726)	6:23	1:45
36	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (730)	17:35	4:22

To be continued on next page...

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2022-04-12 12:03/3.4.424

SHADOW - Main Result

Calculation: Še š eliai 3 v.

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
37	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (727)	15:03	5:08
38	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (728)	0:00	0:00
39	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (729)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:
Akmene

Description:
Š e š eliai 3 v.

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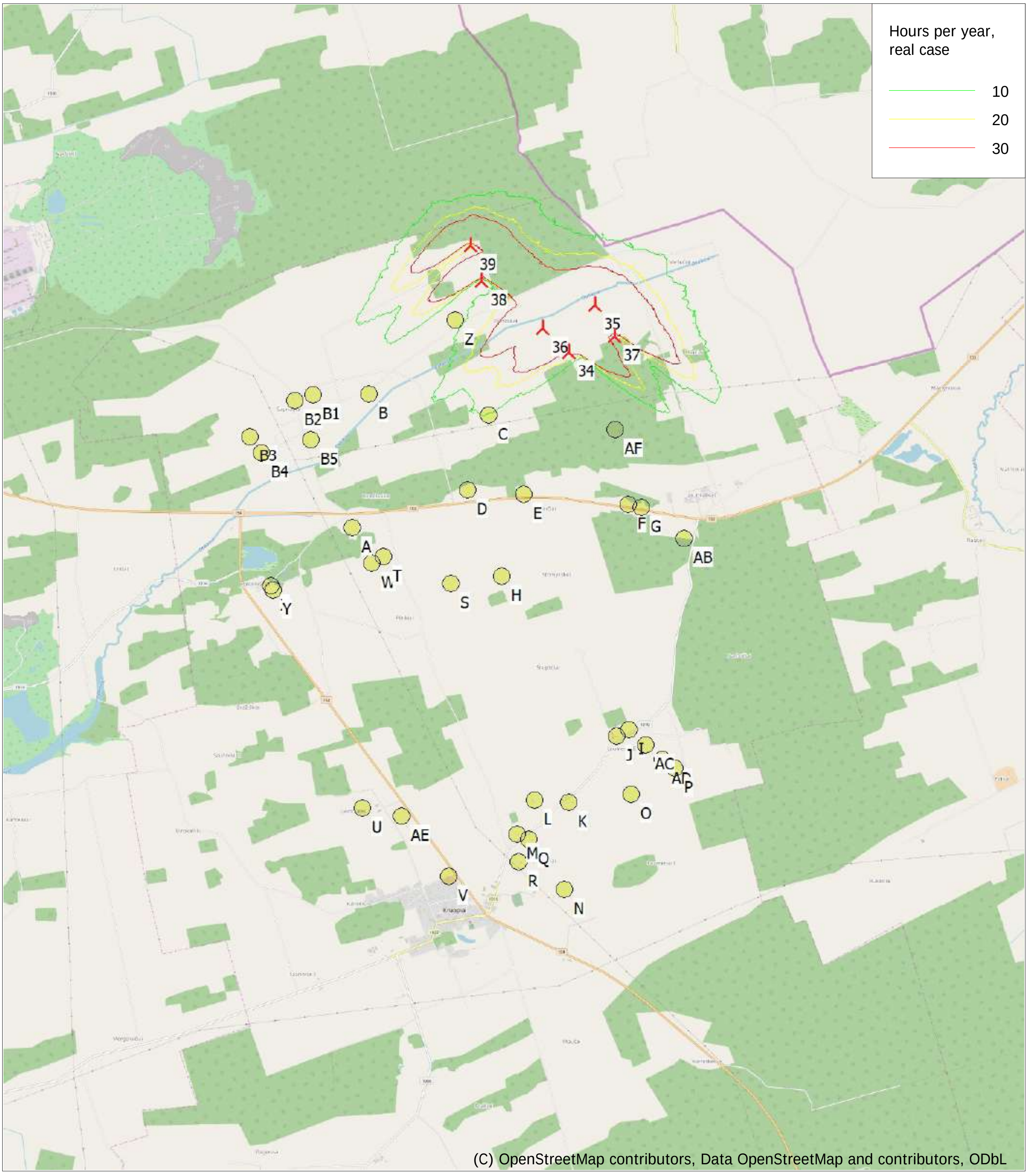
Calculated:
2022-04-12 12:03/3.4.424

SHADOW - Map

Calculation: Š e š eliai 3 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project: Akmene

Description: Šešeliai 3 v. suminis

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Calculated:
2022-04-12 15:19/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 3 v. suminis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

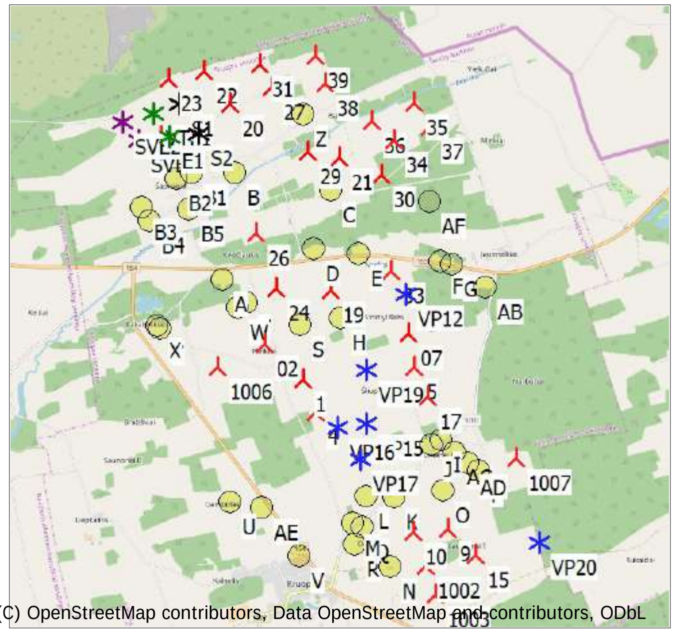
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG
Existing WTG
Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4

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Calculated:
2022-04-12 15:19/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 3 v. suminis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year
	[h/year]
A	10:37
AB	9:55
AC	15:19
AD	22:53
AE	3:48

To be continued on next page...

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Calculated:
2022-04-12 15:19/3.4.424

SHADOW - Main Result

Calculation: Še š eliai 3 v. suminis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]
AF	20:50
B	18:42
B1	11:36
B2	1:44
B3	1:15
B4	1:46
B5	4:33
C	31:35
D	29:25
E	31:46
F	19:18
G	15:46
H	39:22
I	12:39
J	17:58
K	15:25
L	9:13
M	9:19
N	43:24
O	32:13
P	46:44
Q	13:52
R	15:01
S	28:07
T	39:53
U	0:00
V	1:26
W	35:06
X	4:20
Y	4:48
Z	32:58

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39	29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41	14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12	10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57	46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04	33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17	8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57	11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51	61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16	8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14	0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17	23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09	4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17	10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46	3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00	0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21	56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13	28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00	0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57	6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24	18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10	33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00	0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38	42:05
34	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (725)	21:39	6:04
35	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (726)	6:23	1:45
36	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (730)	17:35	4:22
37	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (727)	15:03	5:08
38	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (728)	0:00	0:00

To be continued on next page...

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Calculated:
2022-04-12 15:19/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 3 v. suminis

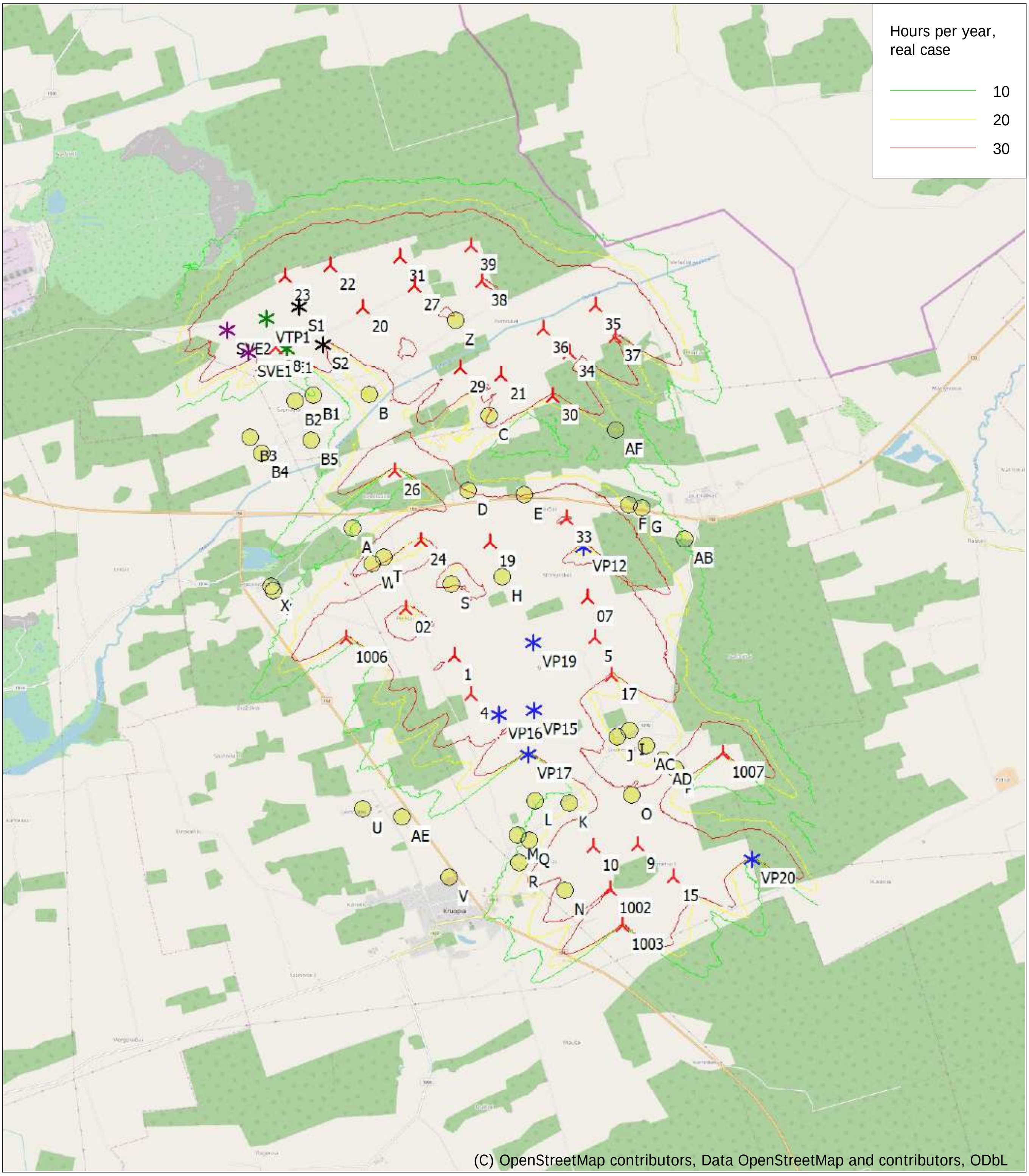
...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
39	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (729)	0:00	0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06	1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50	4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57	38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19	0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00	0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15	1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17	5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15	2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51	35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44	15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04	4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27	18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17	7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00	3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

SHADOW - Map

Calculation: Š e š eliai 3 v. suminis



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG Existing WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project:
Akmene

Description:
Š e š eliai 3 v. suminis su priemonemis

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Calculated:
2022-04-13 12:21/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 3 v. suminis su priemonemis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

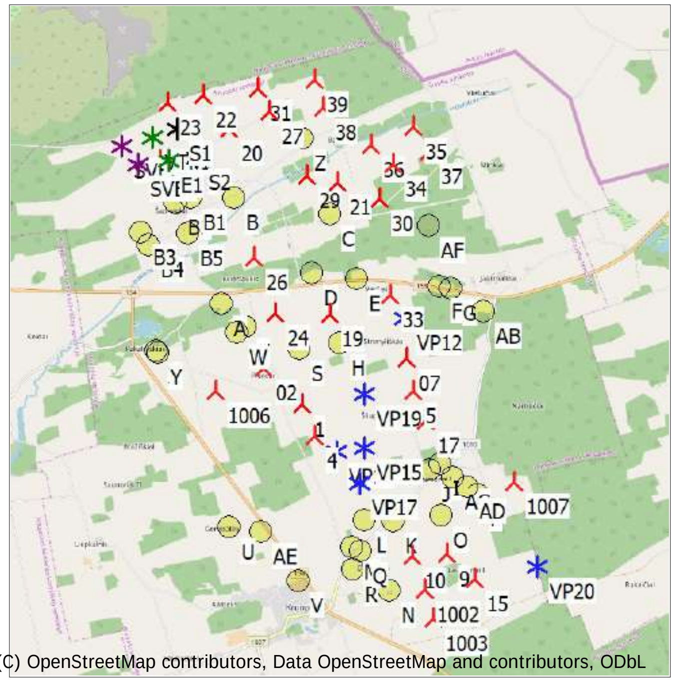
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

Flicker curtailment by stopping specific turbines

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0

To be continued on next page...

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Calculated:
2022-04-13 12:21/3.4.424

SHADOW - Main Result

Calculation: Še š eliai 3 v. suminis su priemonemis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year	Avoided hours per year
	[h/year]	[h/year]
A	10:37	
AB	9:55	
AC	15:19	

To be continued on next page...

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Calculated:
2022-04-13 12:21/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 3 v. suminis su priemonemis

...continued from previous page

	Shadow, expected values	
No.	Shadow hours per year [h/year]	Avoided hours per year [h/year]
AD	22:53	
AE	3:48	
AF	20:50	
B	18:42	
B1	11:36	
B2	1:44	
B3	1:15	
B4	1:46	
B5	4:33	
C*	26:30	5:08
D	29:25	
E	31:46	
F	19:18	
G	15:46	
H	39:22	
I	12:39	
J	17:58	
K	15:25	
L	9:13	
M	9:19	
N	43:24	
O	32:13	
P	46:44	
Q	13:52	
R	15:01	
S	28:07	
T	39:53	
U	0:00	
V	1:26	
W	35:06	
X	4:20	
Y	4:48	
Z*	28:43	4:22

* Receptors where shadow flicker is reduced by curtailment

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39		29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41		14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12		10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57		46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04		33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17		8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57		11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51		61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16		8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14		0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17		23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09		4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17		10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46		3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00		0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21		56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13		28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00		0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57		6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24		18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10		33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00		0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38		42:05
34	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (725)	21:39		6:04

To be continued on next page...

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Calculated:
2022-04-13 12:21/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 3 v. suminis su priemonemis

...continued from previous page

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
35	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (726)	6:23		1:45
36	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (730)	0:00	17:35	0:00
37	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (727)	0:00	15:03	0:00
38	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (728)	0:00		0:00
39	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (729)	0:00		0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06		1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50		4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57		38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19		0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00		0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15		1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17		5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15		2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51		35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44		15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04		4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27		18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17		7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00		3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00		0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Š e š eliai 3 v. suminis su priemonemis

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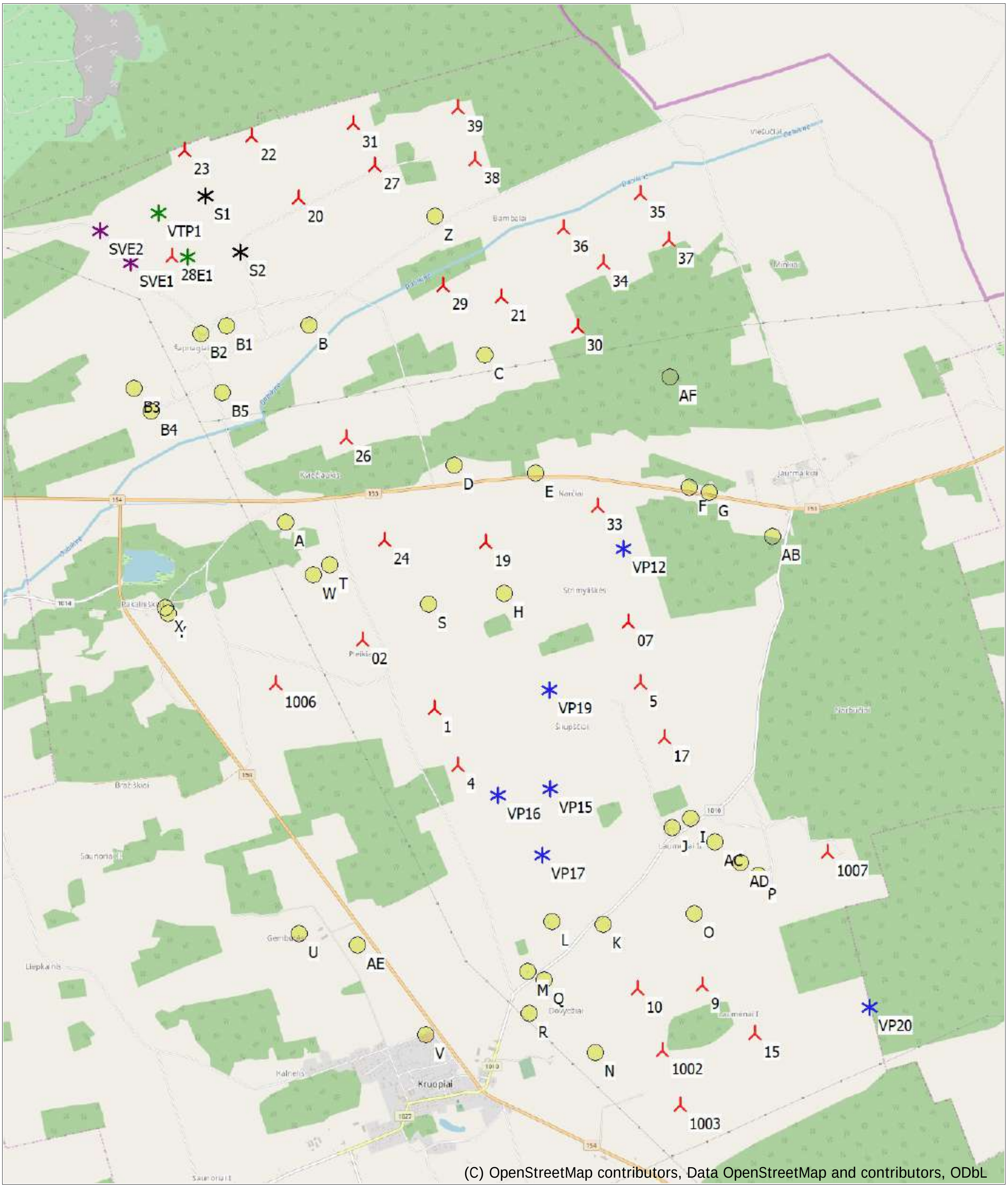
Calculated:
2022-04-13 12:21/3.4.424

SHADOW - Map

Calculation: Š e š eliai 3 v. suminis su priemonemis



Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 347 North: 6 238 916

New WTG | Existing WTG | Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project: Akmene

Description: Šešeliai 4 v.

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Calculated:
2022-04-12 13:21/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 4 v.

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

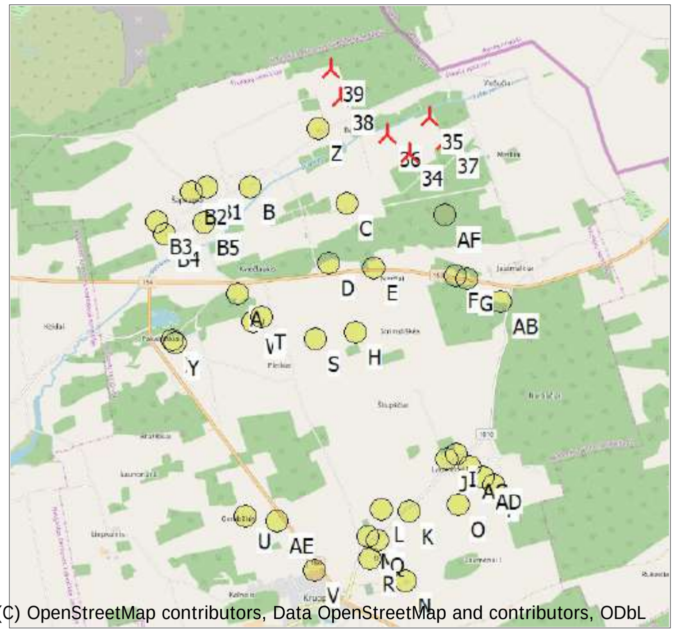
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000

New WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
34	440 449	6 241 981	75,0	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

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Calculated:
2022-04-12 13:21/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 4 v.

...continued from previous page

No.	Y	X	Z [m]	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year [h/year]
A	0:00
AB	0:00
AC	0:00
AD	0:00
AE	0:00
AF	0:00
B	0:00
B1	0:00
B2	0:00
B3	0:00
B4	0:00
B5	0:00
C	9:16
D	0:00
E	0:00
F	0:00
G	0:00
H	0:00
I	0:00
J	0:00
K	0:00
L	0:00
M	0:00
N	0:00
O	0:00
P	0:00
Q	0:00
R	0:00
S	0:00
T	0:00
U	0:00
V	0:00
W	0:00
X	0:00
Y	0:00
Z	8:13

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
34	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (731)	19:07	5:11
35	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (732)	6:43	1:51
36	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (736)	17:32	4:22

To be continued on next page...

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Calculated:
2022-04-12 13:21/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 4 v.

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
37	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (733)	17:55	6:05
38	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (734)	0:00	0:00
39	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (735)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

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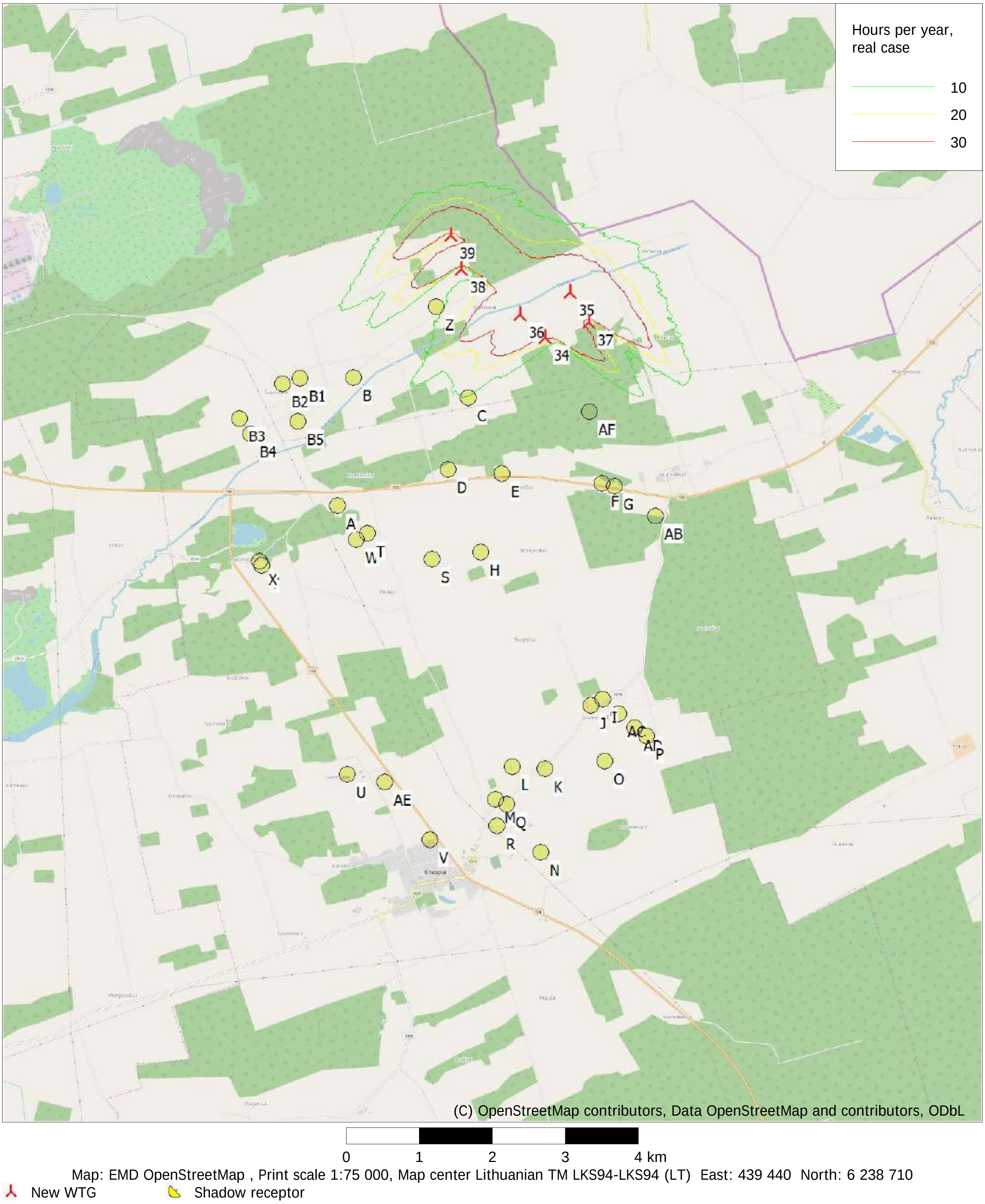
Calculated:
2022-04-12 13:21/3.4.424

SHADOW - Map

Calculation: Šešeliai 4 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-12 15:33/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 4 v. suminis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

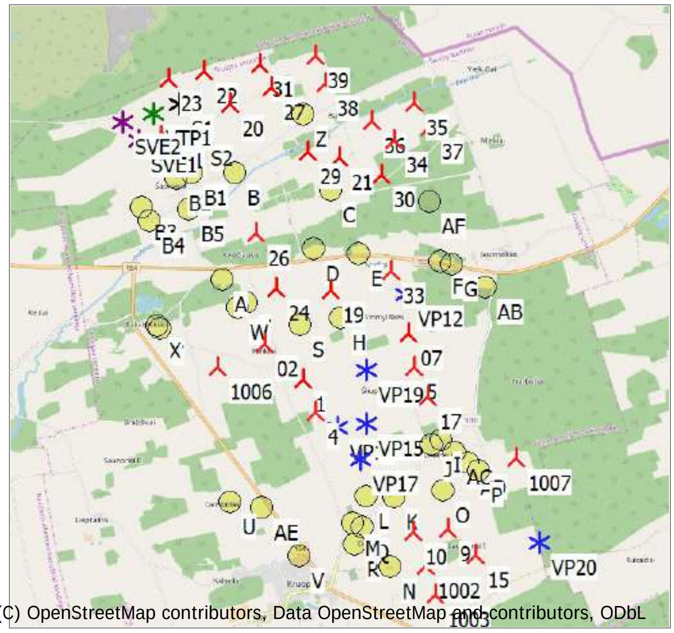
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4

To be continued on next page...

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Calculated:
2022-04-12 15:33/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 4 v. suminis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year
	[h/year]
A	10:37
AB	9:55
AC	15:19
AD	22:53
AE	3:48

To be continued on next page...

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Calculated:
2022-04-12 15:33/3.4.424

SHADOW - Main Result

Calculation: Še š eliai 4 v. suminis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]
AF	20:50
B	18:42
B1	11:36
B2	1:44
B3	1:15
B4	1:46
B5	4:33
C	31:33
D	29:25
E	31:46
F	19:18
G	15:46
H	39:22
I	12:39
J	17:58
K	15:25
L	9:13
M	9:19
N	43:24
O	32:13
P	46:44
Q	13:52
R	15:01
S	28:07
T	39:53
U	0:00
V	1:26
W	35:06
X	4:20
Y	4:48
Z	33:10

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39	29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41	14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12	10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57	46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04	33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17	8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57	11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51	61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16	8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14	0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17	23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09	4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17	10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46	3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00	0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21	56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13	28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00	0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57	6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24	18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10	33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00	0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38	42:05
34	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (731)	19:07	5:11
35	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (732)	6:43	1:51
36	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (736)	17:32	4:22
37	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (733)	17:55	6:05
38	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (734)	0:00	0:00

To be continued on next page...

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2022-04-12 15:33/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 4 v. suminis

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
39	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (735)	0:00	0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06	1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50	4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57	38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19	0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00	0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15	1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17	5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15	2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51	35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44	15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04	4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27	18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17	7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00	3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Š e š eliai 4 v. suminis

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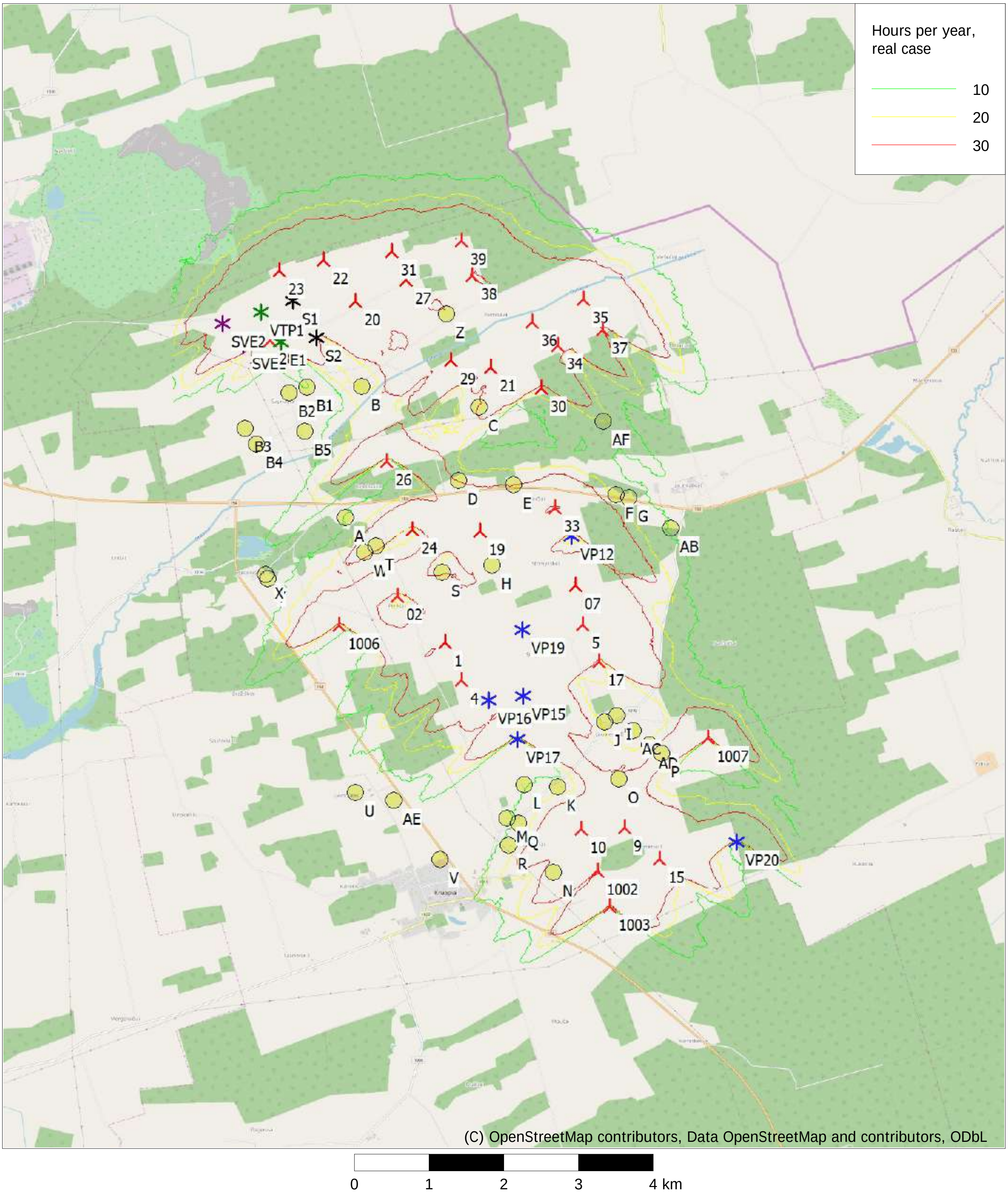
Calculated:
2022-04-12 15:33/3.4.424

SHADOW - Map

Calculation: Š e š eliai 4 v. suminis



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Existing WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-13 12:25/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 4 v. suminis su priemonemis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

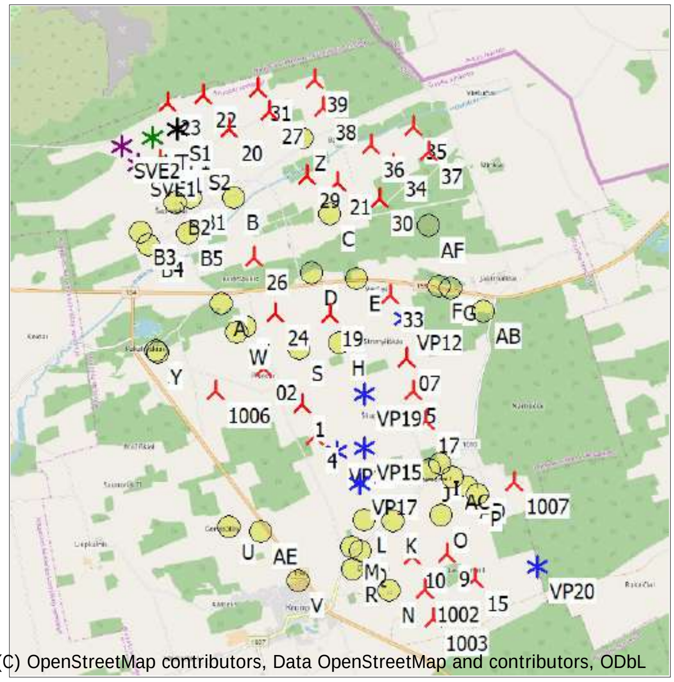
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

Flicker curtailment by stopping specific turbines

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG Existing WTG Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	2 031	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0

To be continued on next page...

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Calculated:
2022-04-13 12:25/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 4 v. suminis su priemonemis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year	Avoided hours per year
	[h/year]	[h/year]
A	10:37	
AB	9:55	
AC	15:19	

To be continued on next page...

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Calculated:
2022-04-13 12:25/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 4 v. suminis su priemonemis

...continued from previous page

Shadow, expected values

No.	Shadow hours per year [h/year]	Avoided hours per year [h/year]
AD	22:53	
AE	3:48	
AF	20:50	
B	18:42	
B1	11:36	
B2	1:44	
B3	1:15	
B4	1:46	
B5	4:33	
C*	25:32	6:05
D	29:25	
E	31:46	
F	19:18	
G	15:46	
H	39:22	
I	12:39	
J	17:58	
K	15:25	
L	9:13	
M	9:19	
N	43:24	
O	32:13	
P	46:44	
Q	13:52	
R	15:01	
S	28:07	
T	39:53	
U	0:00	
V	1:26	
W	35:06	
X	4:20	
Y	4:48	
Z*	28:55	4:22

* Receptors where shadow flicker is reduced by curtailment

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39		29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41		14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12		10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57		46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04		33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17		8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57		11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51		61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16		8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14		0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17		23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09		4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17		10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46		3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00		0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21		56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13		28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00		0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57		6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24		18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10		33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00		0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38		42:05
34	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (731)	19:07		5:11

To be continued on next page...

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Calculated:
2022-04-13 12:25/3.4.424

SHADOW - Main Result

Calculation: Še šeliai 4 v. suminis su priemonemis

...continued from previous page

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
35	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (732)	6:43		1:51
36	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (736)	0:00	17:32	0:00
37	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (733)	0:00	17:55	0:00
38	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (734)	0:00		0:00
39	VESTAS V162-6.8 6800 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (735)	0:00		0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06		1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50		4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57		38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19		0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00		0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15		1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17		5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15		2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51		35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44		15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04		4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27		18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17		7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00		3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00		0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:
Akmene

Description:
Š e š eliai 4 v. suminis su priemonemis

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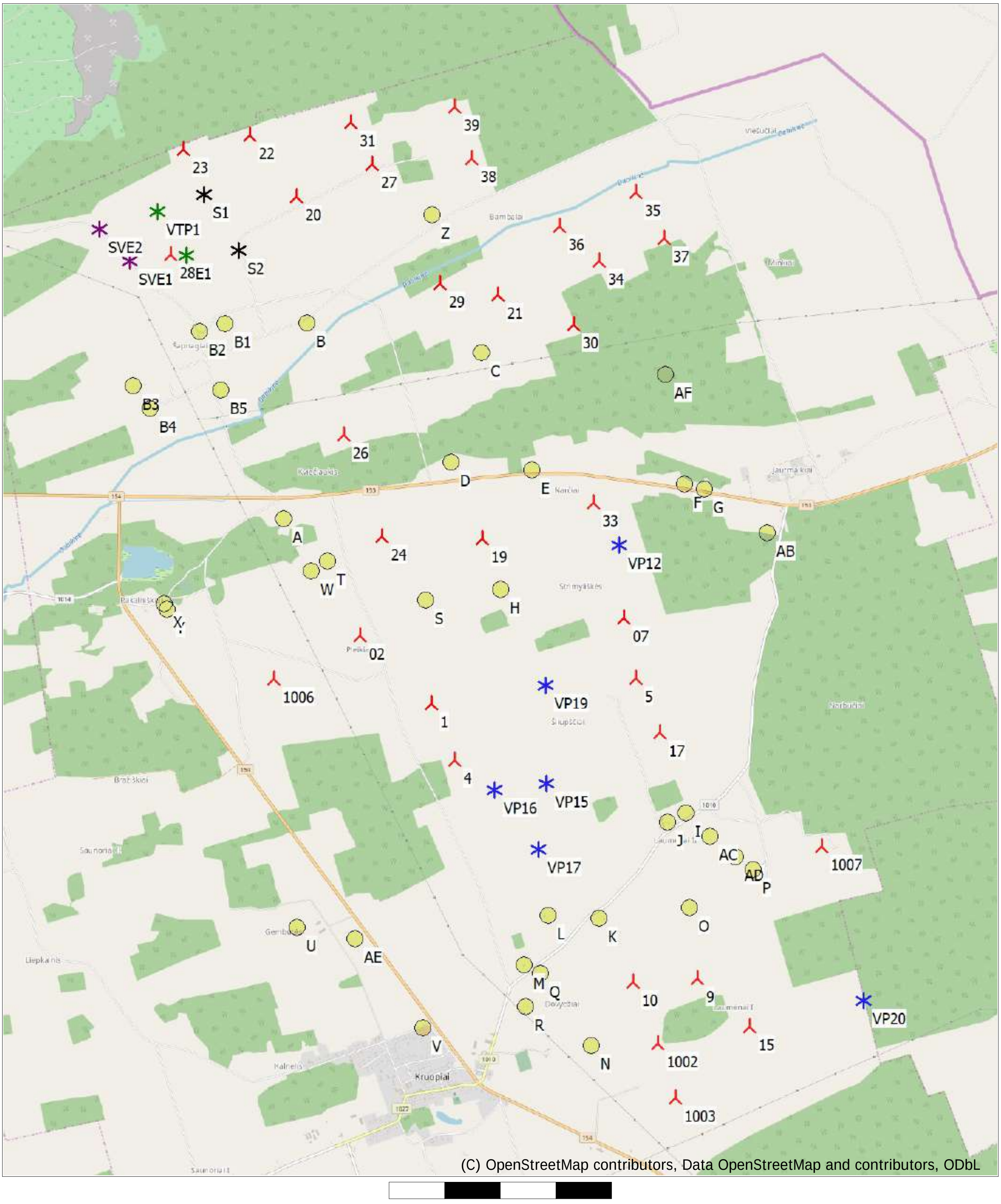
Calculated:
2022-04-13 12:25/3.4.424

SHADOW - Map

Calculation: Š e š eliai 4 v. suminis su priemonemis



Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 347 North: 6 238 916

New WTG Existing WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-12 13:24/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 5 v.

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

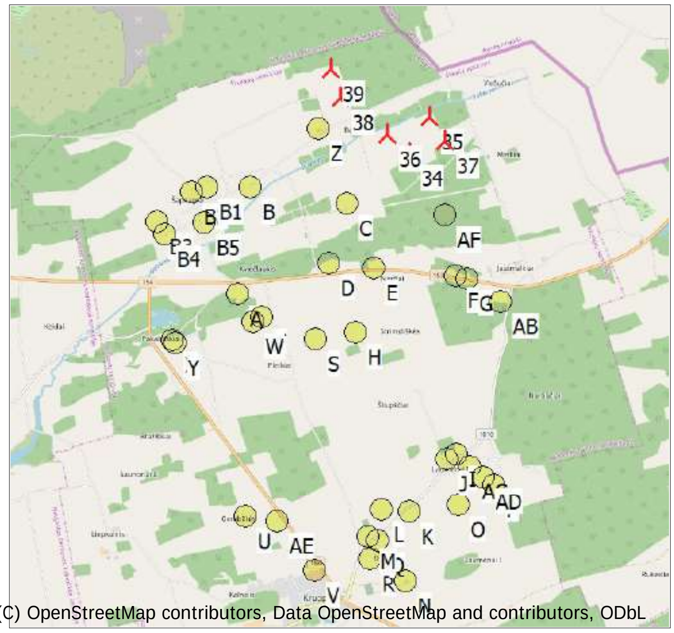
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
34	440 449	6 241 981	75,0	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.8 6800 162.0 !O! h...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

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Calculated:
2022-04-12 13:24/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 5 v.

...continued from previous page

No.	Y	X	Z [m]	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year [h/year]
A	0:00
AB	0:00
AC	0:00
AD	0:00
AE	0:00
AF	0:00
B	0:00
B1	0:00
B2	0:00
B3	0:00
B4	0:00
B5	0:00
C	9:18
D	0:00
E	0:00
F	0:00
G	0:00
H	0:00
I	0:00
J	0:00
K	0:00
L	0:00
M	0:00
N	0:00
O	0:00
P	0:00
Q	0:00
R	0:00
S	0:00
T	0:00
U	0:00
V	0:00
W	0:00
X	0:00
Y	0:00
Z	8:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
34	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (737)	21:39	6:04
35	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (738)	6:23	1:45
36	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (742)	17:35	4:22

To be continued on next page...

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Calculated:
2022-04-12 13:24/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 5 v.

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
37	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (739)	15:03	5:08
38	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (740)	0:00	0:00
39	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (741)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:
Akmene

Description:
Š e š eliai 5 v.

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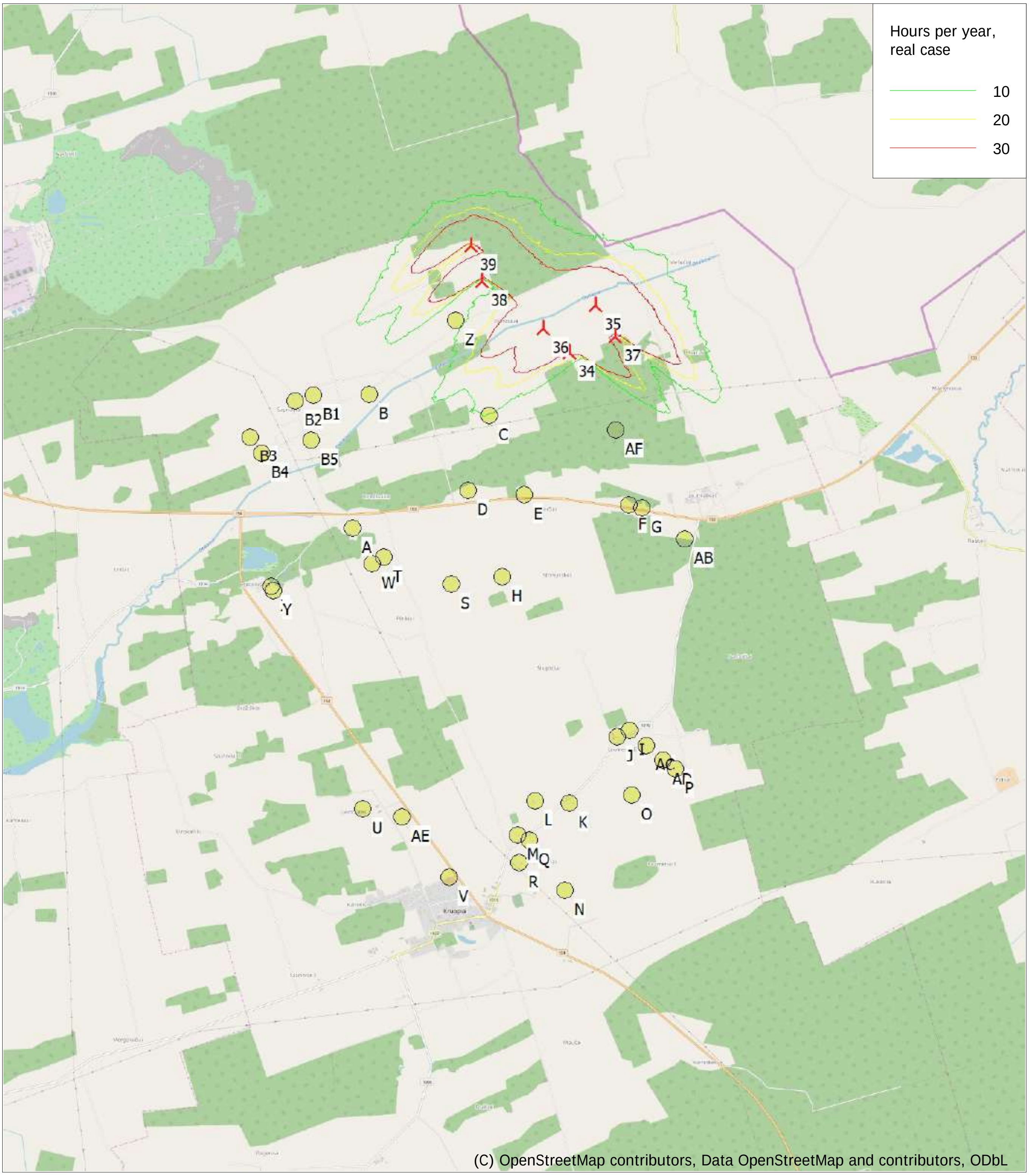
Calculated:
2022-04-12 13:24/3.4.424

SHADOW - Map

Calculation: Š e š eliai 5 v.



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project:
Akmene

Description:
Š e š eliai 5 v. suminis

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Calculated:
2022-04-13 10:33/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 5 v. suminis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

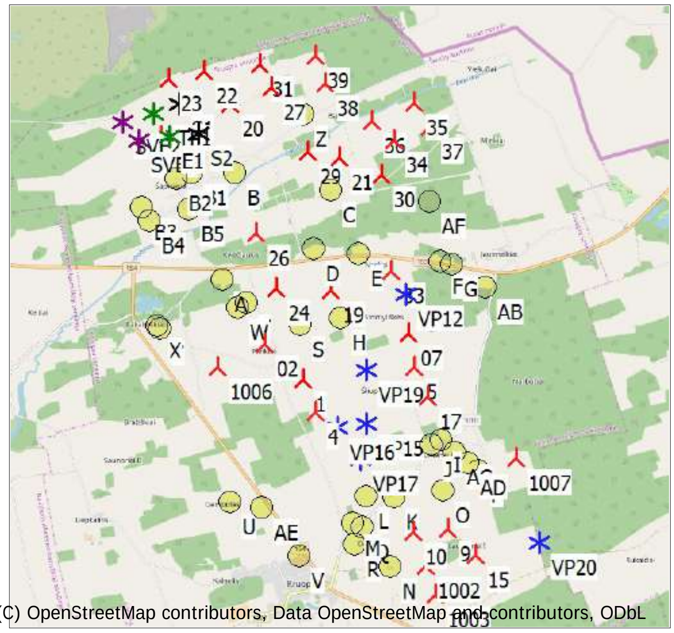
Sunshine probability S (Average daily sunshine hours) [KAUNAS]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m



Scale 1:125 000
New WTG Existing WTG Shadow receptor

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4

To be continued on next page...

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Calculated:
2022-04-13 10:33/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 5 v. suminis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year
	[h/year]
A	10:37
AB	9:55
AC	15:19
AD	22:53
AE	3:48

To be continued on next page...

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Calculated:
2022-04-13 10:33/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 5 v. suminis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]
AF	20:50
B	18:42
B1	11:36
B2	1:44
B3	1:15
B4	1:46
B5	4:33
C	31:35
D	29:25
E	31:46
F	19:18
G	15:46
H	39:22
I	12:39
J	17:58
K	15:25
L	9:13
M	9:19
N	43:24
O	32:13
P	46:44
Q	13:52
R	15:01
S	28:07
T	39:53
U	0:00
V	1:26
W	35:06
X	4:20
Y	4:48
Z	32:58

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39	29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41	14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12	10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57	46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04	33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17	8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57	11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51	61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16	8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14	0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17	23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09	4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17	10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46	3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00	0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21	56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13	28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00	0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57	6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24	18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10	33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00	0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38	42:05
34	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (737)	21:39	6:04
35	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (738)	6:23	1:45
36	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (742)	17:35	4:22
37	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (739)	15:03	5:08
38	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (740)	0:00	0:00

To be continued on next page...

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Calculated:
2022-04-13 10:33/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 5 v. suminis

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
39	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (741)	0:00	0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06	1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50	4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57	38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19	0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00	0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15	1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17	5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15	2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51	35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44	15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04	4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27	18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17	7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00	3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:
Akmene

Description:
Šešeliai 5 v. suminis

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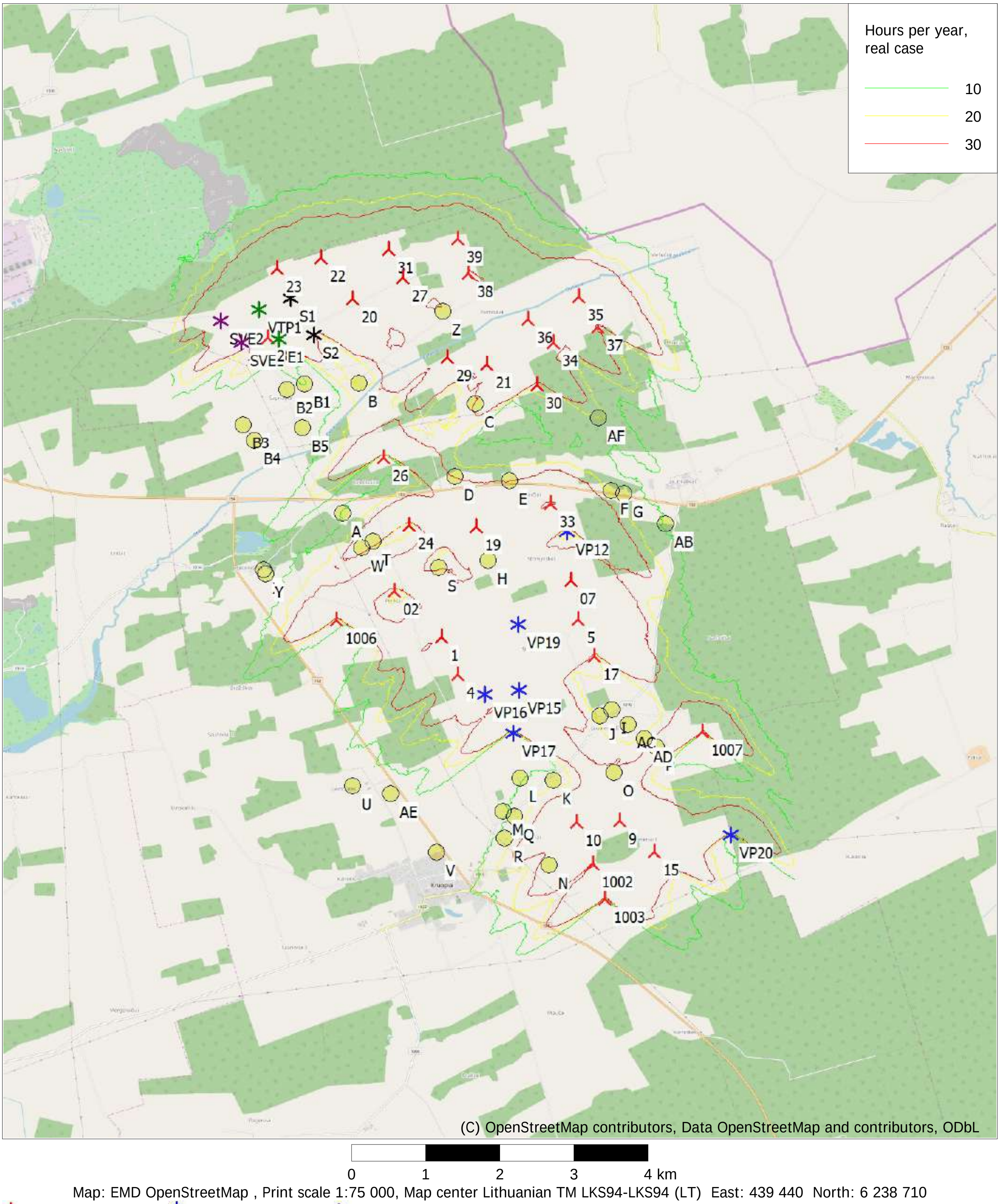
Calculated:
2022-04-13 10:33/3.4.424

SHADOW - Map

Calculation: Šešeliai 5 v. suminis



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Existing WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project: Akmene

Description: Š e š eliai 5 v. suminis su priemonemis

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Calculated:
2022-04-13 12:46/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 5 v. suminis su priemonemis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

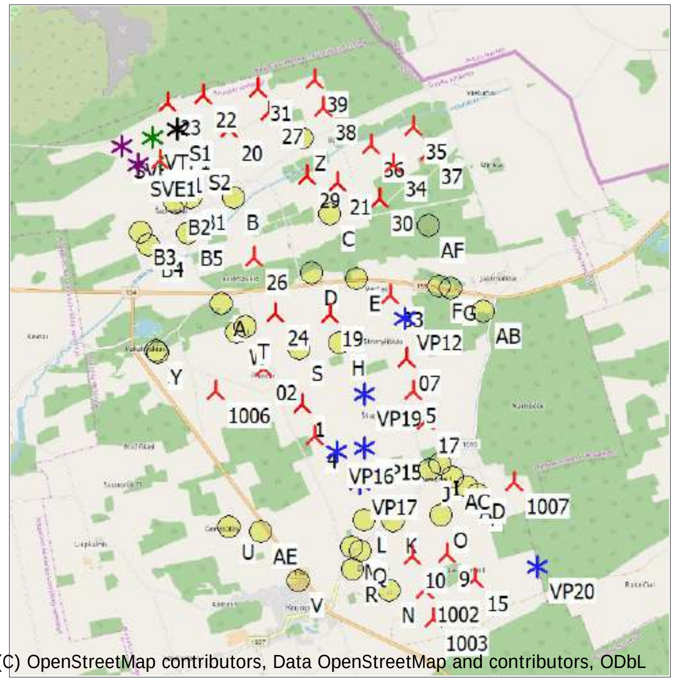
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

Flicker curtailment by stopping specific turbines

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m



All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

Scale 1:125 000
New WTG Existing WTG Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
35	440 792	6 242 597	76,1	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
36	440 096	6 242 301	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
37	441 041	6 242 183	75,0	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
38	439 317	6 242 928	77,4	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
39	439 169	6 243 391	78,1	VESTAS V162-6.8 68...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	2 032	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0

To be continued on next page...

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Calculated:
2022-04-13 12:46/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 5 v. suminis su priemonemis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year	Avoided hours per year
	[h/year]	[h/year]
A	10:37	
AB	9:55	
AC	15:19	

To be continued on next page...

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Calculated:
2022-04-13 12:46/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 5 v. suminis su priemonemis

...continued from previous page

Shadow, expected values

No.	Shadow hours per year [h/year]	Avoided hours per year [h/year]
AD	22:53	
AE	3:48	
AF	20:50	
B	18:42	
B1	11:36	
B2	1:44	
B3	1:15	
B4	1:46	
B5	4:33	
C*	26:30	5:08
D	29:25	
E	31:46	
F	19:18	
G	15:46	
H	39:22	
I	12:39	
J	17:58	
K	15:25	
L	9:13	
M	9:19	
N	43:24	
O	32:13	
P	46:44	
Q	13:52	
R	15:01	
S	28:07	
T	39:53	
U	0:00	
V	1:26	
W	35:06	
X	4:20	
Y	4:48	
Z*	28:43	4:22

* Receptors where shadow flicker is reduced by curtailment

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39		29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41		14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12		10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57		46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04		33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17		8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57		11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51		61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16		8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14		0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17		23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09		4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17		10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46		3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00		0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21		56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13		28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00		0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57		6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24		18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10		33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00		0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38		42:05
34	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (737)	21:39		6:04

To be continued on next page...

SHADOW - Main Result

Calculation: Še š eliai 5 v. suminis su priemonemis

...continued from previous page

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
35	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (738)	6:23		1:45
36	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (742)	0:00	17:35	0:00
37	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (739)	0:00	15:03	0:00
38	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (740)	0:00		0:00
39	VESTAS V162-6.8 6800 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (741)	0:00		0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06		1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50		4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57		38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19		0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00		0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15		1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17		5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15		2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51		35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44		15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04		4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27		18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17		7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00		3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00		0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Še š eliai 5 v. suminis su priemonemis

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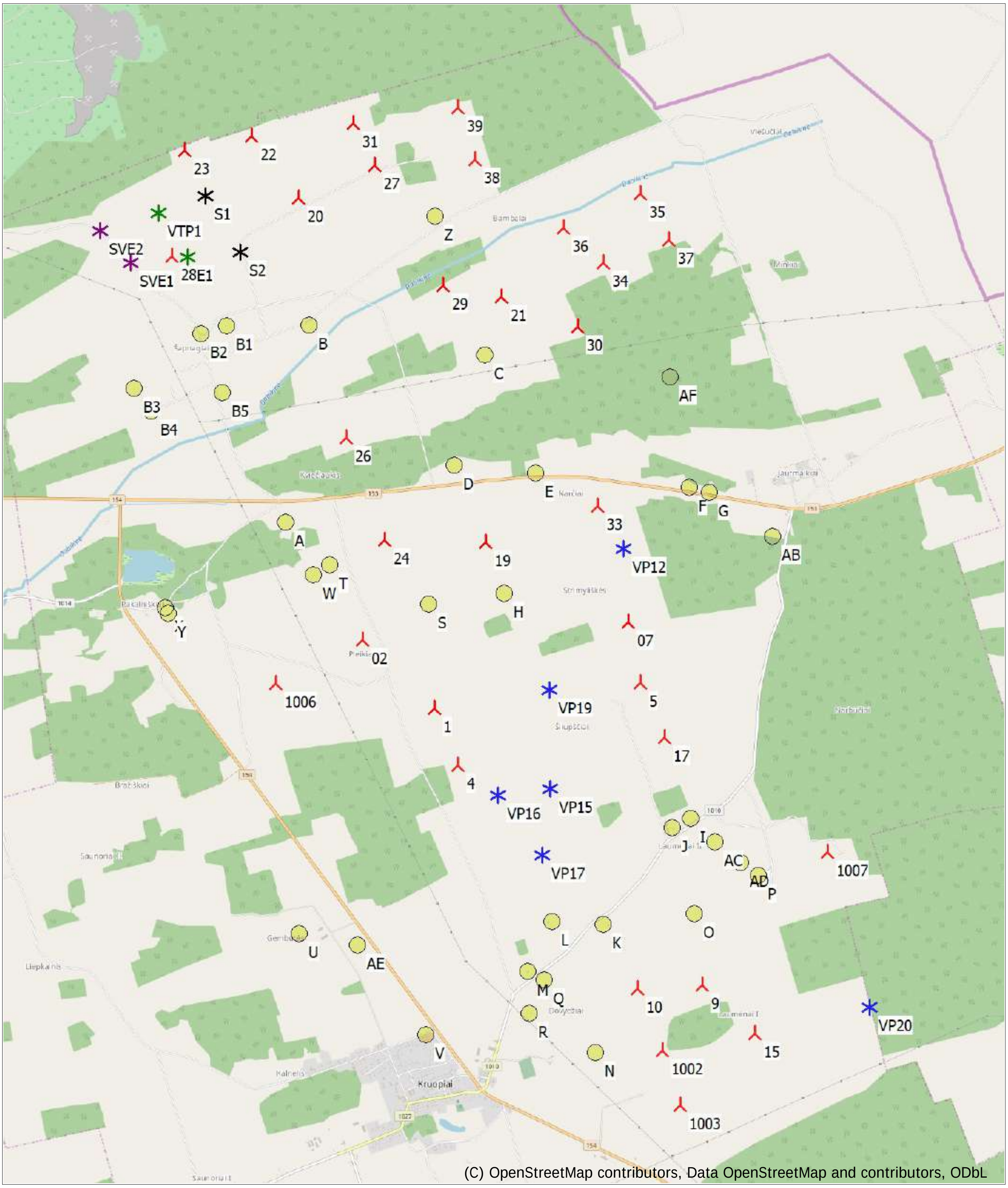
Viktorija / viktorija.leskauskaite@nomineconsult.com

Calculated:
2022-04-13 12:46/3.4.424

SHADOW - Map

Calculation: Še š eliai 5 v. suminis su priemonemis



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 347 North: 6 238 916

New WTG | Existing WTG | Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-12 13:34/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 6 v.

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

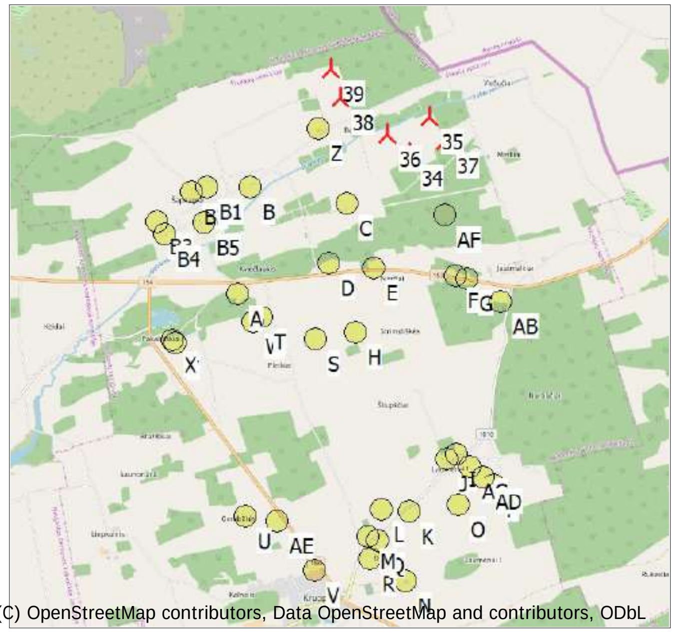
Sunshine probability S (Average daily sunshine hours) [KAUNAS]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m



All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

Scale 1:125 000
New WTG Shadow receptor

WTGs

	Y	X	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data Calculation distance [m]	RPM [RPM]
34	440 449	6 241 981	75,0	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
35	440 792	6 242 597	76,1	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
36	440 096	6 242 301	75,0	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
37	441 041	6 242 183	75,0	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
38	439 317	6 242 928	77,4	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
39	439 169	6 243 391	78,1	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0

Shadow receptor-Input

No.	Y	X	Z [m]	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

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Calculated:
2022-04-12 13:34/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 6 v.

...continued from previous page

No.	Y	X	Z [m]	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year [h/year]
A	0:00
AB	0:00
AC	0:00
AD	0:00
AE	0:00
AF	0:00
B	0:00
B1	0:00
B2	0:00
B3	0:00
B4	0:00
B5	0:00
C	9:16
D	0:00
E	0:00
F	0:00
G	0:00
H	0:00
I	0:00
J	0:00
K	0:00
L	0:00
M	0:00
N	0:00
O	0:00
P	0:00
Q	0:00
R	0:00
S	0:00
T	0:00
U	0:00
V	0:00
W	0:00
X	0:00
Y	0:00
Z	8:13

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
34	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (743)	19:07	5:11
35	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (744)	6:43	1:51
36	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (748)	17:32	4:22

To be continued on next page...

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Calculated:
2022-04-12 13:34/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 6 v.

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
37	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (745)	17:55	6:05
38	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (746)	0:00	0:00
39	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (747)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:
Akmene

Description:
Šešeliai 6 v.

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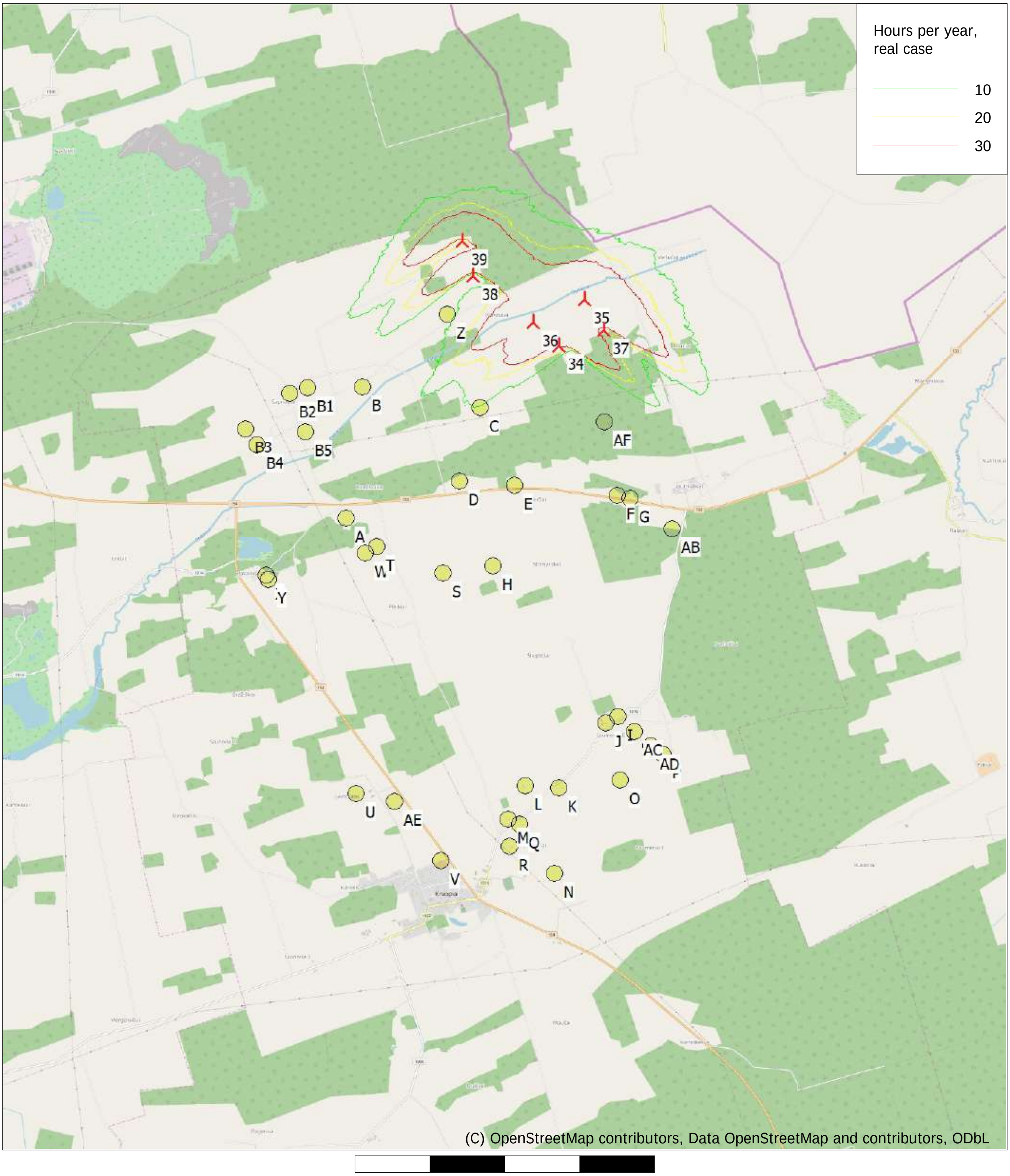
Calculated:
2022-04-12 13:34/3.4.424

SHADOW - Map

Calculation: Šešeliai 6 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project:
Akmene

Description:
Š e š eliai 6 v. suminis

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Calculated:
2022-04-13 11:00/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 6 v. suminis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

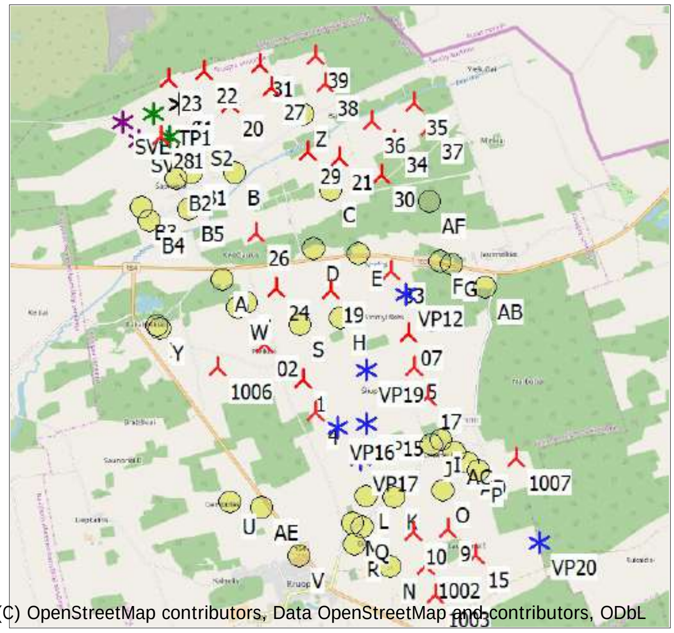
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
35	440 792	6 242 597	76,1	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
36	440 096	6 242 301	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
37	441 041	6 242 183	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
38	439 317	6 242 928	77,4	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
39	439 169	6 243 391	78,1	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4

To be continued on next page...

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Calculated:
2022-04-13 11:00/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 6 v. suminis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year [h/year]
A	10:37
AB	9:55
AC	15:19
AD	22:53
AE	3:48

To be continued on next page...

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Calculated:
2022-04-13 11:00/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 6 v. suminis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]
AF	20:50
B	18:42
B1	11:36
B2	1:44
B3	1:15
B4	1:46
B5	4:33
C	31:33
D	29:25
E	31:46
F	19:18
G	15:46
H	39:22
I	12:39
J	17:58
K	15:25
L	9:13
M	9:19
N	43:24
O	32:13
P	46:44
Q	13:52
R	15:01
S	28:07
T	39:53
U	0:00
V	1:26
W	35:06
X	4:20
Y	4:48
Z	33:10

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39	29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41	14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12	10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57	46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04	33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17	8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57	11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51	61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16	8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14	0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17	23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09	4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17	10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46	3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00	0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21	56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13	28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00	0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57	6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24	18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10	33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00	0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38	42:05
34	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (743)	19:07	5:11
35	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (744)	6:43	1:51
36	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (748)	17:32	4:22
37	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (745)	17:55	6:05
38	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (746)	0:00	0:00

To be continued on next page...

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Calculated:
2022-04-13 11:00/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 6 v. suminis

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
39	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (747)	0:00	0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06	1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50	4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57	38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19	0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00	0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15	1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17	5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15	2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51	35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44	15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04	4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27	18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17	7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00	3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Šešeliai 6 v. suminis

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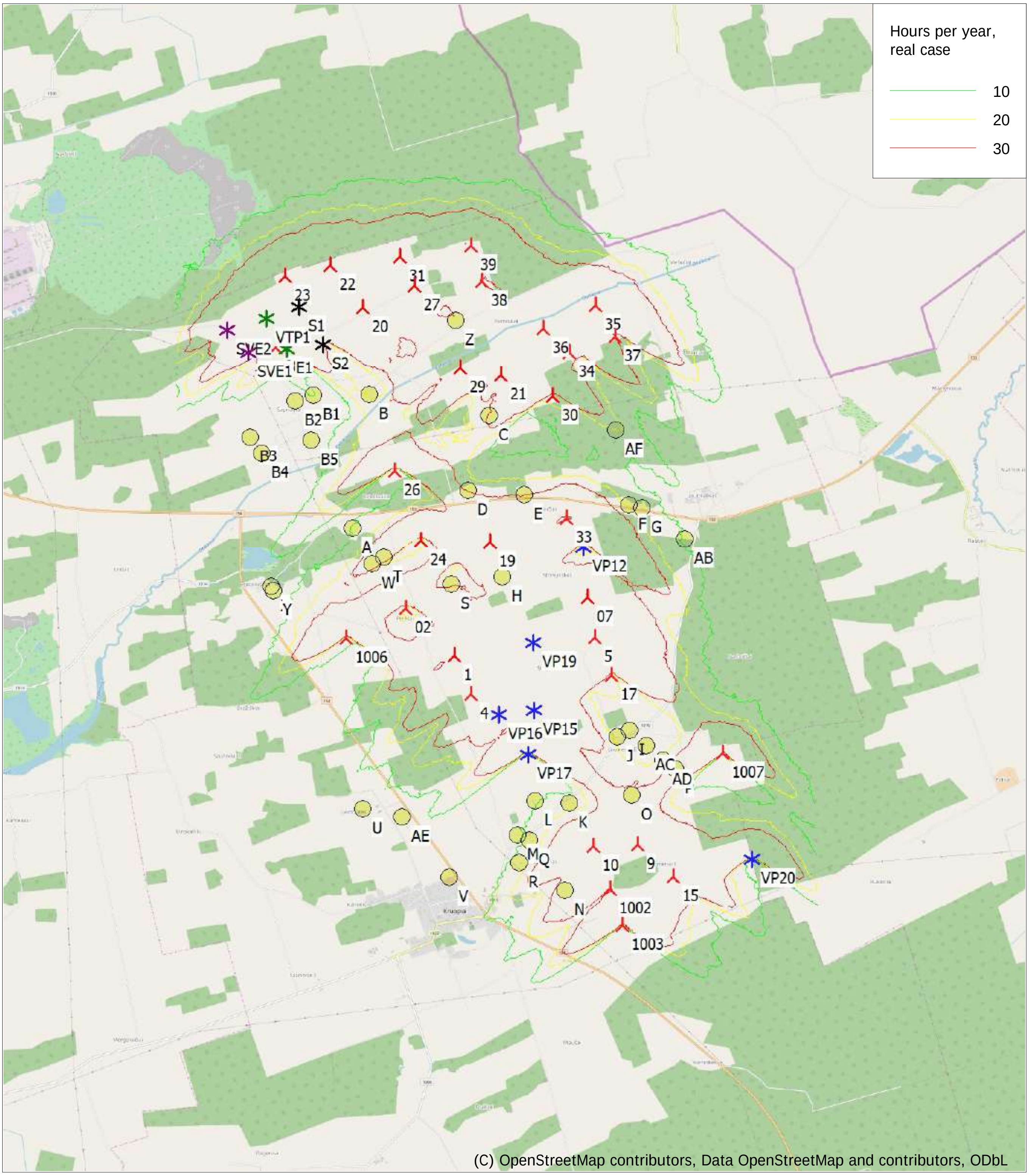
Calculated:
2022-04-13 11:00/3.4.424

SHADOW - Map

Calculation: Šešeliai 6 v. suminis



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Existing WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project:
Akmene

Description:
Š e š eliai 6 v. suminis su priemonemis

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Calculated:
2022-04-13 14:17/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 6 v. suminis su priemonemis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

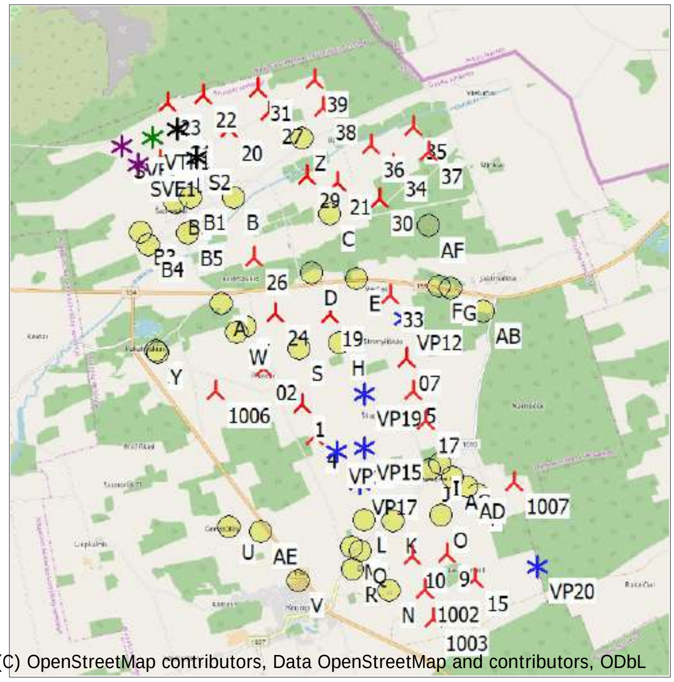
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

Flicker curtailment by stopping specific turbines

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
35	440 792	6 242 597	76,1	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
36	440 096	6 242 301	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
37	441 041	6 242 183	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
38	439 317	6 242 928	77,4	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
39	439 169	6 243 391	78,1	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	2 031	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0

To be continued on next page...

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Calculated:
2022-04-13 14:17/3.4.424

SHADOW - Main Result

Calculation: Šeš eliai 6 v. suminis su priemonemis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year	Avoided hours per year
	[h/year]	[h/year]
A	10:37	
AB	9:55	
AC	15:19	

To be continued on next page...

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Calculated:
2022-04-13 14:17/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 6 v. suminis su priemonemis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]	Avoided hours per year [h/year]
AD	22:53	
AE	3:48	
AF	20:50	
B	18:42	
B1	11:36	
B2	1:44	
B3	1:15	
B4	1:46	
B5	4:33	
C*	25:32	6:05
D	29:25	
E	31:46	
F	19:18	
G	15:46	
H	39:22	
I	12:39	
J	17:58	
K	15:25	
L	9:13	
M	9:19	
N	43:24	
O	32:13	
P	46:44	
Q	13:52	
R	15:01	
S	28:07	
T	39:53	
U	0:00	
V	1:26	
W	35:06	
X	4:20	
Y	4:48	
Z*	28:55	4:22

* Receptors where shadow flicker is reduced by curtailment

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39		29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41		14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12		10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57		46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04		33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17		8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57		11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51		61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16		8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14		0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17		23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09		4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17		10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46		3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00		0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21		56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13		28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00		0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57		6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24		18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10		33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00		0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38		42:05
34	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (743)	19:07		5:11

To be continued on next page...

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Calculated:
2022-04-13 14:17/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 6 v. suminis su priemonemis

...continued from previous page

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
35	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (744)	6:43		1:51
36	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (748)	0:00	17:32	0:00
37	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (745)	0:00	17:55	0:00
38	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (746)	0:00		0:00
39	VESTAS V162-7.2 7200 162.0 !O! hub: 159,0 m (TOT: 240,0 m) (747)	0:00		0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06		1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50		4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57		38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19		0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00		0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15		1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17		5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15		2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51		35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44		15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04		4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27		18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17		7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00		3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00		0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

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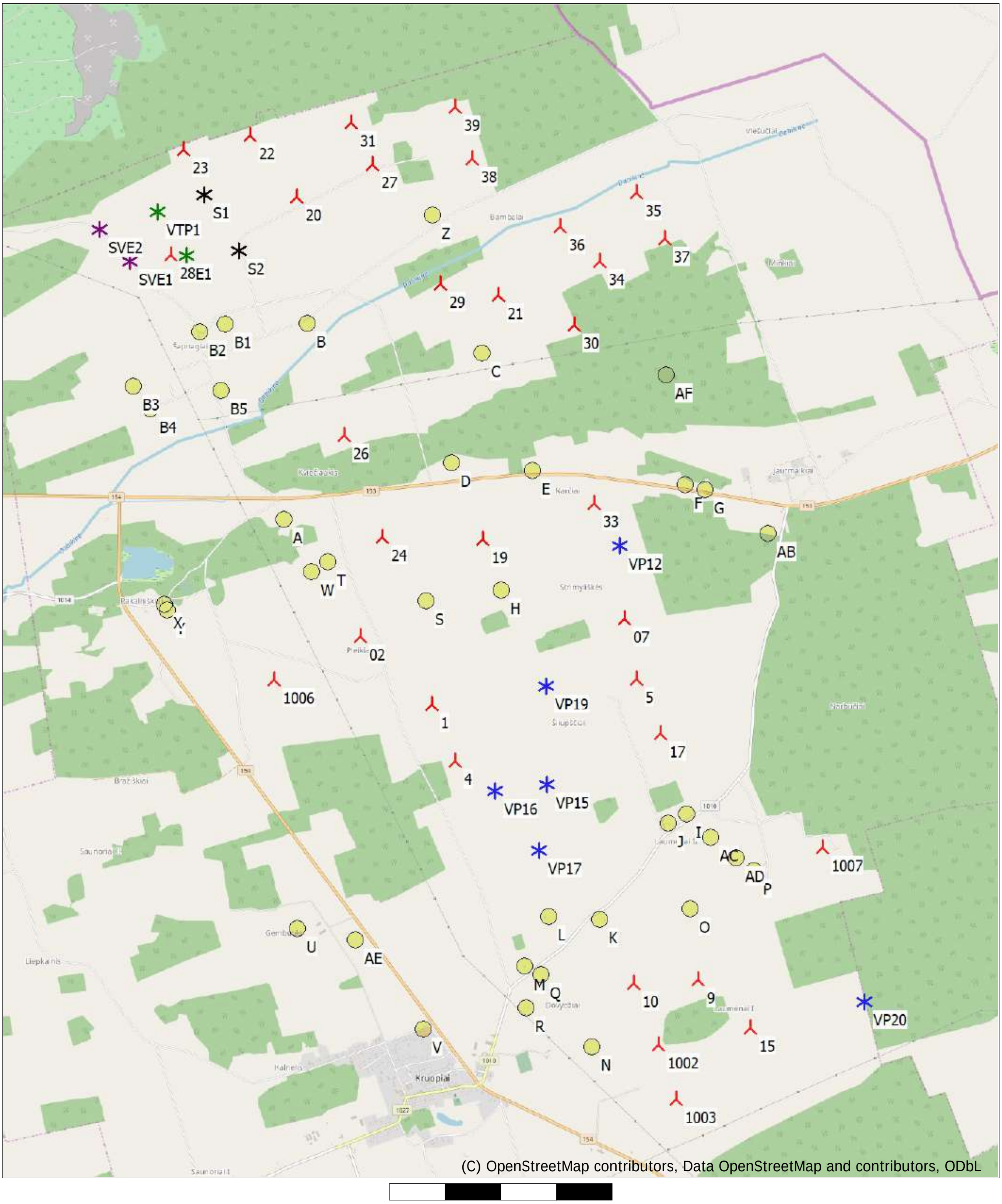
Calculated:
2022-04-13 14:17/3.4.424

SHADOW - Map

Calculation: Še š eliai 6 v. suminis su priemonemis



Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 347 North: 6 238 916

New WTG   Existing WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Project:
Akmene

Description:
Šešeliai 7 v.

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Calculated:
2022-04-12 13:37/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 7 v.

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

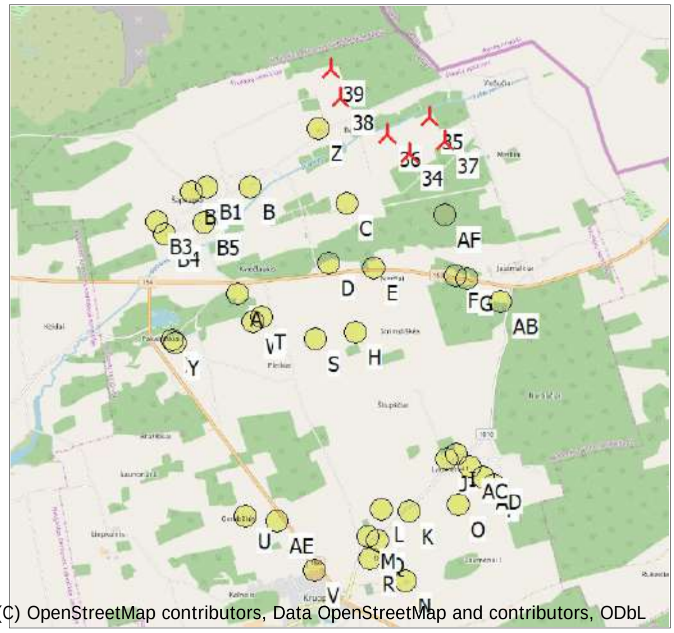
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
34	440 449	6 241 981	75,0	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
35	440 792	6 242 597	76,1	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
36	440 096	6 242 301	75,0	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
37	441 041	6 242 183	75,0	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
38	439 317	6 242 928	77,4	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
39	439 169	6 243 391	78,1	VESTAS V162-7.2 7200 162.0 !O! h...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

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2022-04-12 13:37/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 7 v.

...continued from previous page

No.	Y	X	Z [m]	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year [h/year]
A	0:00
AB	0:00
AC	0:00
AD	0:00
AE	0:00
AF	0:00
B	0:00
B1	0:00
B2	0:00
B3	0:00
B4	0:00
B5	0:00
C	9:18
D	0:00
E	0:00
F	0:00
G	0:00
H	0:00
I	0:00
J	0:00
K	0:00
L	0:00
M	0:00
N	0:00
O	0:00
P	0:00
Q	0:00
R	0:00
S	0:00
T	0:00
U	0:00
V	0:00
W	0:00
X	0:00
Y	0:00
Z	8:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
34	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (749)	21:39	6:04
35	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (750)	6:23	1:45
36	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (754)	17:35	4:22

To be continued on next page...

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SHADOW - Main Result

Calculation: Šešeliai 7 v.

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
37	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (751)	15:03	5:08
38	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (752)	0:00	0:00
39	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (753)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Š e š eliai 7 v.

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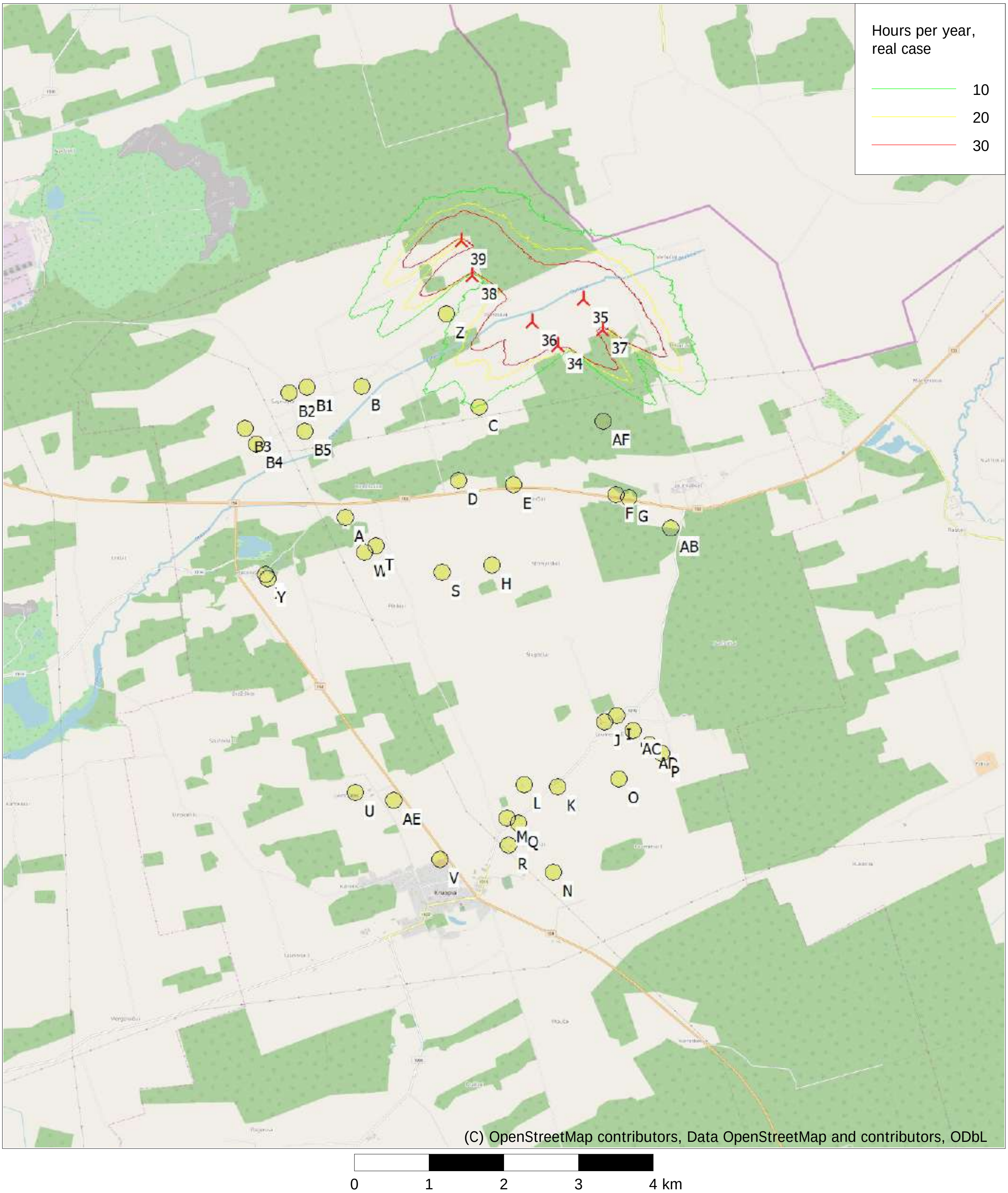
Calculated:
2022-04-12 13:37/3.4.424

SHADOW - Map

Calculation: Š e š eliai 7 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-13 11:22/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 7 v. suminis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

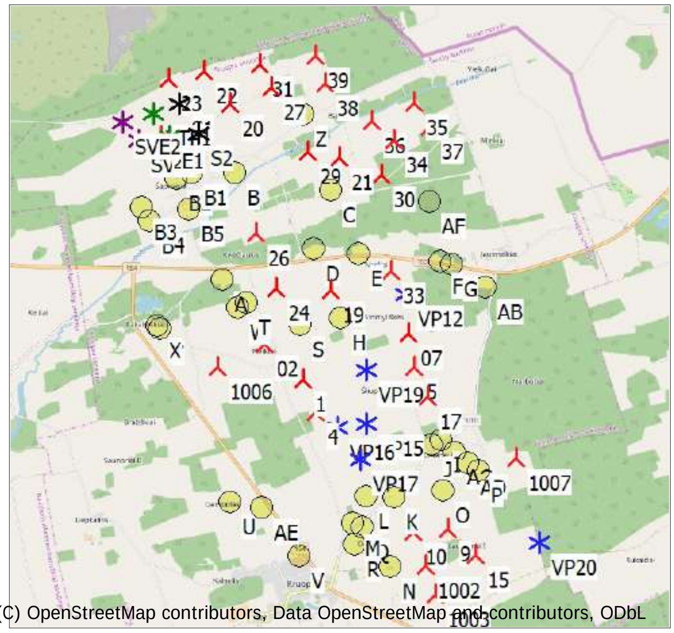
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
35	440 792	6 242 597	76,1	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
36	440 096	6 242 301	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
37	441 041	6 242 183	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
38	439 317	6 242 928	77,4	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
39	439 169	6 243 391	78,1	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4

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Calculated:
2022-04-13 11:22/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 7 v. suminis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type						Shadow data	
					Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year
	[h/year]
A	10:37
AB	9:55
AC	15:19
AD	22:53
AE	3:48

To be continued on next page...

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Calculated:
2022-04-13 11:22/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 7 v. suminis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]
AF	20:50
B	18:42
B1	11:36
B2	1:44
B3	1:15
B4	1:46
B5	4:33
C	31:35
D	29:25
E	31:46
F	19:18
G	15:46
H	39:22
I	12:39
J	17:58
K	15:25
L	9:13
M	9:19
N	43:24
O	32:13
P	46:44
Q	13:52
R	15:01
S	28:07
T	39:53
U	0:00
V	1:26
W	35:06
X	4:20
Y	4:48
Z	32:58

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39	29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41	14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12	10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57	46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04	33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17	8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57	11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51	61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16	8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14	0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17	23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09	4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17	10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46	3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00	0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21	56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13	28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00	0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57	6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24	18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10	33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00	0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38	42:05
34	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (749)	21:39	6:04
35	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (750)	6:23	1:45
36	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (754)	17:35	4:22
37	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (751)	15:03	5:08
38	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (752)	0:00	0:00

To be continued on next page...

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Calculated:
2022-04-13 11:22/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 7 v. suminis

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
39	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (753)	0:00	0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06	1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50	4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57	38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19	0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00	0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15	1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17	5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15	2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51	35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44	15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04	4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27	18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17	7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00	3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

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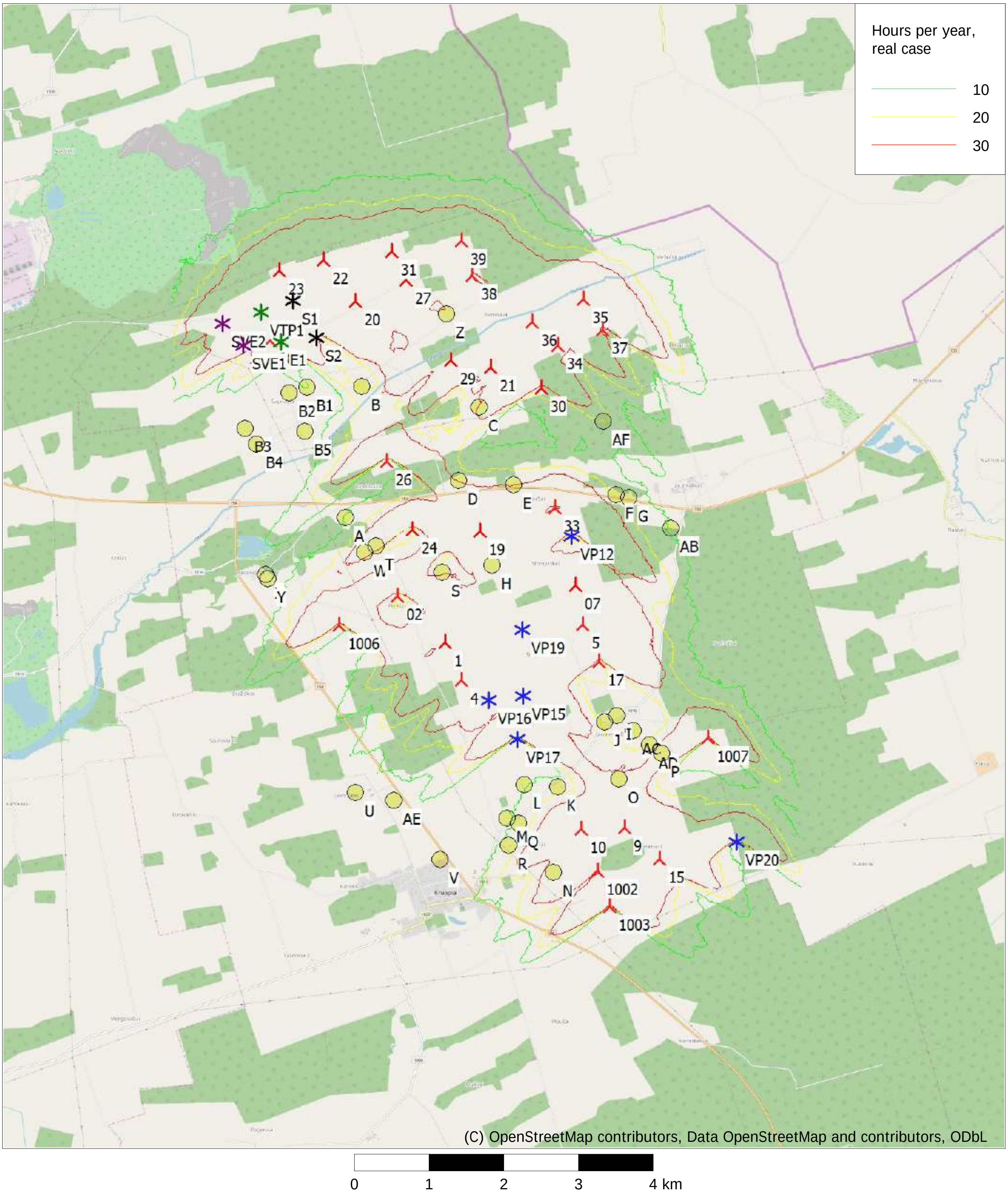
Calculated:
2022-04-13 11:22/3.4.424

SHADOW - Map

Calculation: Šešeliai 7 v. suminis



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Existing WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-13 14:24/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 7 v. suminis su priemonemis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

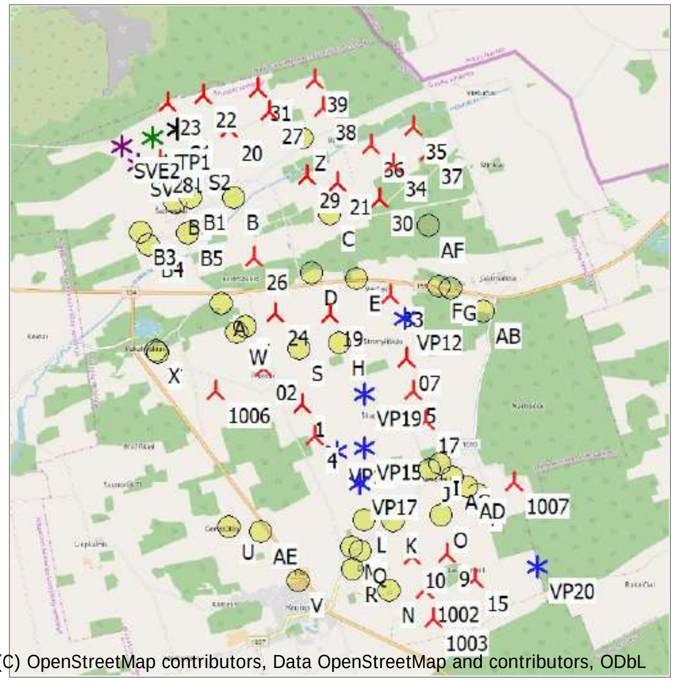
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

Flicker curtailment by stopping specific turbines

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
35	440 792	6 242 597	76,1	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
36	440 096	6 242 301	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
37	441 041	6 242 183	75,0	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
38	439 317	6 242 928	77,4	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
39	439 169	6 243 391	78,1	VESTAS V162-7.2 72...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	2 032	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0

To be continued on next page...

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Calculated:
2022-04-13 14:24/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 7 v. suminis su priemonemis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year	Avoided hours per year
	[h/year]	[h/year]
A	10:37	
AB	9:55	
AC	15:19	

To be continued on next page...

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Calculated:
2022-04-13 14:24/3.4.424

SHADOW - Main Result

Calculation: Še š eliai 7 v. suminis su priemonemis

...continued from previous page

No.	Shadow, expected values: Shadow hours per year [h/year]	Avoided hours per year [h/year]
AD	22:53	
AE	3:48	
AF	20:50	
B	18:42	
B1	11:36	
B2	1:44	
B3	1:15	
B4	1:46	
B5	4:33	
C*	26:30	5:08
D	29:25	
E	31:46	
F	19:18	
G	15:46	
H	39:22	
I	12:39	
J	17:58	
K	15:25	
L	9:13	
M	9:19	
N	43:24	
O	32:13	
P	46:44	
Q	13:52	
R	15:01	
S	28:07	
T	39:53	
U	0:00	
V	1:26	
W	35:06	
X	4:20	
Y	4:48	
Z*	28:43	4:22

* Receptors where shadow flicker is reduced by curtailment

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39		29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41		14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12		10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57		46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04		33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17		8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57		11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51		61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16		8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14		0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17		23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09		4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17		10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46		3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00		0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21		56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13		28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00		0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57		6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24		18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10		33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00		0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38		42:05
34	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (749)	21:39		6:04

To be continued on next page...

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Calculated:
2022-04-13 14:24/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 7 v. suminis su priemonemis

...continued from previous page

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
35	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (750)	6:23		1:45
36	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (754)	0:00	17:35	0:00
37	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (751)	0:00	15:03	0:00
38	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (752)	0:00		0:00
39	VESTAS V162-7.2 7200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (753)	0:00		0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06		1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50		4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57		38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19		0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00		0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15		1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17		5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15		2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51		35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44		15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04		4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27		18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17		7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00		3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00		0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Šešeliai 7 v. suminis su priemonemis

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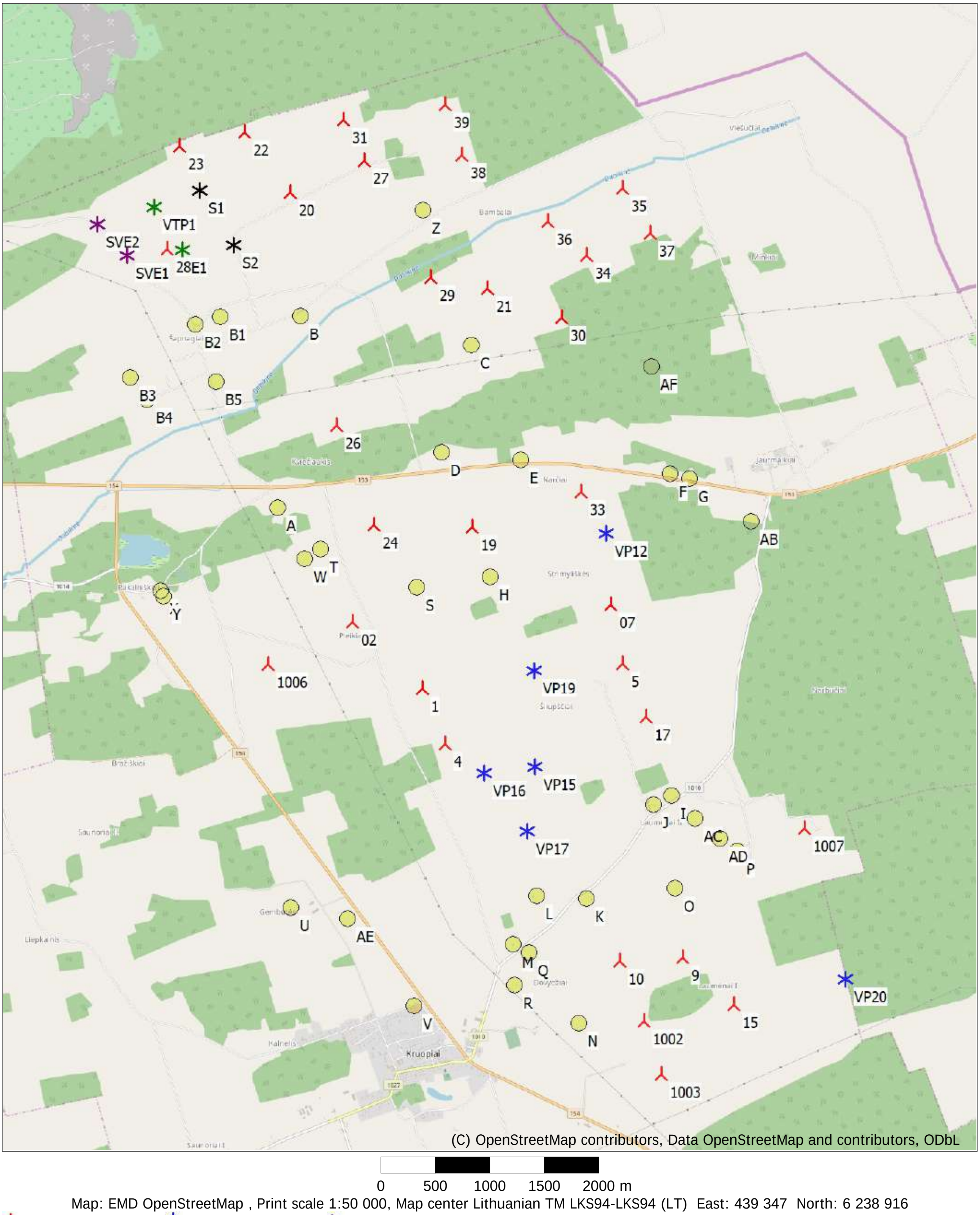
Calculated:
2022-04-13 14:24/3.4.424

SHADOW - Map

Calculation: Šešeliai 7 v. suminis su priemonemis



Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 347 North: 6 238 916

New WTG Existing WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

SHADOW - Main Result

Calculation: Šešeliai 8 v.

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

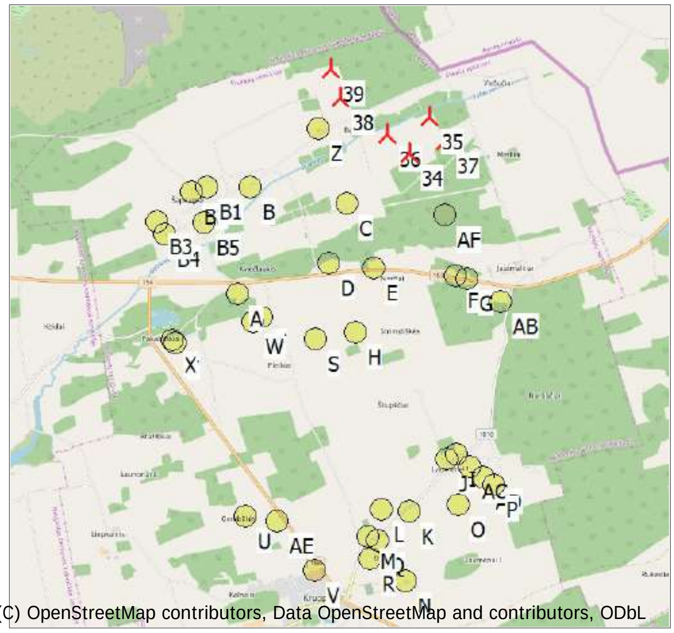
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG
Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
34	440 449	6 241 981	75,0	GE WIND ENERGY 6.1-158...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
35	440 792	6 242 597	76,1	GE WIND ENERGY 6.1-158...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
36	440 096	6 242 301	75,0	GE WIND ENERGY 6.1-158...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
37	441 041	6 242 183	75,0	GE WIND ENERGY 6.1-158...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
38	439 317	6 242 928	77,4	GE WIND ENERGY 6.1-158...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
39	439 169	6 243 391	78,1	GE WIND ENERGY 6.1-158...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

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Calculated:
2022-04-12 13:45/3.4.424

SHADOW - Main Result

Calculation: Še š eliai 8 v.

...continued from previous page

No.	Y	X	Z [m]	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year [h/year]
A	0:00
AB	0:00
AC	0:00
AD	0:00
AE	0:00
AF	0:00
B	1:14
B1	0:00
B2	0:00
B3	0:00
B4	0:00
B5	0:00
C	8:35
D	0:00
E	0:00
F	0:00
G	0:00
H	0:00
I	0:00
J	0:00
K	0:00
L	0:00
M	0:00
N	0:00
O	0:00
P	0:00
Q	0:00
R	0:00
S	0:00
T	0:00
U	0:00
V	0:00
W	0:00
X	0:00
Y	0:00
Z	8:15

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
34	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (755)	17:07	4:34
35	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (756)	6:30	1:48
36	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (760)	20:25	5:24

To be continued on next page...

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Calculated:
2022-04-12 13:45/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 8 v.

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
37	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (757)	21:49	6:59
38	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (758)	0:00	0:00
39	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (759)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Šeš eliai 8 v.

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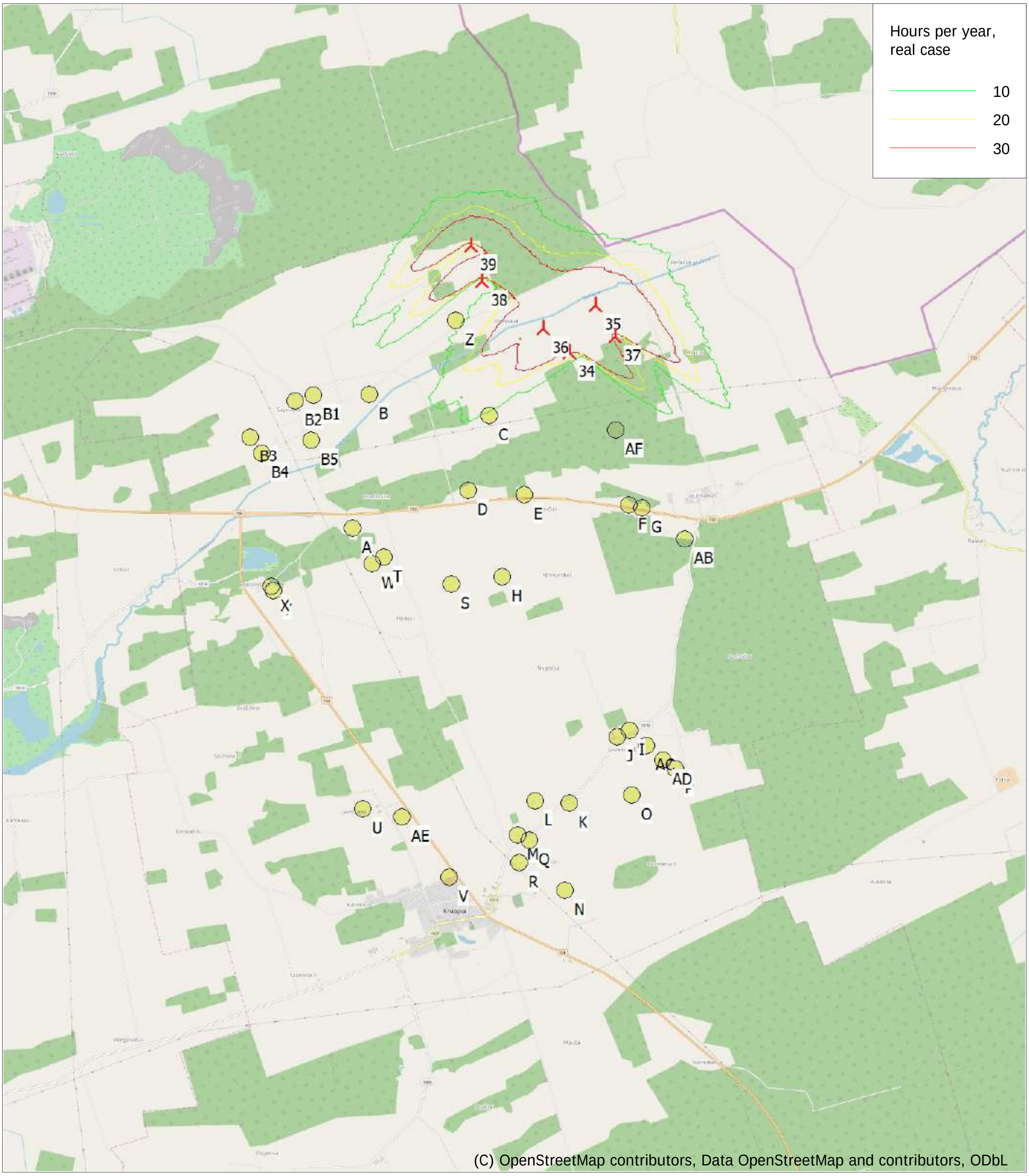
Calculated:
2022-04-12 13:45/3.4.424

SHADOW - Map

Calculation: Šeš eliai 8 v.



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

SHADOW - Main Result

Calculation: Š e š eliai 8 v. suminis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

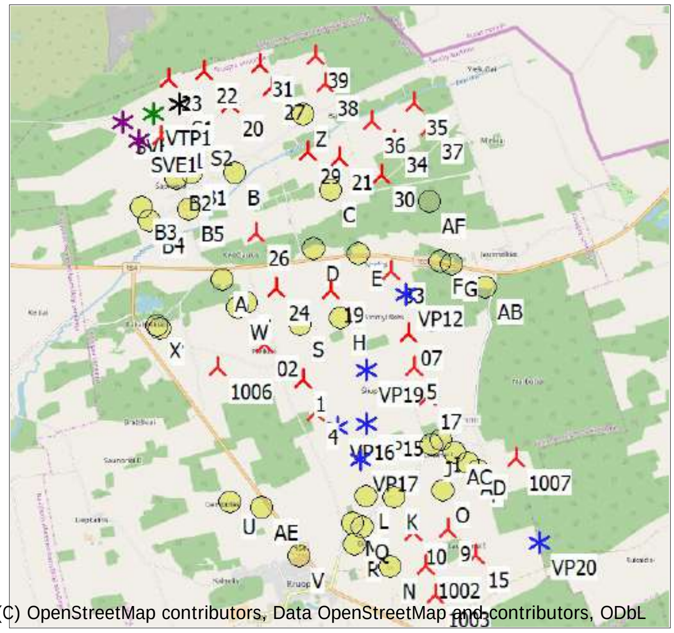
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
35	440 792	6 242 597	76,1	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
36	440 096	6 242 301	75,0	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
37	441 041	6 242 183	75,0	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
38	439 317	6 242 928	77,4	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
39	439 169	6 243 391	78,1	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.70...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9

To be continued on next page...

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Calculated:
2022-04-13 11:29/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 8 v. suminis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.70...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year
	[h/year]
A	10:37
AB	9:55
AC	15:19
AD	22:53
AE	3:48
AF	20:50

To be continued on next page...

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Calculated:
2022-04-13 11:29/3.4.424

SHADOW - Main Result

Calculation: Še š eliai 8 v. suminis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]
B	19:52
B1	11:36
B2	1:44
B3	1:15
B4	1:46
B5	4:33
C	30:53
D	29:25
E	31:46
F	19:18
G	15:46
H	39:22
I	12:39
J	17:58
K	15:25
L	9:13
M	9:19
N	43:24
O	32:13
P	46:44
Q	13:52
R	15:01
S	28:07
T	39:53
U	0:00
V	1:26
W	35:06
X	4:20
Y	4:48
Z	33:12

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39	29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41	14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12	10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57	46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04	33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17	8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57	11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51	61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16	8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14	0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17	23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09	4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17	10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46	3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00	0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21	56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13	28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00	0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57	6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24	18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10	33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00	0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38	42:05
34	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (755)	17:07	4:34
35	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (756)	6:30	1:48
36	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (760)	20:25	5:24
37	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (757)	21:49	6:59
38	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (758)	0:00	0:00
39	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (759)	0:00	0:00

To be continued on next page...

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Calculated:
2022-04-13 11:29/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 8 v. suminis

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06	1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50	4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57	38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19	0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00	0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15	1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17	5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15	2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51	35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44	15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04	4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27	18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17	7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00	3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:
Akmene

Description:
Šeš eliai 8 v. suminis

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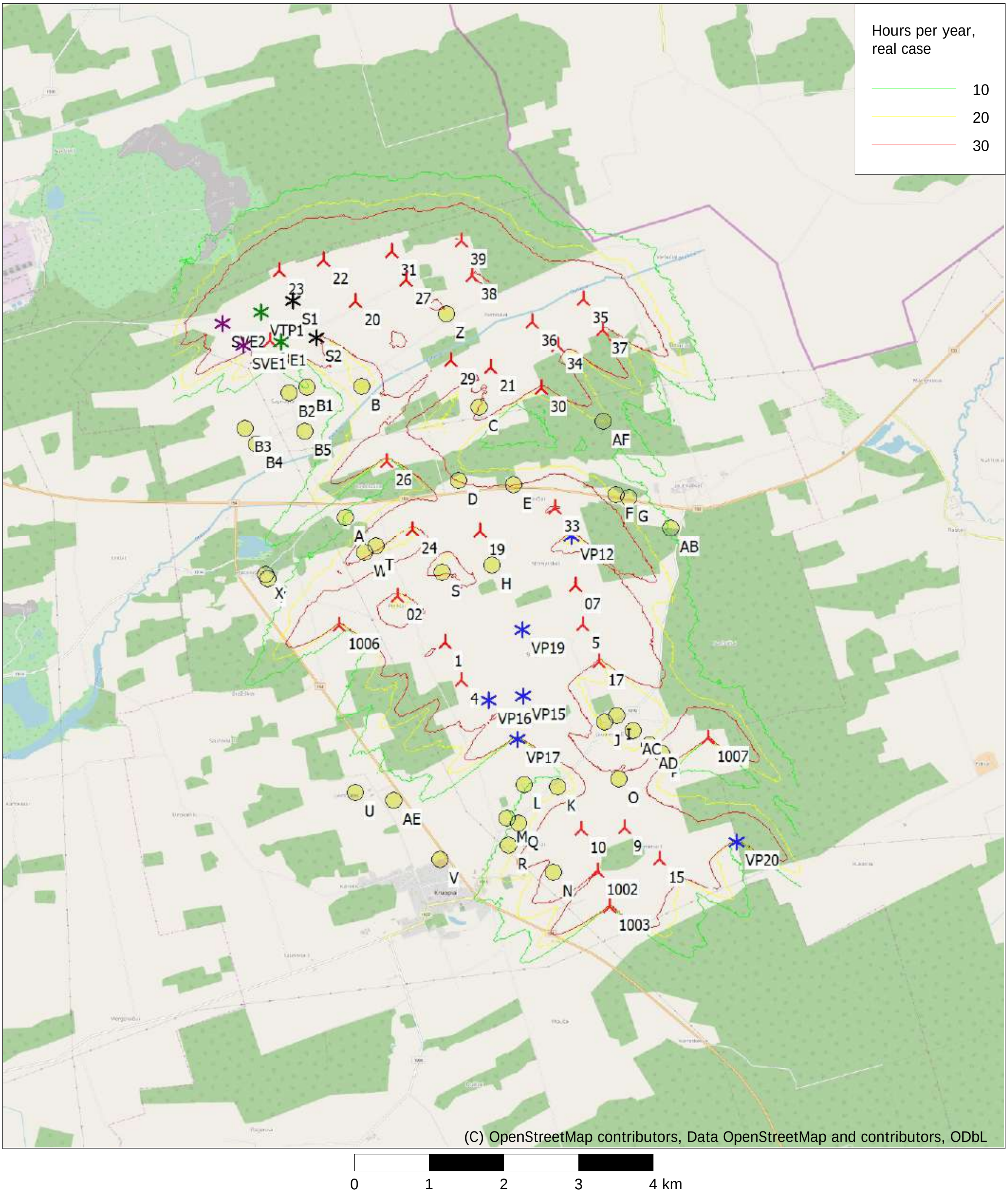
Calculated:
2022-04-13 11:29/3.4.424

SHADOW - Map

Calculation: Šeš eliai 8 v. suminis



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Existing WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-13 14:28/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 8 v. suminis su priemonemis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

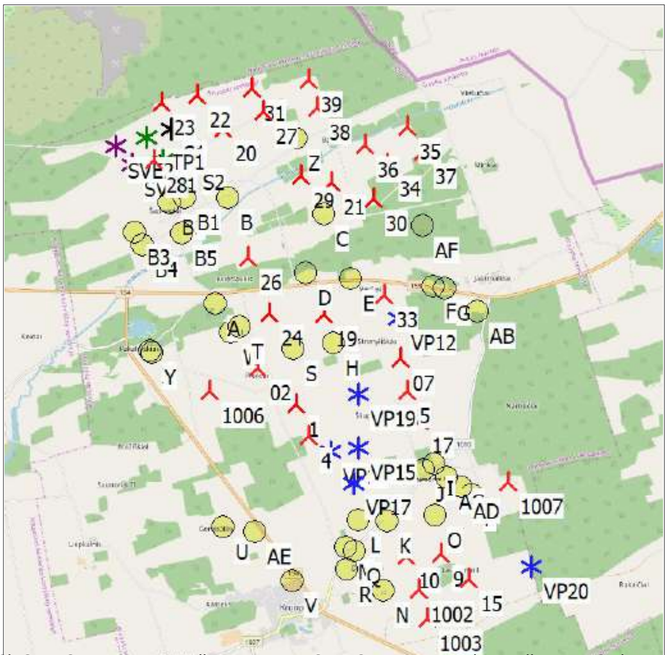
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

Flicker curtailment by stopping specific turbines

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



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Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
35	440 792	6 242 597	76,1	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
36	440 096	6 242 301	75,0	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
37	441 041	6 242 183	75,0	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
38	439 317	6 242 928	77,4	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
39	439 169	6 243 391	78,1	GE WIND ENERGY 6....	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	2 500	9,9
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.70...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4

To be continued on next page...

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Calculated:
2022-04-13 14:28/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 8 v. suminis su priemonemis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.70...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values: Shadow hours per year [h/year]	Avoided hours per year [h/year]
A	10:37	
AB	9:55	
AC	15:19	
AD	22:53	

To be continued on next page...

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Calculated:
2022-04-13 14:28/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 8 v. suminis su priemonemis

...continued from previous page

Shadow, expected values

No.	Shadow hours per year [h/year]	Avoided hours per year [h/year]
AE	3:48	
AF	20:50	
B	19:52	
B1	11:36	
B2	1:44	
B3	1:15	
B4	1:46	
B5	4:33	
C*	25:00	5:56
D	29:25	
E	31:46	
F	19:18	
G	15:46	
H	39:22	
I	12:39	
J	17:58	
K	15:25	
L	9:13	
M	9:19	
N	43:24	
O	32:13	
P	46:44	
Q	13:52	
R	15:01	
S	28:07	
T	39:53	
U	0:00	
V	1:26	
W	35:06	
X	4:20	
Y	4:48	
Z*	29:48	3:30

* Receptors where shadow flicker is reduced by curtailment

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39		29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41		14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12		10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57		46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04		33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17		8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57		11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51		61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16		8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14		0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17		23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09		4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17		10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46		3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00		0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21		56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13		28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00		0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57		6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24		18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10		33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00		0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38		42:05
34	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (755)	17:07		4:34
35	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (756)	6:30		1:48

To be continued on next page...

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Calculated:
2022-04-13 14:28/3.4.424

SHADOW - Main Result

Calculation: Še šeliai 8 v. suminis su priemonemis

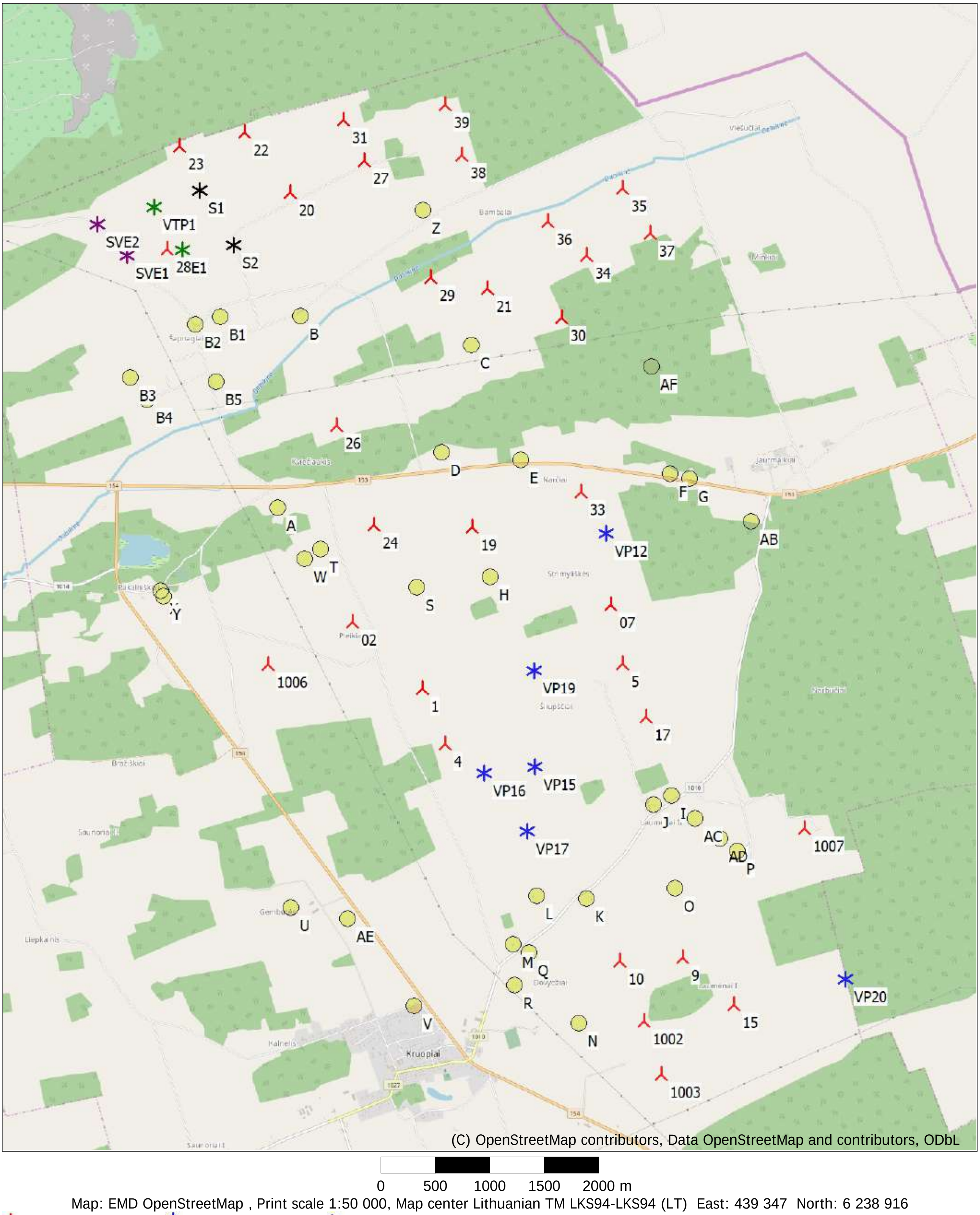
...continued from previous page

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
36	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (760)	3:43	16:42	1:14
37	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (757)	4:20	17:29	1:03
38	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (758)	0:00		0:00
39	GE WIND ENERGY 6.1-158 6100 158.0 !-! hub: 161,0 m (TOT: 240,0 m) (759)	0:00		0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06		1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50		4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57		38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19		0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00		0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15		1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17		5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15		2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51		35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44		15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04		4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27		18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17		7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00		3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00		0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

SHADOW - Map

Calculation: Šešeliai 8 v. suminis su priemonemis



Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 347 North: 6 238 916

New WTG — Existing WTG — Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-12 13:47/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 9 v.

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

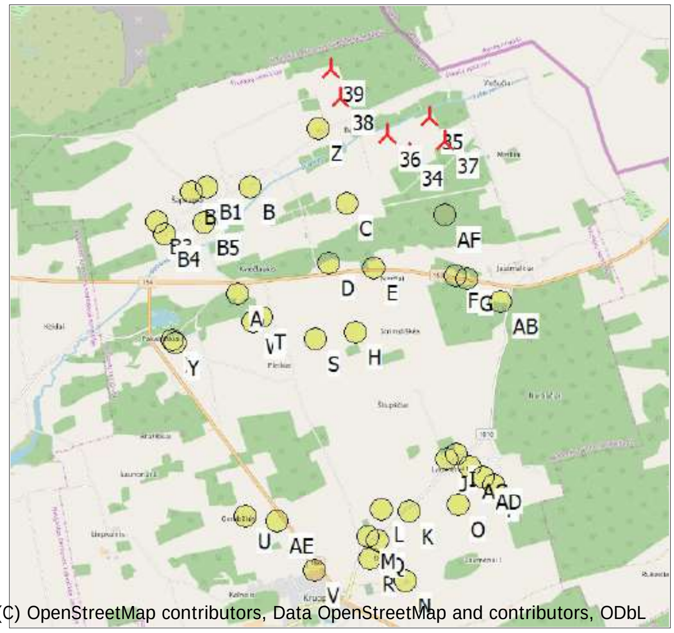
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
34	440 449	6 241 981	75,0	NORDEX N163/6.X 6800 163.0 !O! ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
35	440 792	6 242 597	76,1	NORDEX N163/6.X 6800 163.0 !O! ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
36	440 096	6 242 301	75,0	NORDEX N163/6.X 6800 163.0 !O! ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
37	441 041	6 242 183	75,0	NORDEX N163/6.X 6800 163.0 !O! ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
38	439 317	6 242 928	77,4	NORDEX N163/6.X 6800 163.0 !O! ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
39	439 169	6 243 391	78,1	NORDEX N163/6.X 6800 163.0 !O! ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

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Calculated:
2022-04-12 13:47/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 9 v.

...continued from previous page

No.	Y	X	Z [m]	Width [m]	Height [m]	Elevation a.g.l. [m]	Slope of window [°]	Direction mode	Eye height (ZVI) a.g.l. [m]
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

	Shadow, expected values
No.	Shadow hours per year [h/year]
A	0:00
AB	0:00
AC	0:00
AD	0:00
AE	0:00
AF	0:00
B	0:00
B1	0:00
B2	0:00
B3	0:00
B4	0:00
B5	0:00
C	3:17
D	0:00
E	0:00
F	0:00
G	0:00
H	0:00
I	0:00
J	0:00
K	0:00
L	0:00
M	0:00
N	0:00
O	0:00
P	0:00
Q	0:00
R	0:00
S	0:00
T	0:00
U	0:00
V	0:00
W	0:00
X	0:00
Y	0:00
Z	6:26

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
34	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (761)	19:30	5:18
35	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (762)	0:00	0:00
36	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (766)	17:46	4:25

To be continued on next page...

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Calculated:
2022-04-12 13:47/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 9 v.

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
37	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (763)	0:00	0:00
38	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (764)	0:00	0:00
39	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (765)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Š e š eliai 9 v.

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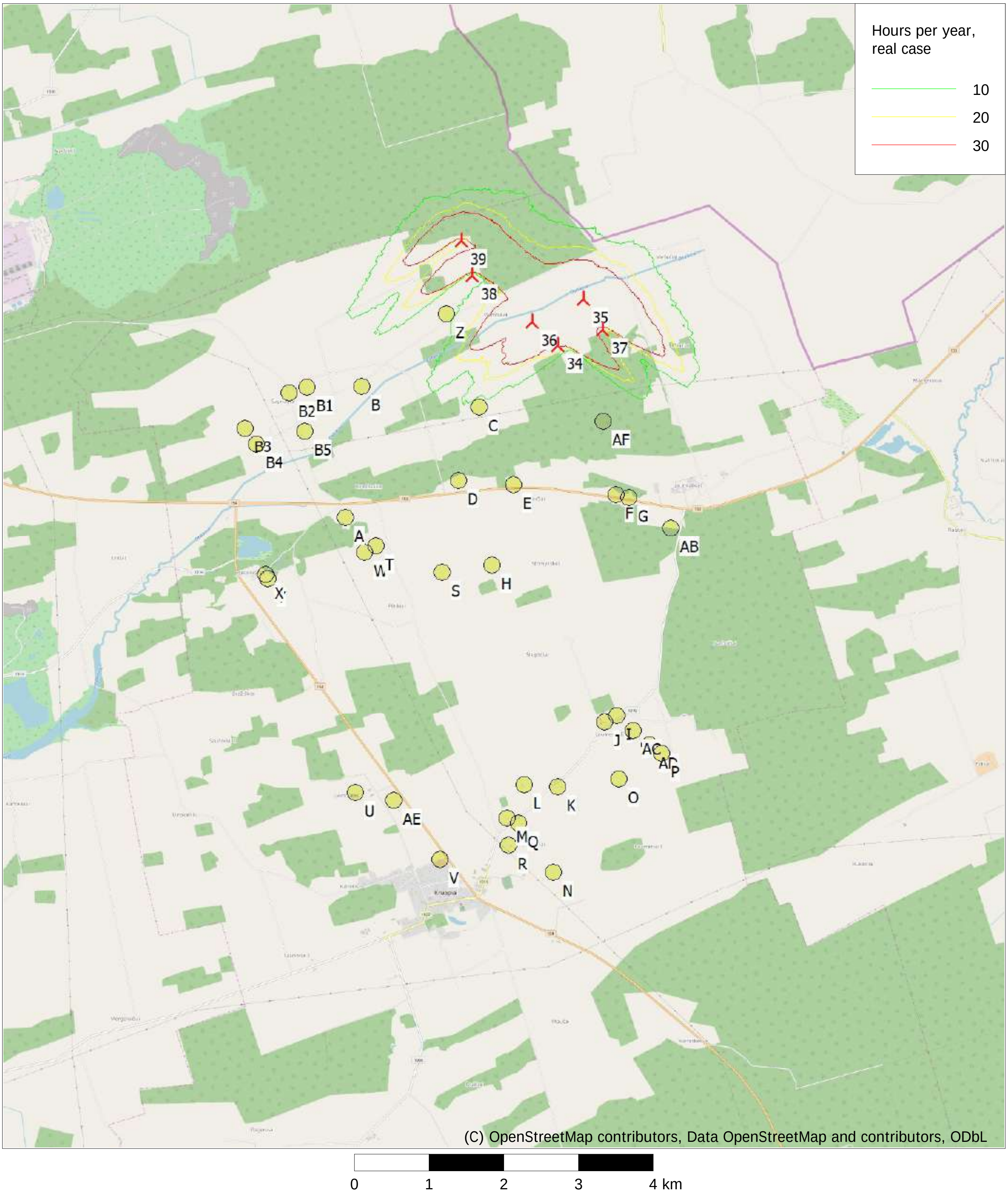
Calculated:
2022-04-12 13:47/3.4.424

SHADOW - Map

Calculation: Š e š eliai 9 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG   Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

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Calculated:
2022-04-13 14:37/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 9 v. suminis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

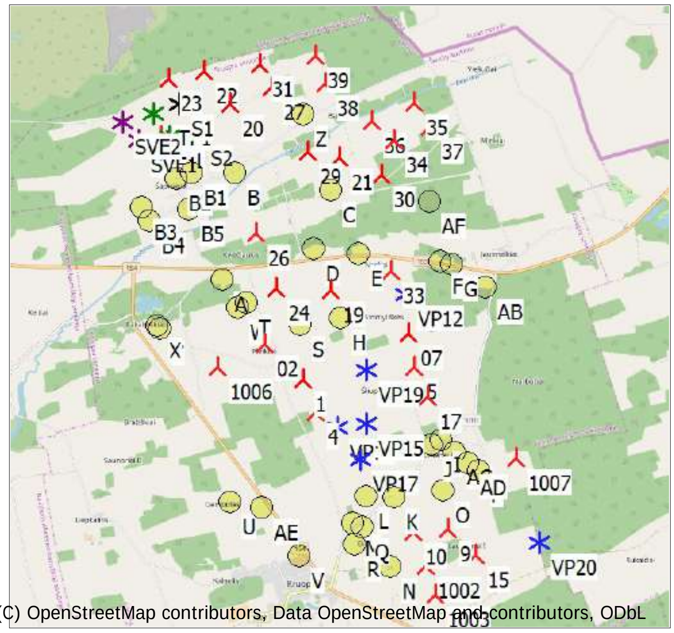
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
35	440 792	6 242 597	76,1	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
36	440 096	6 242 301	75,0	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
37	441 041	6 242 183	75,0	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
38	439 317	6 242 928	77,4	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
39	439 169	6 243 391	78,1	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4

To be continued on next page...

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Calculated:
2022-04-13 14:37/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 9 v. suminis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year
	[h/year]
A	10:37
AB	9:55
AC	15:19
AD	22:53
AE	3:48

To be continued on next page...

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Calculated:
2022-04-13 14:37/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 9 v. suminis

...continued from previous page

No.	Shadow, expected values Shadow hours per year [h/year]
AF	20:50
B	18:42
B1	11:36
B2	1:44
B3	1:15
B4	1:46
B5	4:33
C	25:38
D	29:25
E	31:46
F	19:18
G	15:46
H	39:22
I	12:39
J	17:58
K	15:25
L	9:13
M	9:19
N	43:24
O	32:13
P	46:44
Q	13:52
R	15:01
S	28:07
T	39:53
U	0:00
V	1:26
W	35:06
X	4:20
Y	4:48
Z	31:27

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39	29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41	14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12	10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57	46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04	33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17	8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57	11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51	61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16	8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14	0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17	23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09	4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17	10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46	3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00	0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21	56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13	28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00	0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57	6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24	18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10	33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00	0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38	42:05
34	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (761)	19:30	5:18
35	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (762)	0:00	0:00
36	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (766)	17:46	4:25
37	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (763)	0:00	0:00
38	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (764)	0:00	0:00

To be continued on next page...

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Calculated:
2022-04-13 14:37/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 9 v. suminis

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
39	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (765)	0:00	0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06	1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50	4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57	38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19	0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00	0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15	1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17	5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15	2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51	35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44	15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04	4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27	18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17	7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00	3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project: Akmene

Description: Še š eliai 9 v. suminis

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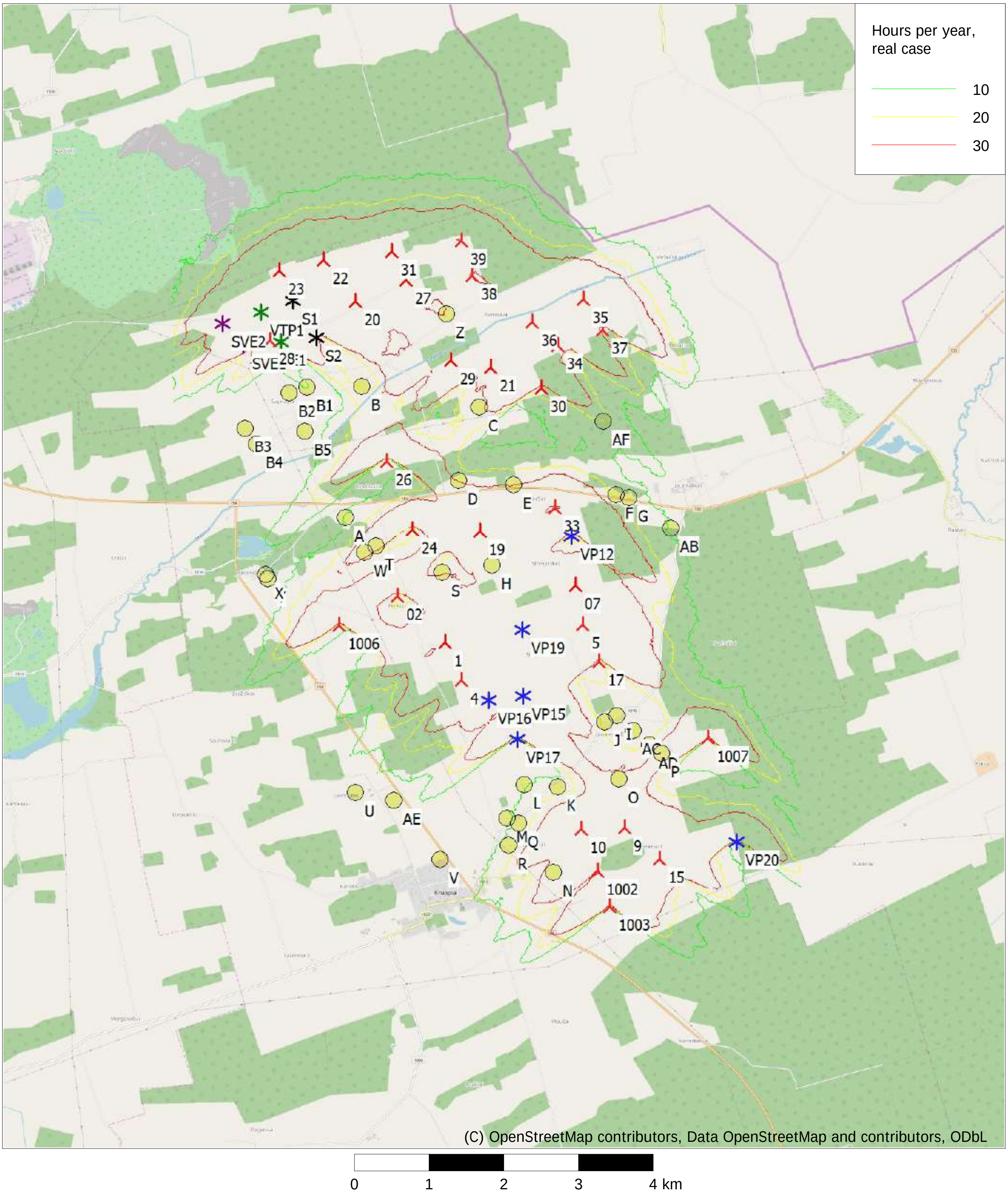
Calculated:
2022-04-13 14:37/3.4.424

SHADOW - Map

Calculation: Še š eliai 9 v. suminis



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 440 North: 6 238 710

New WTG Existing WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

SHADOW - Main Result

Calculation: Š e š eliai 9 v. suminis su priemonemis

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [KAUNAS]

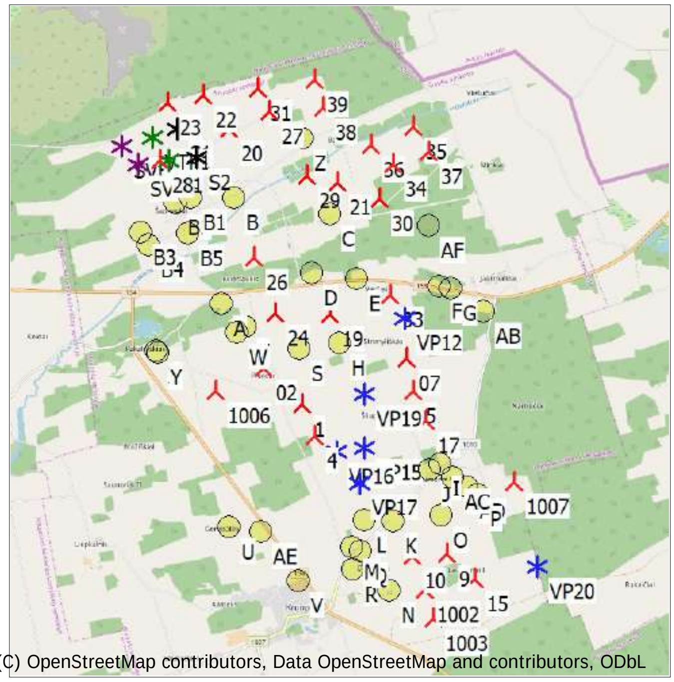
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,41	2,36	4,03	5,55	8,35	8,36	8,16	7,72	5,06	3,23	1,33	0,98

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
492	598	576	481	475	622	686	859	1 237	1 426	830	478	8 760

Flicker curtailment by stopping specific turbines

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Akmene_4.wpo (9)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m



Scale 1:125 000
New WTG   Existing WTG   Shadow receptor

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

WTGs

	Y	X	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data Calculation distance [m]	RPM [RPM]
02	438 245	6 238 645	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
07	440 630	6 238 767	76,4	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
1	438 883	6 238 023	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	2 039	0,0
10	440 668	6 235 489	84,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1002	440 878	6 234 931	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1003	441 032	6 234 442	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
1006	437 459	6 238 265	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
1007	442 387	6 236 687	84,5	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
15	441 716	6 235 075	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
17	440 942	6 237 733	80,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
19	439 365	6 239 502	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
20	437 732	6 242 608	76,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
21	439 534	6 241 694	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
22	437 317	6 243 164	77,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
23	436 719	6 243 042	78,2	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
24	438 456	6 239 538	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
26	438 129	6 240 455	75,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	2 038	8,8
27	438 416	6 242 886	76,6	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
28	436 585	6 242 096	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	1 915	10,8
29	439 012	6 241 800	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
30	440 217	6 241 414	75,0	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
31	438 230	6 243 267	77,1	VESTAS V162-6.2 62...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	2 039	0,0
33	440 370	6 239 809	77,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
34	440 449	6 241 981	75,0	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
35	440 792	6 242 597	76,1	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
36	440 096	6 242 301	75,0	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
37	441 041	6 242 183	75,0	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
38	439 317	6 242 928	77,4	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
39	439 169	6 243 391	78,1	NORDEX N163/6.X 6...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	1 819	0,0
4	439 084	6 237 509	75,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
5	440 728	6 238 225	77,4	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	135,0	2 040	8,8
9	441 252	6 235 510	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	115,0	2 041	8,8
E1	436 730	6 242 089	75,3	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	1 487	22,0

To be continued on next page...

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Calculated:
2022-04-13 15:09/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 9 v. suminis su priemonemis

...continued from previous page

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
S1	436 894	6 242 632	76,9	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
S2	437 205	6 242 132	75,3	VESTAS V150-4.0 40...	Yes	VESTAS	V150-4.0-4 000	4 000	150,0	166,0	1 901	10,4
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 L...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	1 439	16,9
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	2 039	8,8
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.7...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	1 487	22,0

Shadow receptor-Input

No.	Y	X	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
A	437 571	6 239 710	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AB	441 931	6 239 511	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AC	441 381	6 236 794	82,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AD	441 603	6 236 606	83,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AE	438 163	6 235 914	77,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
AF	441 037	6 240 954	76,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B	437 807	6 241 464	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B1	437 072	6 241 468	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B2	436 835	6 241 397	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B3	436 235	6 240 921	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B4	436 379	6 240 709	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
B5	437 026	6 240 873	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
C	439 385	6 241 172	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
D	439 090	6 240 187	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
E	439 819	6 240 110	75,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
F	441 191	6 239 964	78,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
G	441 377	6 239 919	79,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
H	439 520	6 239 040	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
I	441 169	6 237 006	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
J	440 999	6 236 920	80,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
K	440 367	6 236 063	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
L	439 906	6 236 095	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
M	439 682	6 235 655	81,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
N	440 278	6 234 919	85,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
O	441 183	6 236 157	82,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
P	441 763	6 236 484	84,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Q	439 830	6 235 577	81,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
R	439 694	6 235 286	83,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
S	438 848	6 238 952	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
T	437 966	6 239 316	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
U	437 637	6 236 022	75,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
V	438 766	6 235 103	80,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
W	437 811	6 239 233	75,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
X	436 480	6 238 962	77,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Y	436 508	6 238 909	76,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
Z	438 951	6 242 419	76,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

No.	Shadow, expected values Shadow hours per year	Avoided hours per year
	[h/year]	[h/year]
A	10:37	
AB	9:55	
AC	15:19	

To be continued on next page...

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Calculated:
2022-04-13 15:09/3.4.424

SHADOW - Main Result

Calculation: Šešeliai 9 v. suminis su priemonemis

...continued from previous page

Shadow, expected values

No.	Shadow hours per year [h/year]	Avoided hours per year [h/year]
AD	22:53	
AE	3:48	
AF	20:50	
B	18:42	
B1	11:36	
B2	1:44	
B3	1:15	
B4	1:46	
B5	4:33	
C	25:38	
D	29:25	
E	31:46	
F	19:18	
G	15:46	
H	39:22	
I	12:39	
J	17:58	
K	15:25	
L	9:13	
M	9:19	
N	43:24	
O	32:13	
P	46:44	
Q	13:52	
R	15:01	
S	28:07	
T	39:53	
U	0:00	
V	1:26	
W	35:06	
X	4:20	
Y	4:48	
Z*	27:09	4:25

* Receptors where shadow flicker is reduced by curtailment

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
02	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (639)	202:39		29:03
07	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (637)	102:41		14:20
1	VESTAS V162-6.2 6200 162.0 !O! hub: 139,0 m (TOT: 220,0 m) (640)	107:12		10:37
10	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (785)	303:57		46:07
1002	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (783)	154:04		33:01
1003	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (786)	58:17		8:08
1006	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (787)	92:57		11:50
1007	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (789)	199:51		61:56
15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (788)	53:16		8:12
17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (790)	9:14		0:58
19	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (635)	166:17		23:39
20	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (643)	17:09		4:53
21	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (636)	60:17		10:35
22	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (629)	9:46		3:03
23	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (632)	0:00		0:00
24	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (641)	213:21		56:16
26	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 155,0 m (TOT: 240,0 m) (792)	153:13		28:59
27	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (634)	0:00		0:00
28	Siemens Gamesa SG 5.0-145 MkII 5000 145.0 !O! hub: 157,5 m (TOT: 230,0 m) (638)	20:57		6:23
29	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (630)	124:24		18:12
30	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (633)	113:10		33:57
31	VESTAS V162-6.2 6200 162.0 !O! hub: 149,0 m (TOT: 230,0 m) (631)	0:00		0:00
33	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (791)	205:38		42:05
34	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (761)	19:30		5:18

To be continued on next page...

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Calculated:
2022-04-13 15:09/3.4.424

SHADOW - Main Result

Calculation: Š e š eliai 9 v. suminis su priemonemis

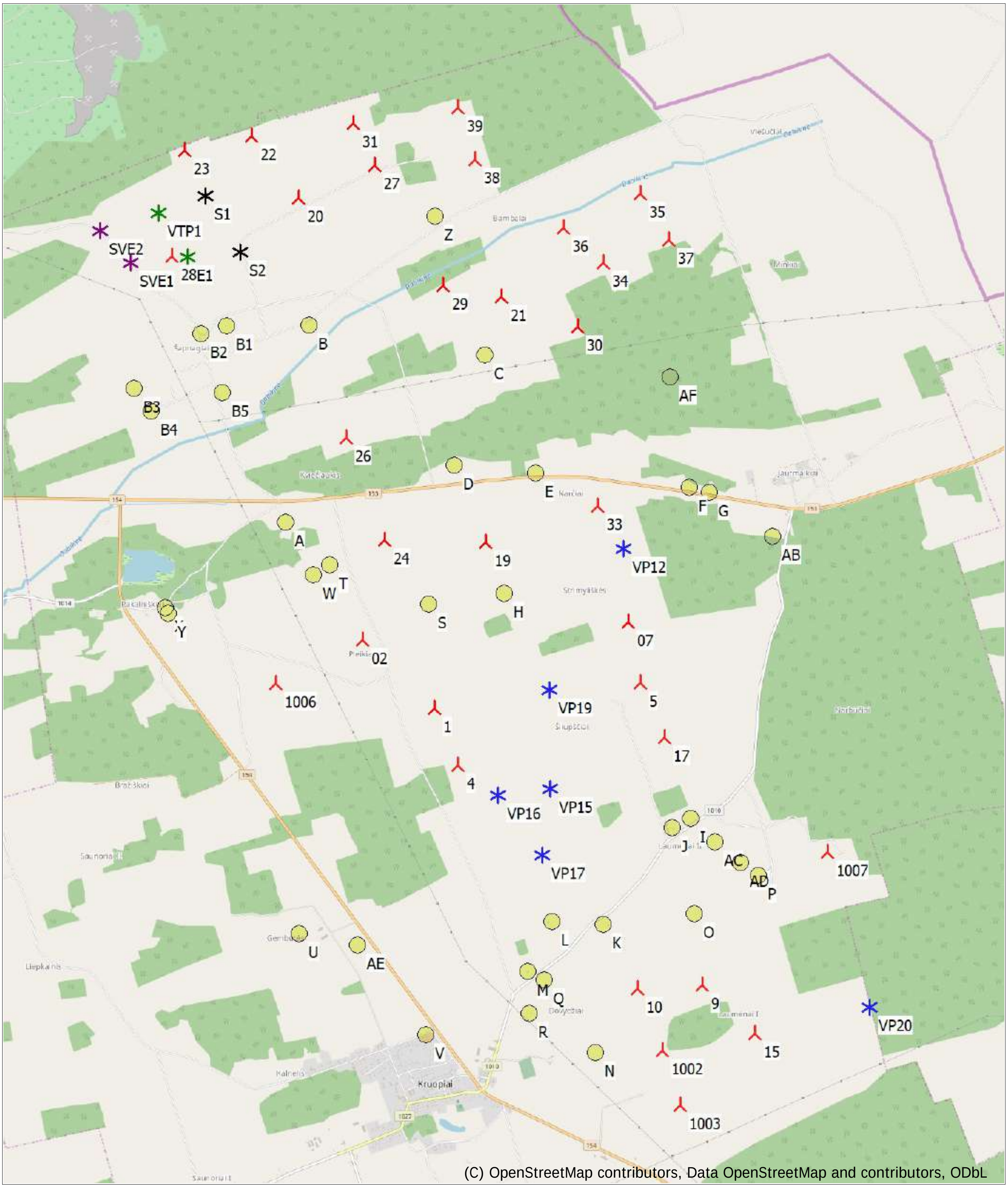
...continued from previous page

No.	Name	Worst case [h/year]	Stopped due to flicker curtailment [h/year]	Expected [h/year]
35	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (762)	0:00		0:00
36	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (766)	0:00	17:46	0:00
37	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (763)	0:00		0:00
38	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (764)	0:00		0:00
39	NORDEX N163/6.X 6800 163.0 !O! hub: 159,0 m (TOT: 240,5 m) (765)	0:00		0:00
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (793)	5:06		1:25
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 135,0 m (TOT: 220,0 m) (782)	29:50		4:24
9	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 115,0 m (TOT: 200,0 m) (784)	225:57		38:16
E1	ENERCON E-66/18.70 1800 70.0 !O! hub: 65,0 m (TOT: 100,0 m) (26)	2:19		0:42
S1	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (107)	0:00		0:00
S2	VESTAS V150-4.0 4000 150.0 !O! hub: 166,0 m (TOT: 241,0 m) (108)	6:15		1:32
SVE1	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (16)	19:17		5:40
SVE2	NORDEX N90/2500 LS 2500 90.0 !O! hub: 80,0 m (TOT: 125,0 m) (17)	9:15		2:38
VP12	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (1)	165:51		35:21
VP15	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (3)	63:44		15:50
VP16	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (4)	16:04		4:29
VP17	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (5)	67:27		18:46
VP19	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (6)	73:17		7:56
VP20	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 145,0 m (TOT: 230,0 m) (7)	32:00		3:40
VTP1	ENERCON E-66/18.70 1800 70.0 !O! hub: 63,0 m (TOT: 98,0 m) (30)	0:00		0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

SHADOW - Map

Calculation: Š e š eliai 9 v. suminis su priemonemis



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 347 North: 6 238 916

New WTG | Existing WTG | Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Akmene_4.wpo (9)

Annex 2. Noise dispersion simulation results

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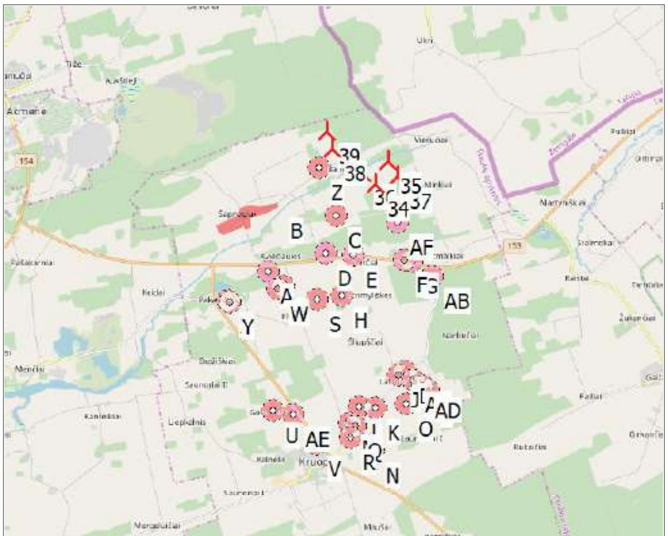
Calculated:
2022-04-11 16:20/3.4.424

DECIBEL - Main Result

Calculation: SAZ 1 v.

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
10,0 m/s
Ground attenuation:
General, Ground factor: 0,9
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones
WTG catalogue
Height above ground level, when no value in NSA object:
1,5 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:200 000
New WTG
Noise sensitive area

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	Status	LwA,ref	
			[m]					[kW]	[m]	[m]			[m/s]		[dB(A)]	
34	440 449	6 241 981	75,0	Siemens Gamesa SG 6.0-170...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0	g
35	440 792	6 242 597	76,1	Siemens Gamesa SG 6.0-170...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0	g
36	440 096	6 242 301	75,0	Siemens Gamesa SG 6.0-170...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0	g
37	441 041	6 242 183	75,0	Siemens Gamesa SG 6.0-170...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0	g
38	439 317	6 242 928	77,4	Siemens Gamesa SG 6.0-170...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0	g
39	439 169	6 243 391	78,1	Siemens Gamesa SG 6.0-170...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	155,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0	g

g) Data calculated from data for other wind speed (uncertain)

Calculation Results

Sound level

Noise sensitive area No.	Name	Y	X	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (2)	437 569	6 239 711	75,0	1,5	45,0	20,5	3 409	Yes
B	Noise sensitive area: User defined (1)	437 806	6 241 513	75,0	1,5	45,0	26,0	1 875	Yes
C	Noise sensitive point: User defined (4)	439 386	6 241 171	75,0	1,5	45,0	31,3	1 120	Yes
D	Noise sensitive point: User defined (5)	439 090	6 240 183	75,0	1,5	45,0	25,5	2 045	Yes
E	Noise sensitive point: User defined (6)	439 819	6 240 113	75,1	1,5	45,0	26,5	1 766	Yes
F	Noise sensitive point: User defined (7)	441 189	6 239 963	78,6	1,5	45,0	25,7	1 943	Yes
G	Noise sensitive point: User defined (8)	441 376	6 239 922	79,0	1,5	45,0	25,2	2 051	Yes
H	Noise sensitive point: User defined (9)	439 522	6 239 041	75,0	1,5	45,0	21,6	2 878	Yes
I	Noise sensitive point: User defined (10)	441 173	6 237 007	81,0	1,5	45,0	16,1	4 822	Yes
J	Noise sensitive point: User defined (12)	441 000	6 236 921	80,5	1,5	45,0	15,9	4 885	Yes
K	Noise sensitive point: User defined (13)	440 369	6 236 062	80,0	1,5	45,0	14,4	5 715	Yes
L	Noise sensitive point: User defined (14)	439 907	6 236 095	80,0	1,5	45,0	14,4	5 707	Yes
M	Noise sensitive point: User defined (15)	439 685	6 235 657	81,0	1,5	45,0	13,7	6 166	Yes
N	Noise sensitive point: User defined (16)	440 283	6 234 920	85,0	1,5	45,0	12,6	6 859	Yes
O	Noise sensitive point: User defined (17)	441 183	6 236 156	82,7	1,5	45,0	14,5	5 666	Yes
P	Noise sensitive point: User defined (18)	441 764	6 236 483	84,1	1,5	45,0	14,9	5 448	Yes
Q	Noise sensitive point: User defined (19)	439 828	6 235 577	81,7	1,5	45,0	13,6	6 230	Yes
R	Noise sensitive point: User defined (20)	439 694	6 235 284	83,0	1,5	45,0	13,1	6 535	Yes
S	Noise sensitive point: User defined (21)	438 848	6 238 952	75,0	1,5	45,0	20,6	3 219	Yes
T	Noise sensitive point: User defined (22)	437 966	6 239 316	75,0	1,5	45,0	20,3	3 431	Yes
U	Noise sensitive point: User defined (23)	437 637	6 236 022	75,8	1,5	45,0	13,5	6 383	Yes
V	Noise sensitive point: User defined (24)	438 766	6 235 103	80,0	1,5	45,0	12,7	6 876	Yes
W	Noise sensitive point: User defined (25)	437 811	6 239 233	75,0	1,5	45,0	19,8	3 598	Yes
X	Noise sensitive point: User defined (26)	436 480	6 238 962	77,7	1,5	45,0	17,0	4 682	Yes
Y	Noise sensitive point: User defined (11)	436 507	6 238 908	76,5	1,5	45,0	16,9	4 711	Yes

To be continued on next page...

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Calculated:
2022-04-11 16:20/3.4.424

DECIBEL - Main Result

Calculation: SAZ 1 v.

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Y	X	Z	Immission height	Noise	From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
Z	Noise sensitive point: User defined (27)	438 951	6 242 419	76,3	1,5	45,0	36,8	433	Yes
AB	Noise sensitive point: User defined (32)	441 931	6 239 511	80,0	1,5	45,0	22,5	2 614	Yes
AC	Noise sensitive point: User defined (33)	441 381	6 236 794	82,1	1,5	45,0	15,6	5 065	Yes
AD	Noise sensitive point: User defined (34)	441 603	6 236 606	83,3	1,5	45,0	15,1	5 293	Yes
AE	Noise sensitive point: User defined (35)	438 163	6 235 914	77,6	1,5	45,0	13,6	6 278	Yes
AF	Noise sensitive point: User defined (36)	441 037	6 240 954	76,7	1,5	45,0	32,1	975	Yes

Distances (m)

	WTG					
NSA	34	35	36	37	38	39
A	3667	4326	3618	4262	3661	4013
B	2668	3174	2418	3289	2070	2320
C	1336	2002	1334	1940	1758	2230
D	2254	2954	2345	2794	2754	3209
E	1971	2668	2205	2404	2859	3342
F	2149	2664	2581	2225	3506	3979
G	2258	2738	2701	2286	3643	4111
H	3083	3776	3310	3490	3892	4364
I	5026	5603	5402	5177	6205	6691
J	5090	5680	5455	5262	6238	6724
K	5919	6548	6245	6157	6946	7426
L	5911	6562	6209	6192	6858	7333
M	6370	7027	6656	6665	7280	7751
N	7063	7693	7383	7302	8066	8543
O	5871	6453	6240	6028	7024	7510
P	5653	6191	6052	5745	6894	7379
Q	6434	7086	6729	6716	7368	7841
R	6739	7395	7028	7029	7653	8124
S	3426	4131	3574	3905	4003	4450
T	3642	4330	3667	4204	3856	4249
U	6589	7292	6743	7038	7107	7526
V	7081	7763	7319	7436	7844	8297
W	3809	4495	3825	4374	3990	4374
X	4986	5639	4922	5583	4876	5181
Y	4998	5654	4939	5593	4904	5213
Z	1561	1849	1151	2103	627	996
AB	2880	3289	3339	2816	4302	4762
AC	5270	5833	5655	5399	6472	6958
AD	5497	6045	5891	5605	6722	7208
AE	6483	7181	6673	6898	7108	7544
AF	1183	1661	1643	1229	2618	3070

Project:
Akmene

Description:
SAZ, 1 v.

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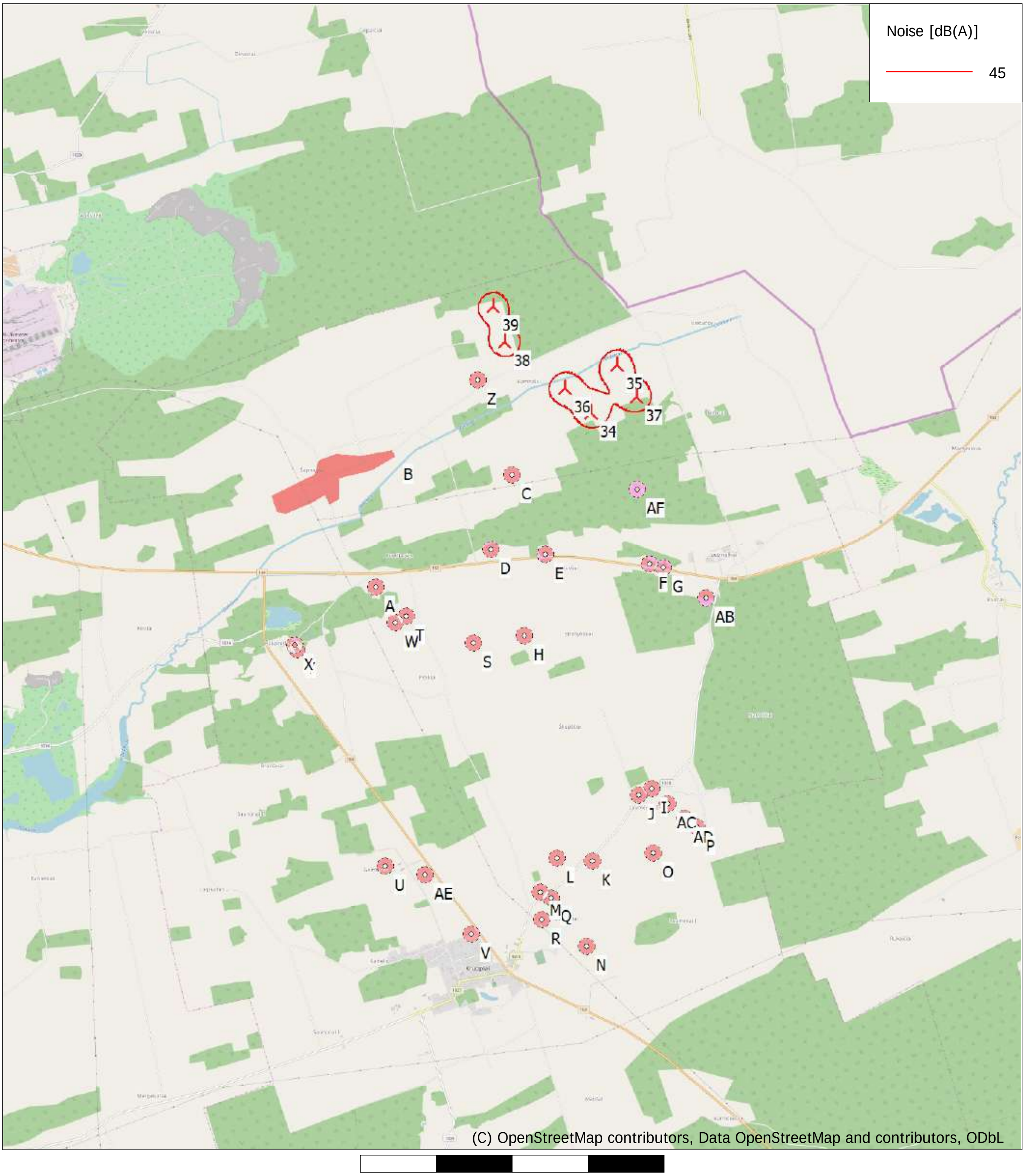
2022-04-11 16:20/3.4.424

DECIBEL - Map 10,0 m/s

Calculation: SAZ 1 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 125 North: 6 239 655

New WTG   Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 10,0 m/s

Height above sea level from active line object

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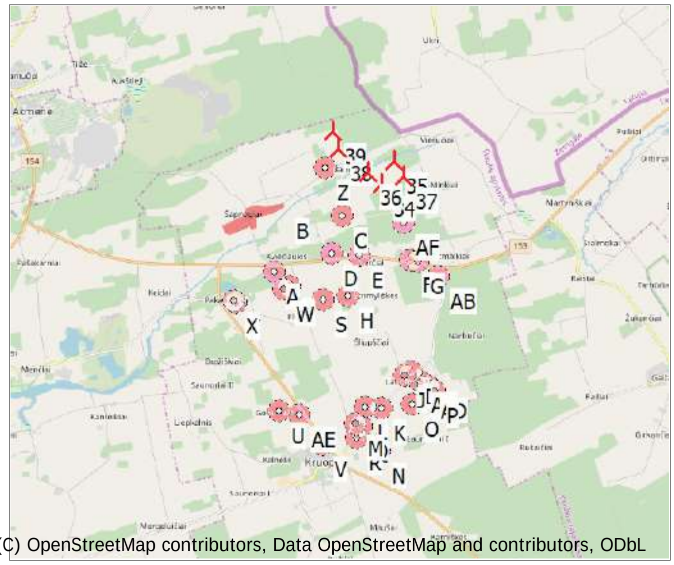
Calculated:
2022-04-11 16:23/3.4.424

DECIBEL - Main Result

Calculation: SAZ 2 v.

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
10,0 m/s
Ground attenuation:
General, Ground factor: 0,9
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones
WTG catalogue
Height above ground level, when no value in NSA object:
1,5 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:200 000
New WTG
Noise sensitive area

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	LwA,ref	
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]	
34	440 449	6 241 981	75,0	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h
35	440 792	6 242 597	76,1	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h
36	440 096	6 242 301	75,0	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h
37	441 041	6 242 183	75,0	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h
38	439 317	6 242 928	77,4	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h
39	439 169	6 243 391	78,1	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	159,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h

h) Generic octave distribution used

Calculation Results

Sound level

Noise sensitive area No.	Name	Y	X	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (2)	437 569	6 239 711	75,0	1,5	45,0	19,3	3 458	Yes
B	Noise sensitive area: User defined (1)	437 806	6 241 513	75,0	1,5	45,0	24,8	1 920	Yes
C	Noise sensitive point: User defined (4)	439 386	6 241 171	75,0	1,5	45,0	30,1	1 171	Yes
D	Noise sensitive point: User defined (5)	439 090	6 240 183	75,0	1,5	45,0	24,3	2 092	Yes
E	Noise sensitive point: User defined (6)	439 819	6 240 113	75,1	1,5	45,0	25,3	1 812	Yes
F	Noise sensitive point: User defined (7)	441 189	6 239 963	78,6	1,5	45,0	24,4	1 990	Yes
G	Noise sensitive point: User defined (8)	441 376	6 239 922	79,0	1,5	45,0	24,0	2 098	Yes
H	Noise sensitive point: User defined (9)	439 522	6 239 041	75,0	1,5	45,0	20,4	2 924	Yes
I	Noise sensitive point: User defined (10)	441 173	6 237 007	81,0	1,5	45,0	14,8	4 868	Yes
J	Noise sensitive point: User defined (12)	441 000	6 236 921	80,5	1,5	45,0	14,7	4 932	Yes
K	Noise sensitive point: User defined (13)	440 369	6 236 062	80,0	1,5	45,0	13,2	5 761	Yes
L	Noise sensitive point: User defined (14)	439 907	6 236 095	80,0	1,5	45,0	13,2	5 752	Yes
M	Noise sensitive point: User defined (15)	439 685	6 235 657	81,0	1,5	45,0	12,5	6 211	Yes
N	Noise sensitive point: User defined (16)	440 283	6 234 920	85,0	1,5	45,0	11,4	6 905	Yes
O	Noise sensitive point: User defined (17)	441 183	6 236 156	82,7	1,5	45,0	13,2	5 713	Yes
P	Noise sensitive point: User defined (18)	441 764	6 236 483	84,1	1,5	45,0	13,6	5 494	Yes
Q	Noise sensitive point: User defined (19)	439 828	6 235 577	81,7	1,5	45,0	12,3	6 276	Yes
R	Noise sensitive point: User defined (20)	439 694	6 235 284	83,0	1,5	45,0	11,9	6 581	Yes
S	Noise sensitive point: User defined (21)	438 848	6 238 952	75,0	1,5	45,0	19,4	3 266	Yes
T	Noise sensitive point: User defined (22)	437 966	6 239 316	75,0	1,5	45,0	19,1	3 480	Yes
U	Noise sensitive point: User defined (23)	437 637	6 236 022	75,8	1,5	45,0	12,3	6 429	Yes
V	Noise sensitive point: User defined (24)	438 766	6 235 103	80,0	1,5	45,0	11,4	6 922	Yes
W	Noise sensitive point: User defined (25)	437 811	6 239 233	75,0	1,5	45,0	18,6	3 646	Yes
X	Noise sensitive point: User defined (26)	436 480	6 238 962	77,7	1,5	45,0	15,7	4 726	Yes
Y	Noise sensitive point: User defined (11)	436 507	6 238 908	76,5	1,5	45,0	15,7	4 755	Yes

To be continued on next page...

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Calculated:
2022-04-11 16:23/3.4.424

DECIBEL - Main Result

Calculation: SAZ 2 v.

...continued from previous page

Noise sensitive area

No.	Name	Y	X	Z [m]	Immission height [m]	Demands Noise [dB(A)]	Sound level From WTGs [dB(A)]	Distance to noise demand [m]	Demands fulfilled ? Noise
Z	Noise sensitive point: User defined (27)	438 951	6 242 419	76,3	1,5	45,0	35,6	477	Yes
AB	Noise sensitive point: User defined (32)	441 931	6 239 511	80,0	1,5	45,0	21,3	2 661	Yes
AC	Noise sensitive point: User defined (33)	441 381	6 236 794	82,1	1,5	45,0	14,4	5 111	Yes
AD	Noise sensitive point: User defined (34)	441 603	6 236 606	83,3	1,5	45,0	13,9	5 339	Yes
AE	Noise sensitive point: User defined (35)	438 163	6 235 914	77,6	1,5	45,0	12,4	6 324	Yes
AF	Noise sensitive point: User defined (36)	441 037	6 240 954	76,7	1,5	45,0	30,8	1 023	Yes

Distances (m)

NSA	WTG 34	35	36	37	38	39
A	3667	4326	3618	4262	3661	4013
B	2668	3174	2418	3289	2070	2320
C	1336	2002	1334	1940	1758	2230
D	2254	2954	2345	2794	2754	3209
E	1971	2668	2205	2404	2859	3342
F	2149	2664	2581	2225	3506	3979
G	2258	2738	2701	2286	3643	4111
H	3083	3776	3310	3490	3892	4364
I	5026	5603	5402	5177	6205	6691
J	5090	5680	5455	5262	6238	6724
K	5919	6548	6245	6157	6946	7426
L	5911	6562	6209	6192	6858	7333
M	6370	7027	6656	6665	7280	7751
N	7063	7693	7383	7302	8066	8543
O	5871	6453	6240	6028	7024	7510
P	5653	6191	6052	5745	6894	7379
Q	6434	7086	6729	6716	7368	7841
R	6739	7395	7028	7029	7653	8124
S	3426	4131	3574	3905	4003	4450
T	3642	4330	3667	4204	3856	4249
U	6589	7292	6743	7038	7107	7526
V	7081	7763	7319	7436	7844	8297
W	3809	4495	3825	4374	3990	4374
X	4986	5639	4922	5583	4876	5181
Y	4998	5654	4939	5593	4904	5213
Z	1561	1849	1151	2103	627	996
AB	2880	3289	3339	2816	4302	4762
AC	5270	5833	5655	5399	6472	6958
AD	5497	6045	5891	5605	6722	7208
AE	6483	7181	6673	6898	7108	7544
AF	1183	1661	1643	1229	2618	3070

Project:
Akmene

Description:
SAZ, 2 v.

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Calculated:
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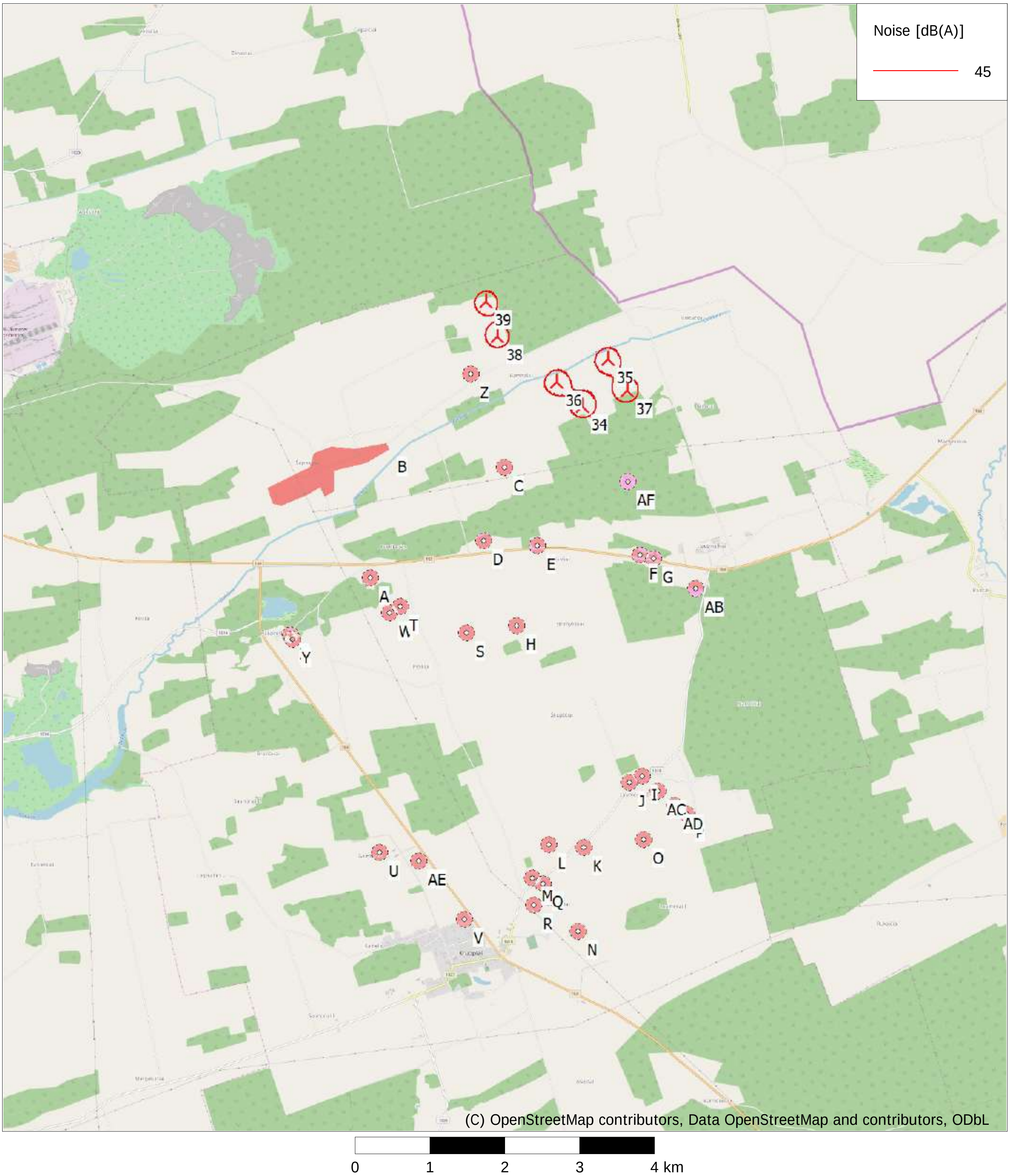
DECIBEL - Map 10,0 m/s

Calculation: SAZ 2 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 125 North: 6 239 655

New WTG   Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 10,0 m/s
Height above sea level from active line object

Project: Akmene

Description: SAZ, 3 v.

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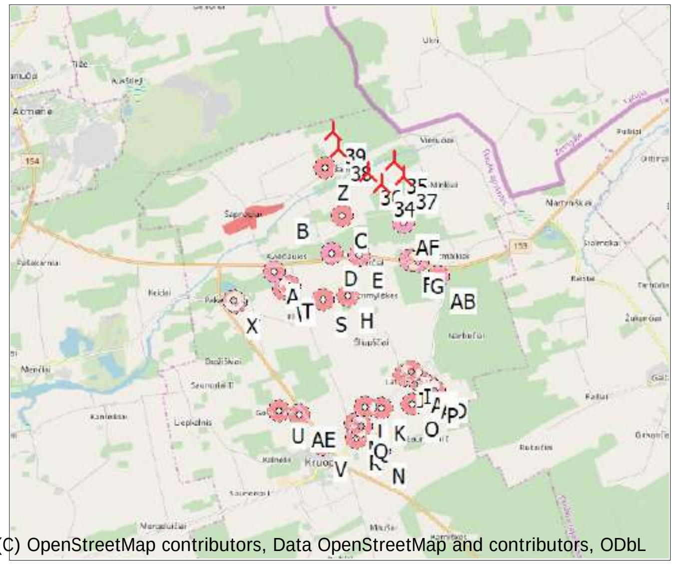
Calculated:
2022-04-11 16:26/3.4.424

DECIBEL - Main Result

Calculation: SAZ 3 v.

Noise calculation model:
 ISO 9613-2 General
Wind speed (in 10 m height):
 10,0 m/s
Ground attenuation:
 General, Ground factor: 0,9
Meteorological coefficient, C0:
 0,0 dB
Type of demand in calculation:
 1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
 All noise values are mean values (Lwa) (Normal)
Pure tones:
 Fixed penalty added to source noise of WTGs with pure tones
 WTG catalogue
Height above ground level, when no value in NSA object:
 1,5 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
 0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
 0,0 dB(A)



Scale 1:200 000
New WTG
Noise sensitive area

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	LwA,ref	
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]	
34	440 449	6 241 981	75,0	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h
35	440 792	6 242 597	76,1	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h
36	440 096	6 242 301	75,0	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h
37	441 041	6 242 183	75,0	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h
38	439 317	6 242 928	77,4	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h
39	439 169	6 243 391	78,1	VESTAS V162-6.2 6200 162....	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0	104,8	h

h) Generic octave distribution used

Calculation Results

Sound level

Noise sensitive area No.	Name	Y	X	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (2)	437 569	6 239 711	75,0	1,5	45,0	19,3	3 449	Yes
B	Noise sensitive area: User defined (1)	437 806	6 241 513	75,0	1,5	45,0	24,8	1 910	Yes
C	Noise sensitive point: User defined (4)	439 386	6 241 171	75,0	1,5	45,0	30,1	1 162	Yes
D	Noise sensitive point: User defined (5)	439 090	6 240 183	75,0	1,5	45,0	24,3	2 084	Yes
E	Noise sensitive point: User defined (6)	439 819	6 240 113	75,1	1,5	45,0	25,3	1 804	Yes
F	Noise sensitive point: User defined (7)	441 189	6 239 963	78,6	1,5	45,0	24,5	1 982	Yes
G	Noise sensitive point: User defined (8)	441 376	6 239 922	79,0	1,5	45,0	24,0	2 090	Yes
H	Noise sensitive point: User defined (9)	439 522	6 239 041	75,0	1,5	45,0	20,4	2 915	Yes
I	Noise sensitive point: User defined (10)	441 173	6 237 007	81,0	1,5	45,0	14,9	4 859	Yes
J	Noise sensitive point: User defined (12)	441 000	6 236 921	80,5	1,5	45,0	14,8	4 923	Yes
K	Noise sensitive point: User defined (13)	440 369	6 236 062	80,0	1,5	45,0	13,3	5 753	Yes
L	Noise sensitive point: User defined (14)	439 907	6 236 095	80,0	1,5	45,0	13,3	5 744	Yes
M	Noise sensitive point: User defined (15)	439 685	6 235 657	81,0	1,5	45,0	12,5	6 203	Yes
N	Noise sensitive point: User defined (16)	440 283	6 234 920	85,0	1,5	45,0	11,5	6 896	Yes
O	Noise sensitive point: User defined (17)	441 183	6 236 156	82,7	1,5	45,0	13,3	5 704	Yes
P	Noise sensitive point: User defined (18)	441 764	6 236 483	84,1	1,5	45,0	13,7	5 486	Yes
Q	Noise sensitive point: User defined (19)	439 828	6 235 577	81,7	1,5	45,0	12,4	6 267	Yes
R	Noise sensitive point: User defined (20)	439 694	6 235 284	83,0	1,5	45,0	12,0	6 572	Yes
S	Noise sensitive point: User defined (21)	438 848	6 238 952	75,0	1,5	45,0	19,4	3 258	Yes
T	Noise sensitive point: User defined (22)	437 966	6 239 316	75,0	1,5	45,0	19,1	3 471	Yes
U	Noise sensitive point: User defined (23)	437 637	6 236 022	75,8	1,5	45,0	12,3	6 421	Yes
V	Noise sensitive point: User defined (24)	438 766	6 235 103	80,0	1,5	45,0	11,5	6 914	Yes
W	Noise sensitive point: User defined (25)	437 811	6 239 233	75,0	1,5	45,0	18,6	3 638	Yes
X	Noise sensitive point: User defined (26)	436 480	6 238 962	77,7	1,5	45,0	15,8	4 717	Yes
Y	Noise sensitive point: User defined (11)	436 507	6 238 908	76,5	1,5	45,0	15,8	4 746	Yes

To be continued on next page...

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Calculated:
2022-04-11 16:26/3.4.424

DECIBEL - Main Result

Calculation: SAZ 3 v.

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Y	X	Z	Immission height	Noise	From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
Z	Noise sensitive point: User defined (27)	438 951	6 242 419	76,3	1,5	45,0	35,6	468	Yes
AB	Noise sensitive point: User defined (32)	441 931	6 239 511	80,0	1,5	45,0	21,3	2 652	Yes
AC	Noise sensitive point: User defined (33)	441 381	6 236 794	82,1	1,5	45,0	14,4	5 103	Yes
AD	Noise sensitive point: User defined (34)	441 603	6 236 606	83,3	1,5	45,0	14,0	5 330	Yes
AE	Noise sensitive point: User defined (35)	438 163	6 235 914	77,6	1,5	45,0	12,5	6 316	Yes
AF	Noise sensitive point: User defined (36)	441 037	6 240 954	76,7	1,5	45,0	30,9	1 014	Yes

Distances (m)

	WTG					
NSA	34	35	36	37	38	39
A	3667	4326	3618	4262	3661	4013
B	2668	3174	2418	3289	2070	2320
C	1336	2002	1334	1940	1758	2230
D	2254	2954	2345	2794	2754	3209
E	1971	2668	2205	2404	2859	3342
F	2149	2664	2581	2225	3506	3979
G	2258	2738	2701	2286	3643	4111
H	3083	3776	3310	3490	3892	4364
I	5026	5603	5402	5177	6205	6691
J	5090	5680	5455	5262	6238	6724
K	5919	6548	6245	6157	6946	7426
L	5911	6562	6209	6192	6858	7333
M	6370	7027	6656	6665	7280	7751
N	7063	7693	7383	7302	8066	8543
O	5871	6453	6240	6028	7024	7510
P	5653	6191	6052	5745	6894	7379
Q	6434	7086	6729	6716	7368	7841
R	6739	7395	7028	7029	7653	8124
S	3426	4131	3574	3905	4003	4450
T	3642	4330	3667	4204	3856	4249
U	6589	7292	6743	7038	7107	7526
V	7081	7763	7319	7436	7844	8297
W	3809	4495	3825	4374	3990	4374
X	4986	5639	4922	5583	4876	5181
Y	4998	5654	4939	5593	4904	5213
Z	1561	1849	1151	2103	627	996
AB	2880	3289	3339	2816	4302	4762
AC	5270	5833	5655	5399	6472	6958
AD	5497	6045	5891	5605	6722	7208
AE	6483	7181	6673	6898	7108	7544
AF	1183	1661	1643	1229	2618	3070

Project:
Akmene

Description:
SAZ, 3 v.

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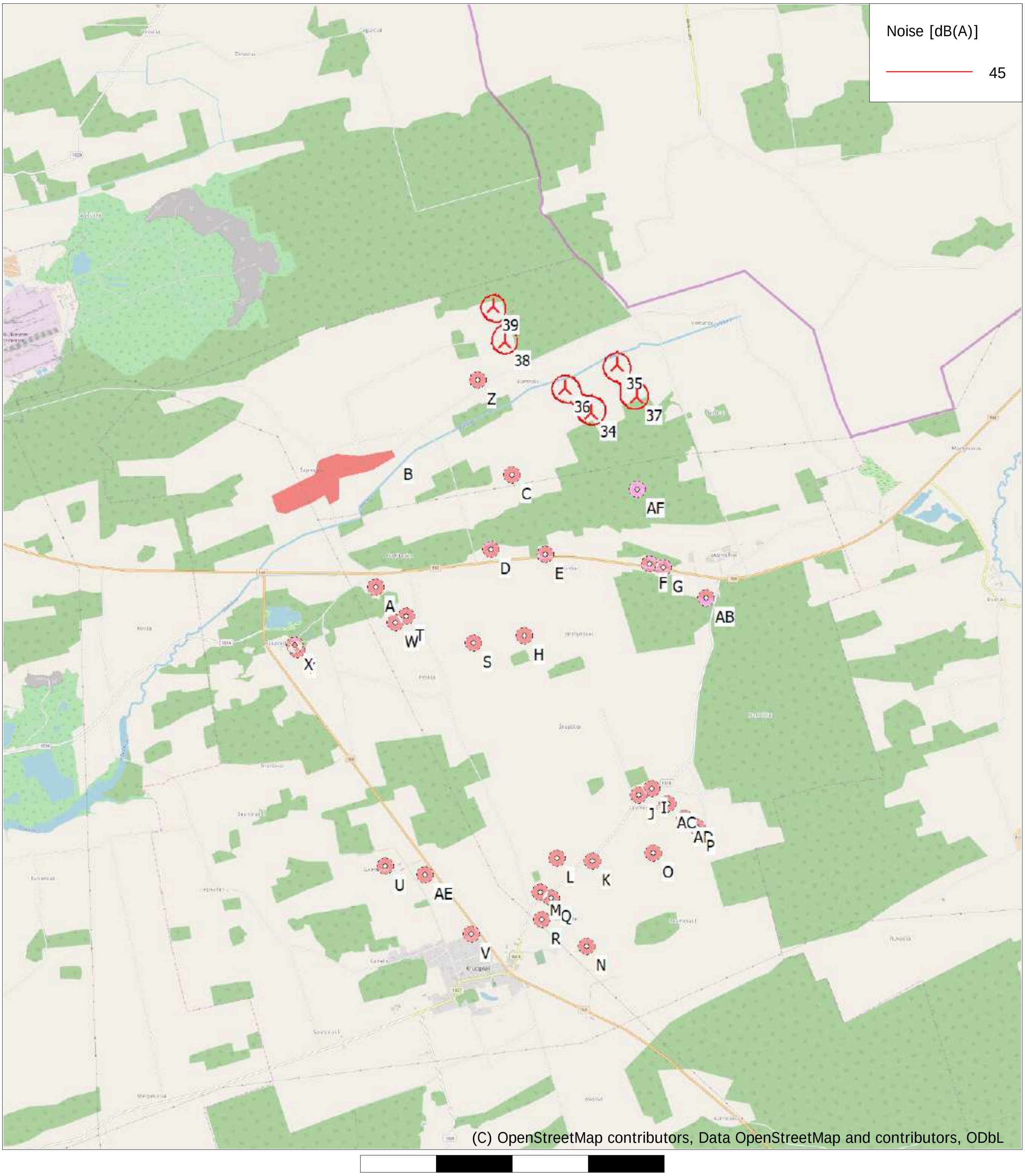
Calculated:
2022-04-11 16:26/3.4.424

DECIBEL - Map 10,0 m/s

Calculation: SAZ 3 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 125 North: 6 239 655

New WTG   Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 10,0 m/s

Height above sea level from active line object

Project:
Akmene

Description:
SAZ, 4 v.

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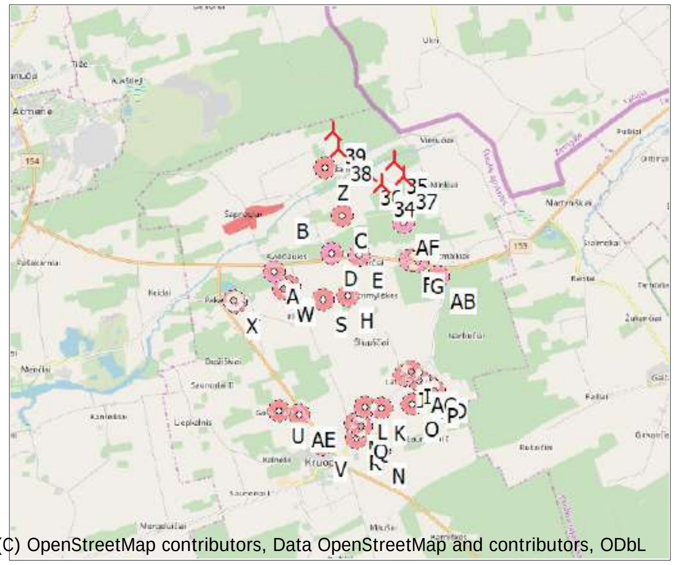
Calculated:
2022-04-13 10:17/3.4.424

DECIBEL - Main Result

Calculation: SAZ 4 v.

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
10,0 m/s
Ground attenuation:
General, Ground factor: 0,9
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones
WTG catalogue
Height above ground level, when no value in NSA object:
1,5 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:200 000
New WTG
Noise sensitive area

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	LwA,ref
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]
34	440 449	6 241 981	75,0	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5 h
35	440 792	6 242 597	76,1	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5 h
36	440 096	6 242 301	75,0	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5 h
37	441 041	6 242 183	75,0	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5 h
38	439 317	6 242 928	77,4	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5 h
39	439 169	6 243 391	78,1	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	159,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5 h

h) Generic octave distribution used

Calculation Results

Sound level

Noise sensitive area No.	Name	Y	X	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (2)	437 569	6 239 711	75,0	1,5	45,0	19,0	3 469	Yes
B	Noise sensitive area: User defined (1)	437 806	6 241 513	75,0	1,5	45,0	24,5	1 930	Yes
C	Noise sensitive point: User defined (4)	439 386	6 241 171	75,0	1,5	45,0	29,8	1 182	Yes
D	Noise sensitive point: User defined (5)	439 090	6 240 183	75,0	1,5	45,0	24,0	2 103	Yes
E	Noise sensitive point: User defined (6)	439 819	6 240 113	75,1	1,5	45,0	25,0	1 823	Yes
F	Noise sensitive point: User defined (7)	441 189	6 239 963	78,6	1,5	45,0	24,2	2 001	Yes
G	Noise sensitive point: User defined (8)	441 376	6 239 922	79,0	1,5	45,0	23,7	2 109	Yes
H	Noise sensitive point: User defined (9)	439 522	6 239 041	75,0	1,5	45,0	20,1	2 934	Yes
I	Noise sensitive point: User defined (10)	441 173	6 237 007	81,0	1,5	45,0	14,5	4 878	Yes
J	Noise sensitive point: User defined (12)	441 000	6 236 921	80,5	1,5	45,0	14,4	4 942	Yes
K	Noise sensitive point: User defined (13)	440 369	6 236 062	80,0	1,5	45,0	12,9	5 772	Yes
L	Noise sensitive point: User defined (14)	439 907	6 236 095	80,0	1,5	45,0	12,9	5 763	Yes
M	Noise sensitive point: User defined (15)	439 685	6 235 657	81,0	1,5	45,0	12,2	6 222	Yes
N	Noise sensitive point: User defined (16)	440 283	6 234 920	85,0	1,5	45,0	11,1	6 915	Yes
O	Noise sensitive point: User defined (17)	441 183	6 236 156	82,7	1,5	45,0	12,9	5 723	Yes
P	Noise sensitive point: User defined (18)	441 764	6 236 483	84,1	1,5	45,0	13,3	5 505	Yes
Q	Noise sensitive point: User defined (19)	439 828	6 235 577	81,7	1,5	45,0	12,1	6 286	Yes
R	Noise sensitive point: User defined (20)	439 694	6 235 284	83,0	1,5	45,0	11,6	6 591	Yes
S	Noise sensitive point: User defined (21)	438 848	6 238 952	75,0	1,5	45,0	19,1	3 277	Yes
T	Noise sensitive point: User defined (22)	437 966	6 239 316	75,0	1,5	45,0	18,8	3 491	Yes
U	Noise sensitive point: User defined (23)	437 637	6 236 022	75,8	1,5	45,0	12,0	6 440	Yes
V	Noise sensitive point: User defined (24)	438 766	6 235 103	80,0	1,5	45,0	11,1	6 933	Yes
W	Noise sensitive point: User defined (25)	437 811	6 239 233	75,0	1,5	45,0	18,3	3 657	Yes
X	Noise sensitive point: User defined (26)	436 480	6 238 962	77,7	1,5	45,0	15,4	4 736	Yes

To be continued on next page...

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Calculated:
2022-04-13 10:17/3.4.424

DECIBEL - Main Result

Calculation: SAZ 4 v.

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Y	X	Z	Immission height	Noise	From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
Y	Noise sensitive point: User defined (11)	436 507	6 238 908	76,5	1,5	45,0	15,4	4 765	Yes
Z	Noise sensitive point: User defined (27)	438 951	6 242 419	76,3	1,5	45,0	35,3	487	Yes
AB	Noise sensitive point: User defined (32)	441 931	6 239 511	80,0	1,5	45,0	21,0	2 671	Yes
AC	Noise sensitive point: User defined (33)	441 381	6 236 794	82,1	1,5	45,0	14,1	5 122	Yes
AD	Noise sensitive point: User defined (34)	441 603	6 236 606	83,3	1,5	45,0	13,6	5 349	Yes
AE	Noise sensitive point: User defined (35)	438 163	6 235 914	77,6	1,5	45,0	12,1	6 335	Yes
AF	Noise sensitive point: User defined (36)	441 037	6 240 954	76,7	1,5	45,0	30,5	1 034	Yes

Distances (m)

	WTG					
NSA	34	35	36	37	38	39
A	3667	4326	3618	4262	3661	4013
B	2668	3174	2418	3289	2070	2320
C	1336	2002	1334	1940	1758	2230
D	2254	2954	2345	2794	2754	3209
E	1971	2668	2205	2404	2859	3342
F	2149	2664	2581	2225	3506	3979
G	2258	2738	2701	2286	3643	4111
H	3083	3776	3310	3490	3892	4364
I	5026	5603	5402	5177	6205	6691
J	5090	5680	5455	5262	6238	6724
K	5919	6548	6245	6157	6946	7426
L	5911	6562	6209	6192	6858	7333
M	6370	7027	6656	6665	7280	7751
N	7063	7693	7383	7302	8066	8543
O	5871	6453	6240	6028	7024	7510
P	5653	6191	6052	5745	6894	7379
Q	6434	7086	6729	6716	7368	7841
R	6739	7395	7028	7029	7653	8124
S	3426	4131	3574	3905	4003	4450
T	3642	4330	3667	4204	3856	4249
U	6589	7292	6743	7038	7107	7526
V	7081	7763	7319	7436	7844	8297
W	3809	4495	3825	4374	3990	4374
X	4986	5639	4922	5583	4876	5181
Y	4998	5654	4939	5593	4904	5213
Z	1561	1849	1151	2103	627	996
AB	2880	3289	3339	2816	4302	4762
AC	5270	5833	5655	5399	6472	6958
AD	5497	6045	5891	5605	6722	7208
AE	6483	7181	6673	6898	7108	7544
AF	1183	1661	1643	1229	2618	3070

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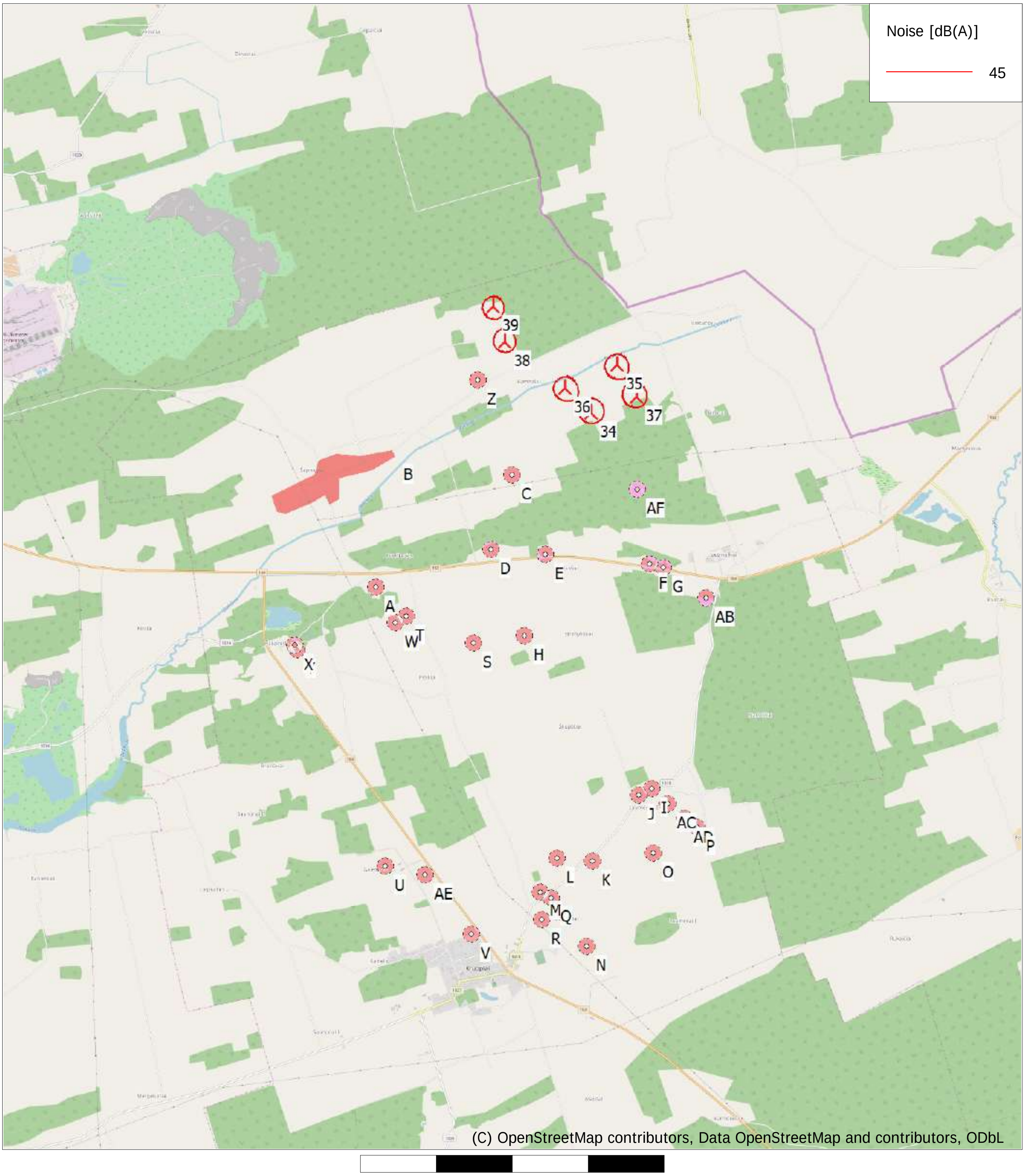
DECIBEL - Map 10,0 m/s

Calculation: SAZ 4 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 125 North: 6 239 655

New WTG   Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 10,0 m/s

Height above sea level from active line object

Project:
Akmene

Description:
SAZ, 5 v.

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Calculated:
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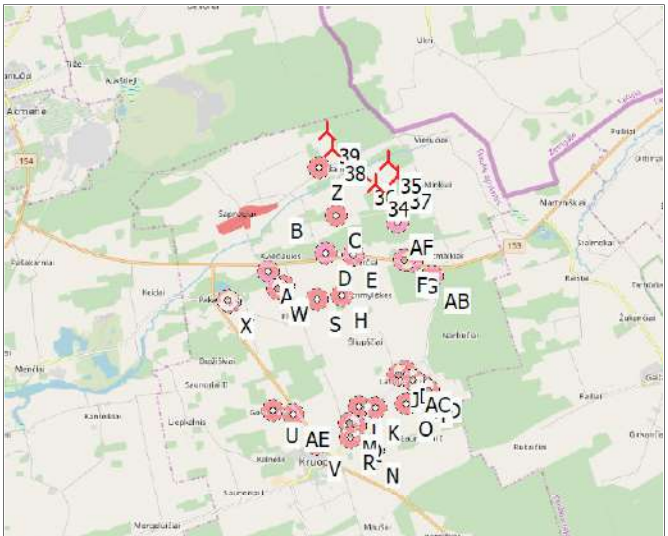
DECIBEL - Main Result

Calculation: SAZ 5 v.

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
10,0 m/s
Ground attenuation:
General, Ground factor: 0,9
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones
WTG catalogue
Height above ground level, when no value in NSA object:
1,5 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:200 000
New WTG
Noise sensitive area

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	LwA,ref	
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]	
34	440 449	6 241 981	75,0	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5	h
35	440 792	6 242 597	76,1	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5	h
36	440 096	6 242 301	75,0	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5	h
37	441 041	6 242 183	75,0	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5	h
38	439 317	6 242 928	77,4	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5	h
39	439 169	6 243 391	78,1	VESTAS V162-6.8 6800 16...	No	VESTAS	V162-6.8-6 800	6 800	162,0	149,0	USER	Level 0 - Measured - Mode PO6800	10,0	104,5	h

h) Generic octave distribution used

Calculation Results

Sound level

Noise sensitive area No.	Name	Y	X	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (2)	437 569	6 239 711	75,0	1,5	45,0	19,0	3 459	Yes
B	Noise sensitive area: User defined (1)	437 806	6 241 513	75,0	1,5	45,0	24,5	1 920	Yes
C	Noise sensitive point: User defined (4)	439 386	6 241 171	75,0	1,5	45,0	29,8	1 173	Yes
D	Noise sensitive point: User defined (5)	439 090	6 240 183	75,0	1,5	45,0	24,0	2 094	Yes
E	Noise sensitive point: User defined (6)	439 819	6 240 113	75,1	1,5	45,0	25,0	1 814	Yes
F	Noise sensitive point: User defined (7)	441 189	6 239 963	78,6	1,5	45,0	24,2	1 992	Yes
G	Noise sensitive point: User defined (8)	441 376	6 239 922	79,0	1,5	45,0	23,7	2 100	Yes
H	Noise sensitive point: User defined (9)	439 522	6 239 041	75,0	1,5	45,0	20,1	2 925	Yes
I	Noise sensitive point: User defined (10)	441 173	6 237 007	81,0	1,5	45,0	14,6	4 869	Yes
J	Noise sensitive point: User defined (12)	441 000	6 236 921	80,5	1,5	45,0	14,5	4 933	Yes
K	Noise sensitive point: User defined (13)	440 369	6 236 062	80,0	1,5	45,0	13,0	5 762	Yes
L	Noise sensitive point: User defined (14)	439 907	6 236 095	80,0	1,5	45,0	13,0	5 754	Yes
M	Noise sensitive point: User defined (15)	439 685	6 235 657	81,0	1,5	45,0	12,2	6 213	Yes
N	Noise sensitive point: User defined (16)	440 283	6 234 920	85,0	1,5	45,0	11,2	6 906	Yes
O	Noise sensitive point: User defined (17)	441 183	6 236 156	82,7	1,5	45,0	13,0	5 714	Yes
P	Noise sensitive point: User defined (18)	441 764	6 236 483	84,1	1,5	45,0	13,4	5 496	Yes
Q	Noise sensitive point: User defined (19)	439 828	6 235 577	81,7	1,5	45,0	12,1	6 277	Yes
R	Noise sensitive point: User defined (20)	439 694	6 235 284	83,0	1,5	45,0	11,7	6 582	Yes
S	Noise sensitive point: User defined (21)	438 848	6 238 952	75,0	1,5	45,0	19,1	3 268	Yes
T	Noise sensitive point: User defined (22)	437 966	6 239 316	75,0	1,5	45,0	18,8	3 482	Yes
U	Noise sensitive point: User defined (23)	437 637	6 236 022	75,8	1,5	45,0	12,0	6 431	Yes
V	Noise sensitive point: User defined (24)	438 766	6 235 103	80,0	1,5	45,0	11,2	6 924	Yes
W	Noise sensitive point: User defined (25)	437 811	6 239 233	75,0	1,5	45,0	18,3	3 648	Yes
X	Noise sensitive point: User defined (26)	436 480	6 238 962	77,7	1,5	45,0	15,5	4 727	Yes

To be continued on next page...

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Calculated:
2022-04-13 10:18/3.4.424

DECIBEL - Main Result

Calculation: SAZ 5 v.

...continued from previous page

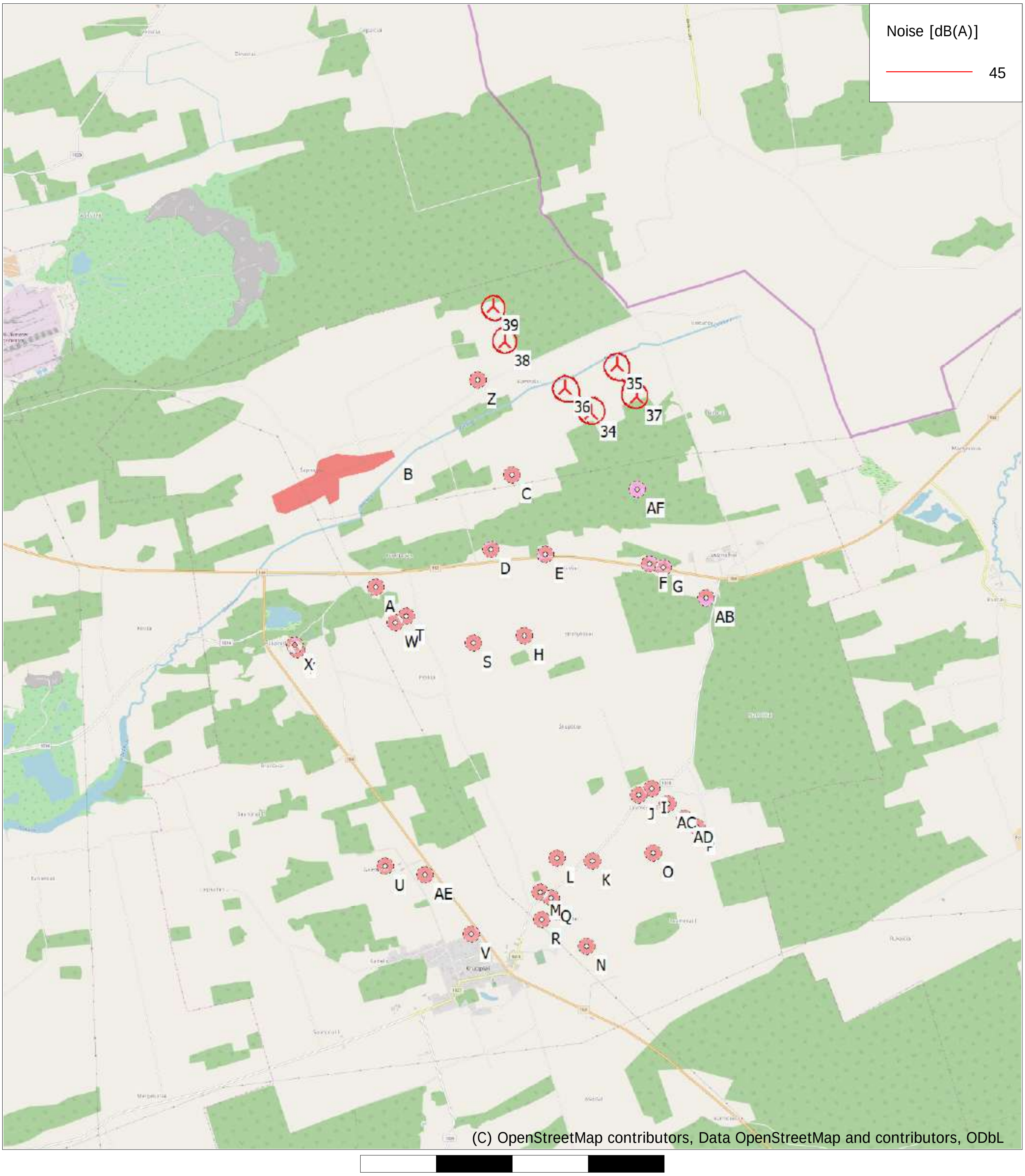
Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Y	X	Z	Immission height	Noise	From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
Y	Noise sensitive point: User defined (11)	436 507	6 238 908	76,5	1,5	45,0	15,5	4 755	Yes
Z	Noise sensitive point: User defined (27)	438 951	6 242 419	76,3	1,5	45,0	35,3	477	Yes
AB	Noise sensitive point: User defined (32)	441 931	6 239 511	80,0	1,5	45,0	21,0	2 662	Yes
AC	Noise sensitive point: User defined (33)	441 381	6 236 794	82,1	1,5	45,0	14,1	5 113	Yes
AD	Noise sensitive point: User defined (34)	441 603	6 236 606	83,3	1,5	45,0	13,7	5 340	Yes
AE	Noise sensitive point: User defined (35)	438 163	6 235 914	77,6	1,5	45,0	12,2	6 326	Yes
AF	Noise sensitive point: User defined (36)	441 037	6 240 954	76,7	1,5	45,0	30,6	1 025	Yes

Distances (m)

	WTG					
NSA	34	35	36	37	38	39
A	3667	4326	3618	4262	3661	4013
B	2668	3174	2418	3289	2070	2320
C	1336	2002	1334	1940	1758	2230
D	2254	2954	2345	2794	2754	3209
E	1971	2668	2205	2404	2859	3342
F	2149	2664	2581	2225	3506	3979
G	2258	2738	2701	2286	3643	4111
H	3083	3776	3310	3490	3892	4364
I	5026	5603	5402	5177	6205	6691
J	5090	5680	5455	5262	6238	6724
K	5919	6548	6245	6157	6946	7426
L	5911	6562	6209	6192	6858	7333
M	6370	7027	6656	6665	7280	7751
N	7063	7693	7383	7302	8066	8543
O	5871	6453	6240	6028	7024	7510
P	5653	6191	6052	5745	6894	7379
Q	6434	7086	6729	6716	7368	7841
R	6739	7395	7028	7029	7653	8124
S	3426	4131	3574	3905	4003	4450
T	3642	4330	3667	4204	3856	4249
U	6589	7292	6743	7038	7107	7526
V	7081	7763	7319	7436	7844	8297
W	3809	4495	3825	4374	3990	4374
X	4986	5639	4922	5583	4876	5181
Y	4998	5654	4939	5593	4904	5213
Z	1561	1849	1151	2103	627	996
AB	2880	3289	3339	2816	4302	4762
AC	5270	5833	5655	5399	6472	6958
AD	5497	6045	5891	5605	6722	7208
AE	6483	7181	6673	6898	7108	7544
AF	1183	1661	1643	1229	2618	3070

DECIBEL - Map 10,0 m/s

Calculation: SAZ 5 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 125 North: 6 239 655

New WTG   Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 10,0 m/s

Height above sea level from active line object

Project: Akmene

Description: SAZ, 6 v.

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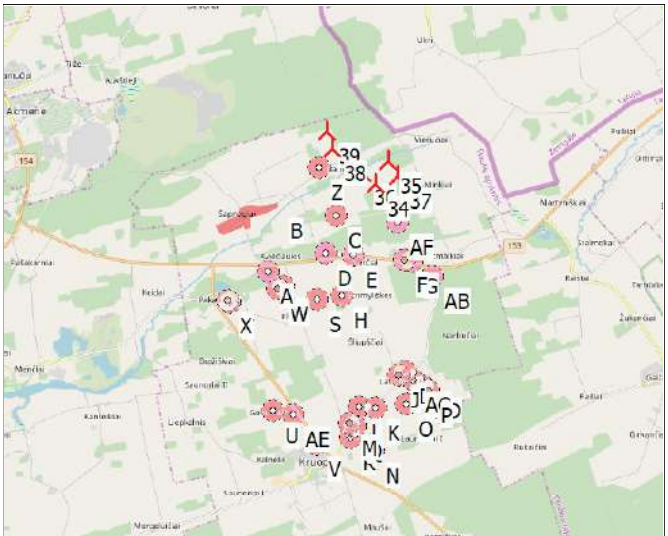
Calculated:
2022-04-11 16:46/3.4.424

DECIBEL - Main Result

Calculation: SAZ 6 v.

Noise calculation model:
 ISO 9613-2 General
Wind speed (in 10 m height):
 10,0 m/s
Ground attenuation:
 General, Ground factor: 0,9
Meteorological coefficient, C0:
 0,0 dB
Type of demand in calculation:
 1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
 All noise values are mean values (Lwa) (Normal)
Pure tones:
 Fixed penalty added to source noise of WTGs with pure tones
 WTG catalogue
Height above ground level, when no value in NSA object:
 1,5 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
 0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
 0,0 dB(A)



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Scale 1:200 000

New WTG   Noise sensitive area

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	LwA,ref
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]
34	440 449	6 241 981	75,0	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h
35	440 792	6 242 597	76,1	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h
36	440 096	6 242 301	75,0	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h
37	441 041	6 242 183	75,0	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h
38	439 317	6 242 928	77,4	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h
39	439 169	6 243 391	78,1	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	159,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h

h) Generic octave distribution used

Calculation Results

Sound level

Noise sensitive area No.	Name	Y	X	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (2)	437 569	6 239 711	75,0	1,5	45,0	20,0	3 432	Yes
B	Noise sensitive area: User defined (1)	437 806	6 241 513	75,0	1,5	45,0	25,5	1 896	Yes
C	Noise sensitive point: User defined (4)	439 386	6 241 171	75,0	1,5	45,0	30,8	1 143	Yes
D	Noise sensitive point: User defined (5)	439 090	6 240 183	75,0	1,5	45,0	25,0	2 067	Yes
E	Noise sensitive point: User defined (6)	439 819	6 240 113	75,1	1,5	45,0	26,0	1 787	Yes
F	Noise sensitive point: User defined (7)	441 189	6 239 963	78,6	1,5	45,0	25,1	1 965	Yes
G	Noise sensitive point: User defined (8)	441 376	6 239 922	79,0	1,5	45,0	24,7	2 073	Yes
H	Noise sensitive point: User defined (9)	439 522	6 239 041	75,0	1,5	45,0	21,1	2 899	Yes
I	Noise sensitive point: User defined (10)	441 173	6 237 007	81,0	1,5	45,0	15,5	4 843	Yes
J	Noise sensitive point: User defined (12)	441 000	6 236 921	80,5	1,5	45,0	15,4	4 907	Yes
K	Noise sensitive point: User defined (13)	440 369	6 236 062	80,0	1,5	45,0	13,9	5 736	Yes
L	Noise sensitive point: User defined (14)	439 907	6 236 095	80,0	1,5	45,0	13,9	5 728	Yes
M	Noise sensitive point: User defined (15)	439 685	6 235 657	81,0	1,5	45,0	13,2	6 187	Yes
N	Noise sensitive point: User defined (16)	440 283	6 234 920	85,0	1,5	45,0	12,1	6 880	Yes
O	Noise sensitive point: User defined (17)	441 183	6 236 156	82,7	1,5	45,0	13,9	5 688	Yes
P	Noise sensitive point: User defined (18)	441 764	6 236 483	84,1	1,5	45,0	14,3	5 469	Yes
Q	Noise sensitive point: User defined (19)	439 828	6 235 577	81,7	1,5	45,0	13,0	6 251	Yes
R	Noise sensitive point: User defined (20)	439 694	6 235 284	83,0	1,5	45,0	12,6	6 556	Yes
S	Noise sensitive point: User defined (21)	438 848	6 238 952	75,0	1,5	45,0	20,1	3 241	Yes
T	Noise sensitive point: User defined (22)	437 966	6 239 316	75,0	1,5	45,0	19,8	3 454	Yes
U	Noise sensitive point: User defined (23)	437 637	6 236 022	75,8	1,5	45,0	13,0	6 404	Yes
V	Noise sensitive point: User defined (24)	438 766	6 235 103	80,0	1,5	45,0	12,1	6 897	Yes
W	Noise sensitive point: User defined (25)	437 811	6 239 233	75,0	1,5	45,0	19,3	3 620	Yes
X	Noise sensitive point: User defined (26)	436 480	6 238 962	77,7	1,5	45,0	16,4	4 703	Yes

To be continued on next page...

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2022-04-11 16:46/3.4.424

DECIBEL - Main Result

Calculation: SAZ 6 v.

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Y	X	Z	Immission height	Noise	From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
Y	Noise sensitive point: User defined (11)	436 507	6 238 908	76,5	1,5	45,0	16,4	4 731	Yes
Z	Noise sensitive point: User defined (27)	438 951	6 242 419	76,3	1,5	45,0	36,3	453	Yes
AB	Noise sensitive point: User defined (32)	441 931	6 239 511	80,0	1,5	45,0	22,0	2 636	Yes
AC	Noise sensitive point: User defined (33)	441 381	6 236 794	82,1	1,5	45,0	15,1	5 087	Yes
AD	Noise sensitive point: User defined (34)	441 603	6 236 606	83,3	1,5	45,0	14,6	5 314	Yes
AE	Noise sensitive point: User defined (35)	438 163	6 235 914	77,6	1,5	45,0	13,1	6 299	Yes
AF	Noise sensitive point: User defined (36)	441 037	6 240 954	76,7	1,5	45,0	31,5	997	Yes

Distances (m)

	WTG					
NSA	34	35	36	37	38	39
A	3667	4326	3618	4262	3661	4013
B	2668	3174	2418	3289	2070	2320
C	1336	2002	1334	1940	1758	2230
D	2254	2954	2345	2794	2754	3209
E	1971	2668	2205	2404	2859	3342
F	2149	2664	2581	2225	3506	3979
G	2258	2738	2701	2286	3643	4111
H	3083	3776	3310	3490	3892	4364
I	5026	5603	5402	5177	6205	6691
J	5090	5680	5455	5262	6238	6724
K	5919	6548	6245	6157	6946	7426
L	5911	6562	6209	6192	6858	7333
M	6370	7027	6656	6665	7280	7751
N	7063	7693	7383	7302	8066	8543
O	5871	6453	6240	6028	7024	7510
P	5653	6191	6052	5745	6894	7379
Q	6434	7086	6729	6716	7368	7841
R	6739	7395	7028	7029	7653	8124
S	3426	4131	3574	3905	4003	4450
T	3642	4330	3667	4204	3856	4249
U	6589	7292	6743	7038	7107	7526
V	7081	7763	7319	7436	7844	8297
W	3809	4495	3825	4374	3990	4374
X	4986	5639	4922	5583	4876	5181
Y	4998	5654	4939	5593	4904	5213
Z	1561	1849	1151	2103	627	996
AB	2880	3289	3339	2816	4302	4762
AC	5270	5833	5655	5399	6472	6958
AD	5497	6045	5891	5605	6722	7208
AE	6483	7181	6673	6898	7108	7544
AF	1183	1661	1643	1229	2618	3070

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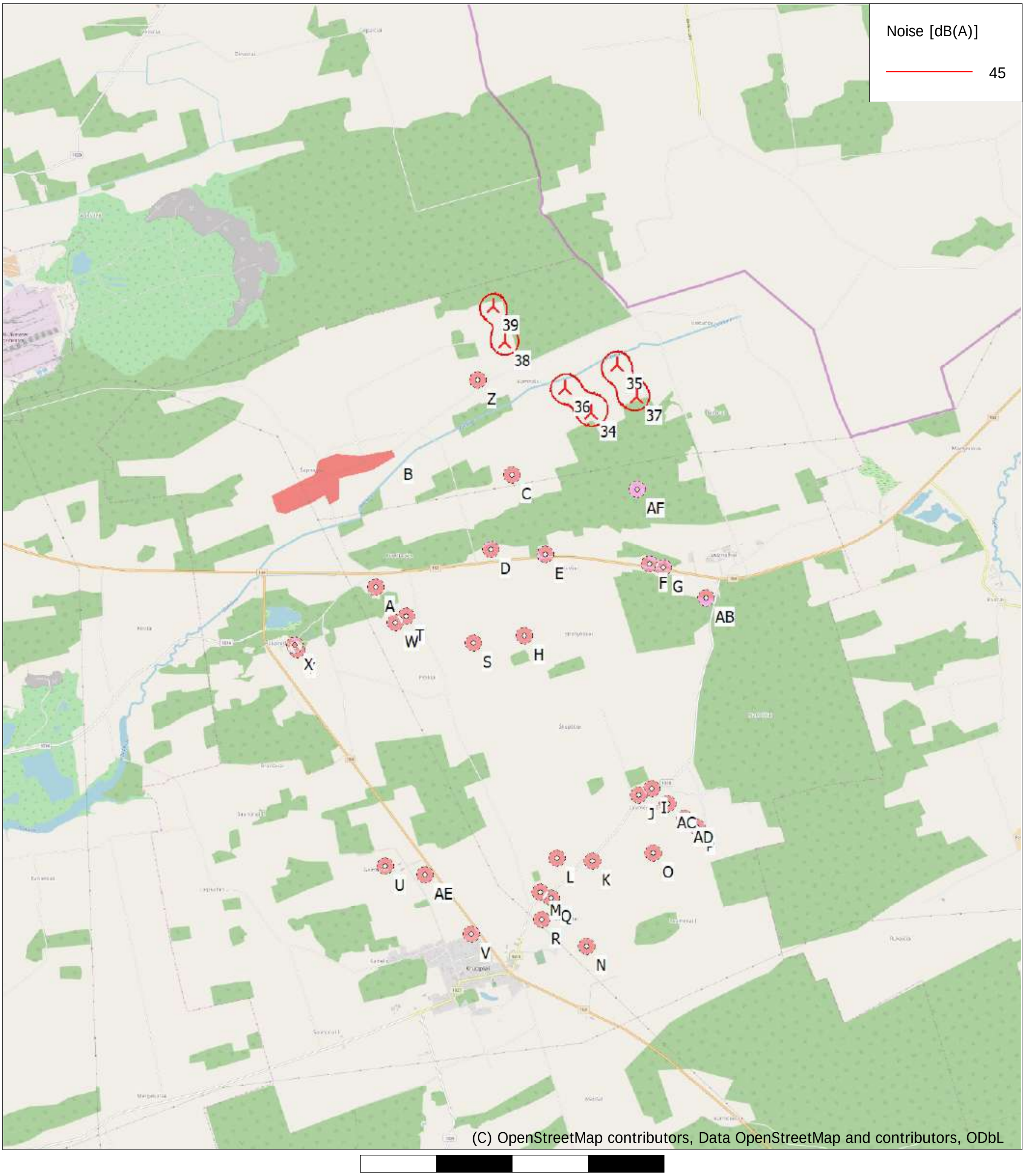
DECIBEL - Map 10,0 m/s

Calculation: SAZ 6 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 125 North: 6 239 655
New WTG   Noise sensitive area
Noise calculation model: ISO 9613-2 General. Wind speed: 10,0 m/s
Height above sea level from active line object

Project: Akmene

Description: SAZ, 7 v.

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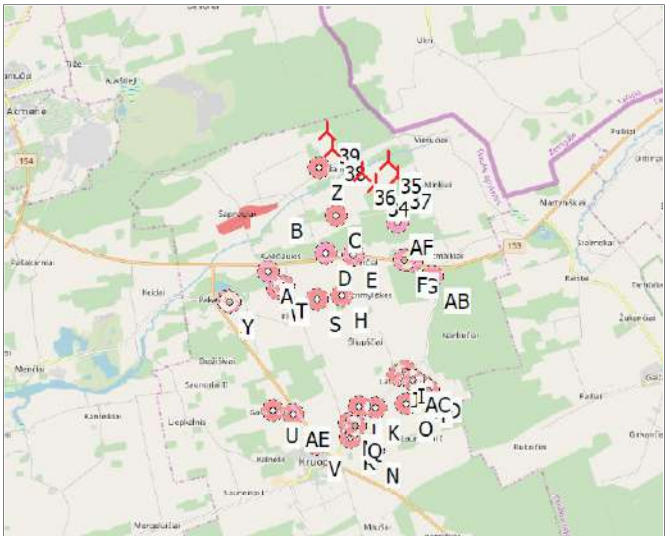
DECIBEL - Main Result

Calculation: SAZ 7 v.

Noise calculation model:
 ISO 9613-2 General
Wind speed (in 10 m height):
 10,0 m/s
Ground attenuation:
 General, Ground factor: 0,9
Meteorological coefficient, C0:
 0,0 dB
Type of demand in calculation:
 1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
 All noise values are mean values (Lwa) (Normal)
Pure tones:
 Fixed penalty added to source noise of WTGs with pure tones
 WTG catalogue
Height above ground level, when no value in NSA object:
 1,5 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
 0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
 0,0 dB(A)

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:200 000
New WTG
Noise sensitive area

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	LwA,ref
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]
34	440 449	6 241 981	75,0	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h
35	440 792	6 242 597	76,1	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h
36	440 096	6 242 301	75,0	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h
37	441 041	6 242 183	75,0	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h
38	439 317	6 242 928	77,4	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h
39	439 169	6 243 391	78,1	VESTAS V162-7.2 7200 16...	No	VESTAS	V162-7.2-7 200	7 200	162,0	149,0	USER	Level 0 - Measured - Mode PO7200	10,0	105,5 h

h) Generic octave distribution used

Calculation Results

Sound level

Noise sensitive area No.	Name	Y	X	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (2)	437 569	6 239 711	75,0	1,5	45,0	20,0	3 424	Yes
B	Noise sensitive area: User defined (1)	437 806	6 241 513	75,0	1,5	45,0	25,5	1 888	Yes
C	Noise sensitive point: User defined (4)	439 386	6 241 171	75,0	1,5	45,0	30,8	1 136	Yes
D	Noise sensitive point: User defined (5)	439 090	6 240 183	75,0	1,5	45,0	25,0	2 059	Yes
E	Noise sensitive point: User defined (6)	439 819	6 240 113	75,1	1,5	45,0	26,0	1 780	Yes
F	Noise sensitive point: User defined (7)	441 189	6 239 963	78,6	1,5	45,0	25,2	1 957	Yes
G	Noise sensitive point: User defined (8)	441 376	6 239 922	79,0	1,5	45,0	24,7	2 065	Yes
H	Noise sensitive point: User defined (9)	439 522	6 239 041	75,0	1,5	45,0	21,1	2 891	Yes
I	Noise sensitive point: User defined (10)	441 173	6 237 007	81,0	1,5	45,0	15,6	4 836	Yes
J	Noise sensitive point: User defined (12)	441 000	6 236 921	80,5	1,5	45,0	15,5	4 899	Yes
K	Noise sensitive point: User defined (13)	440 369	6 236 062	80,0	1,5	45,0	14,0	5 729	Yes
L	Noise sensitive point: User defined (14)	439 907	6 236 095	80,0	1,5	45,0	14,0	5 720	Yes
M	Noise sensitive point: User defined (15)	439 685	6 235 657	81,0	1,5	45,0	13,2	6 179	Yes
N	Noise sensitive point: User defined (16)	440 283	6 234 920	85,0	1,5	45,0	12,2	6 872	Yes
O	Noise sensitive point: User defined (17)	441 183	6 236 156	82,7	1,5	45,0	14,0	5 680	Yes
P	Noise sensitive point: User defined (18)	441 764	6 236 483	84,1	1,5	45,0	14,4	5 462	Yes
Q	Noise sensitive point: User defined (19)	439 828	6 235 577	81,7	1,5	45,0	13,1	6 243	Yes
R	Noise sensitive point: User defined (20)	439 694	6 235 284	83,0	1,5	45,0	12,7	6 549	Yes
S	Noise sensitive point: User defined (21)	438 848	6 238 952	75,0	1,5	45,0	20,1	3 233	Yes
T	Noise sensitive point: User defined (22)	437 966	6 239 316	75,0	1,5	45,0	19,8	3 446	Yes
U	Noise sensitive point: User defined (23)	437 637	6 236 022	75,8	1,5	45,0	13,0	6 397	Yes
V	Noise sensitive point: User defined (24)	438 766	6 235 103	80,0	1,5	45,0	12,2	6 890	Yes
W	Noise sensitive point: User defined (25)	437 811	6 239 233	75,0	1,5	45,0	19,3	3 613	Yes
X	Noise sensitive point: User defined (26)	436 480	6 238 962	77,7	1,5	45,0	16,5	4 695	Yes

To be continued on next page...

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DECIBEL - Main Result

Calculation: SAZ 7 v.

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Y	X	Z	Immission height	Noise	From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
Y	Noise sensitive point: User defined (11)	436 507	6 238 908	76,5	1,5	45,0	16,5	4 723	Yes
Z	Noise sensitive point: User defined (27)	438 951	6 242 419	76,3	1,5	45,0	36,3	445	Yes
AB	Noise sensitive point: User defined (32)	441 931	6 239 511	80,0	1,5	45,0	22,0	2 628	Yes
AC	Noise sensitive point: User defined (33)	441 381	6 236 794	82,1	1,5	45,0	15,1	5 079	Yes
AD	Noise sensitive point: User defined (34)	441 603	6 236 606	83,3	1,5	45,0	14,7	5 306	Yes
AE	Noise sensitive point: User defined (35)	438 163	6 235 914	77,6	1,5	45,0	13,2	6 292	Yes
AF	Noise sensitive point: User defined (36)	441 037	6 240 954	76,7	1,5	45,0	31,6	990	Yes

Distances (m)

	WTG					
NSA	34	35	36	37	38	39
A	3667	4326	3618	4262	3661	4013
B	2668	3174	2418	3289	2070	2320
C	1336	2002	1334	1940	1758	2230
D	2254	2954	2345	2794	2754	3209
E	1971	2668	2205	2404	2859	3342
F	2149	2664	2581	2225	3506	3979
G	2258	2738	2701	2286	3643	4111
H	3083	3776	3310	3490	3892	4364
I	5026	5603	5402	5177	6205	6691
J	5090	5680	5455	5262	6238	6724
K	5919	6548	6245	6157	6946	7426
L	5911	6562	6209	6192	6858	7333
M	6370	7027	6656	6665	7280	7751
N	7063	7693	7383	7302	8066	8543
O	5871	6453	6240	6028	7024	7510
P	5653	6191	6052	5745	6894	7379
Q	6434	7086	6729	6716	7368	7841
R	6739	7395	7028	7029	7653	8124
S	3426	4131	3574	3905	4003	4450
T	3642	4330	3667	4204	3856	4249
U	6589	7292	6743	7038	7107	7526
V	7081	7763	7319	7436	7844	8297
W	3809	4495	3825	4374	3990	4374
X	4986	5639	4922	5583	4876	5181
Y	4998	5654	4939	5593	4904	5213
Z	1561	1849	1151	2103	627	996
AB	2880	3289	3339	2816	4302	4762
AC	5270	5833	5655	5399	6472	6958
AD	5497	6045	5891	5605	6722	7208
AE	6483	7181	6673	6898	7108	7544
AF	1183	1661	1643	1229	2618	3070

Project: Akmene

Description: SAZ, 7 v.

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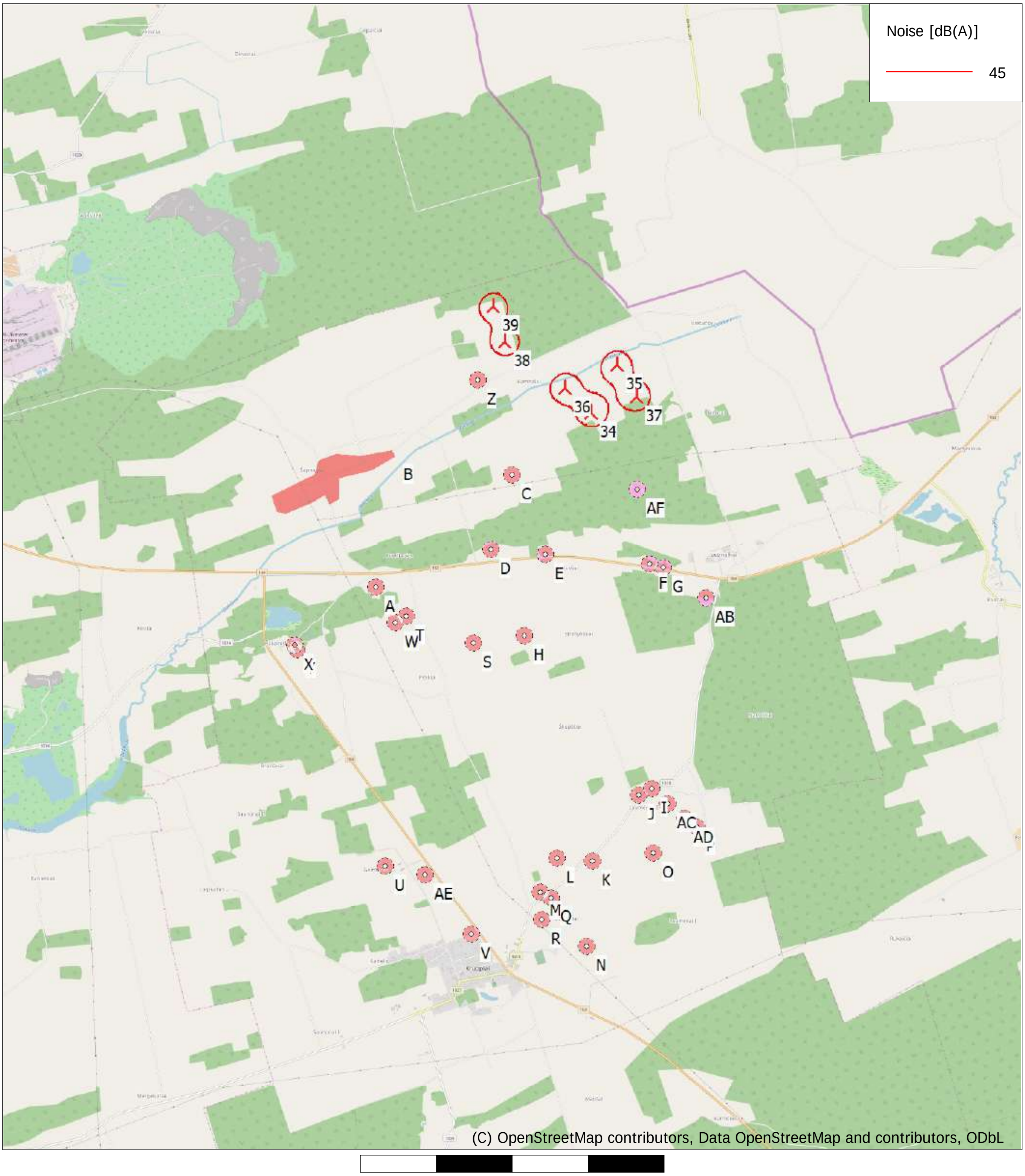
DECIBEL - Map 10,0 m/s

Calculation: SAZ 7 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 125 North: 6 239 655

New WTG Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 10,0 m/s

Height above sea level from active line object

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Calculated:
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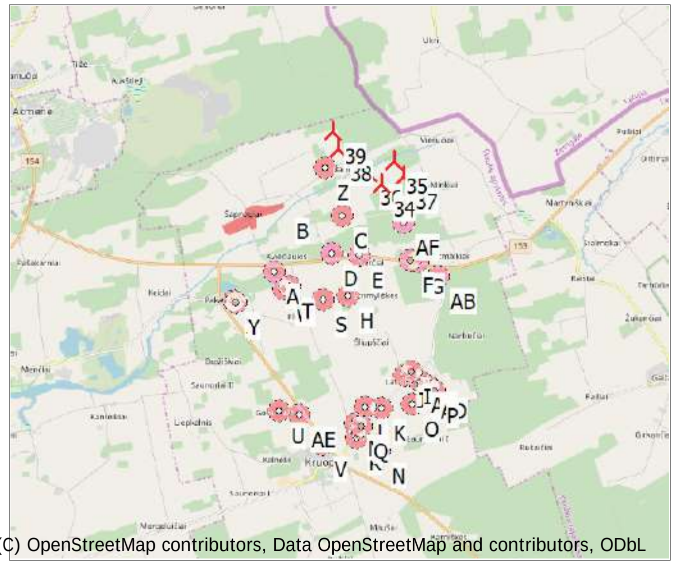
DECIBEL - Main Result

Calculation: SAZ 8 v.

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
10,0 m/s
Ground attenuation:
General, Ground factor: 0,9
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones
WTG catalogue
Height above ground level, when no value in NSA object:
1,5 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)



Scale 1:200 000
New WTG
Noise sensitive area

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	Status	LwA,ref
			[m]					[kW]	[m]	[m]			[m/s]		[dB(A)]
34	440 449	6 241 981	75,0	GE WIND ENERGY 6.1-158 ...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0	From other hub height	107,0 h
35	440 792	6 242 597	76,1	GE WIND ENERGY 6.1-158 ...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0	From other hub height	107,0 h
36	440 096	6 242 301	75,0	GE WIND ENERGY 6.1-158 ...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0	From other hub height	107,0 h
37	441 041	6 242 183	75,0	GE WIND ENERGY 6.1-158 ...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0	From other hub height	107,0 h
38	439 317	6 242 928	77,4	GE WIND ENERGY 6.1-158 ...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0	From other hub height	107,0 h
39	439 169	6 243 391	78,1	GE WIND ENERGY 6.1-158 ...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0	From other hub height	107,0 h

h) Generic octave distribution used

Calculation Results

Sound level

Noise sensitive area No.	Name	Y	X	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (2)	437 569	6 239 711	75,0	1,5	45,0	21,5	3 372	Yes
B	Noise sensitive area: User defined (1)	437 806	6 241 513	75,0	1,5	45,0	27,0	1 842	Yes
C	Noise sensitive point: User defined (4)	439 386	6 241 171	75,0	1,5	45,0	32,3	1 079	Yes
D	Noise sensitive point: User defined (5)	439 090	6 240 183	75,0	1,5	45,0	26,5	2 008	Yes
E	Noise sensitive point: User defined (6)	439 819	6 240 113	75,1	1,5	45,0	27,5	1 732	Yes
F	Noise sensitive point: User defined (7)	441 189	6 239 963	78,6	1,5	45,0	26,7	1 908	Yes
G	Noise sensitive point: User defined (8)	441 376	6 239 922	79,0	1,5	45,0	26,2	2 015	Yes
H	Noise sensitive point: User defined (9)	439 522	6 239 041	75,0	1,5	45,0	22,6	2 843	Yes
I	Noise sensitive point: User defined (10)	441 173	6 237 007	81,0	1,5	45,0	17,0	4 787	Yes
J	Noise sensitive point: User defined (12)	441 000	6 236 921	80,5	1,5	45,0	16,9	4 851	Yes
K	Noise sensitive point: User defined (13)	440 369	6 236 062	80,0	1,5	45,0	15,4	5 681	Yes
L	Noise sensitive point: User defined (14)	439 907	6 236 095	80,0	1,5	45,0	15,4	5 672	Yes
M	Noise sensitive point: User defined (15)	439 685	6 235 657	81,0	1,5	45,0	14,6	6 131	Yes
N	Noise sensitive point: User defined (16)	440 283	6 234 920	85,0	1,5	45,0	13,6	6 824	Yes
O	Noise sensitive point: User defined (17)	441 183	6 236 156	82,7	1,5	45,0	15,4	5 632	Yes
P	Noise sensitive point: User defined (18)	441 764	6 236 483	84,1	1,5	45,0	15,8	5 413	Yes
Q	Noise sensitive point: User defined (19)	439 828	6 235 577	81,7	1,5	45,0	14,5	6 196	Yes
R	Noise sensitive point: User defined (20)	439 694	6 235 284	83,0	1,5	45,0	14,1	6 501	Yes
S	Noise sensitive point: User defined (21)	438 848	6 238 952	75,0	1,5	45,0	21,6	3 184	Yes
T	Noise sensitive point: User defined (22)	437 966	6 239 316	75,0	1,5	45,0	21,3	3 394	Yes
U	Noise sensitive point: User defined (23)	437 637	6 236 022	75,8	1,5	45,0	14,5	6 348	Yes
V	Noise sensitive point: User defined (24)	438 766	6 235 103	80,0	1,5	45,0	13,6	6 842	Yes
W	Noise sensitive point: User defined (25)	437 811	6 239 233	75,0	1,5	45,0	20,8	3 560	Yes
X	Noise sensitive point: User defined (26)	436 480	6 238 962	77,7	1,5	45,0	17,9	4 650	Yes

To be continued on next page...

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DECIBEL - Main Result

Calculation: SAZ 8 v.

...continued from previous page

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Y	X	Z	Immission height	Noise	From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
Y	Noise sensitive point: User defined (11)	436 507	6 238 908	76,5	1,5	45,0	17,9	4 678	Yes
Z	Noise sensitive point: User defined (27)	438 951	6 242 419	76,3	1,5	45,0	37,8	400	Yes
AB	Noise sensitive point: User defined (32)	441 931	6 239 511	80,0	1,5	45,0	23,5	2 580	Yes
AC	Noise sensitive point: User defined (33)	441 381	6 236 794	82,1	1,5	45,0	16,5	5 031	Yes
AD	Noise sensitive point: User defined (34)	441 603	6 236 606	83,3	1,5	45,0	16,1	5 258	Yes
AE	Noise sensitive point: User defined (35)	438 163	6 235 914	77,6	1,5	45,0	14,6	6 243	Yes
AF	Noise sensitive point: User defined (36)	441 037	6 240 954	76,7	1,5	45,0	33,0	939	Yes

Distances (m)

	WTG					
NSA	34	35	36	37	38	39
A	3667	4326	3618	4262	3661	4013
B	2668	3174	2418	3289	2070	2320
C	1336	2002	1334	1940	1758	2230
D	2254	2954	2345	2794	2754	3209
E	1971	2668	2205	2404	2859	3342
F	2149	2664	2581	2225	3506	3979
G	2258	2738	2701	2286	3643	4111
H	3083	3776	3310	3490	3892	4364
I	5026	5603	5402	5177	6205	6691
J	5090	5680	5455	5262	6238	6724
K	5919	6548	6245	6157	6946	7426
L	5911	6562	6209	6192	6858	7333
M	6370	7027	6656	6665	7280	7751
N	7063	7693	7383	7302	8066	8543
O	5871	6453	6240	6028	7024	7510
P	5653	6191	6052	5745	6894	7379
Q	6434	7086	6729	6716	7368	7841
R	6739	7395	7028	7029	7653	8124
S	3426	4131	3574	3905	4003	4450
T	3642	4330	3667	4204	3856	4249
U	6589	7292	6743	7038	7107	7526
V	7081	7763	7319	7436	7844	8297
W	3809	4495	3825	4374	3990	4374
X	4986	5639	4922	5583	4876	5181
Y	4998	5654	4939	5593	4904	5213
Z	1561	1849	1151	2103	627	996
AB	2880	3289	3339	2816	4302	4762
AC	5270	5833	5655	5399	6472	6958
AD	5497	6045	5891	5605	6722	7208
AE	6483	7181	6673	6898	7108	7544
AF	1183	1661	1643	1229	2618	3070

Project:
Akmene

Description:
SAZ, 8 v.

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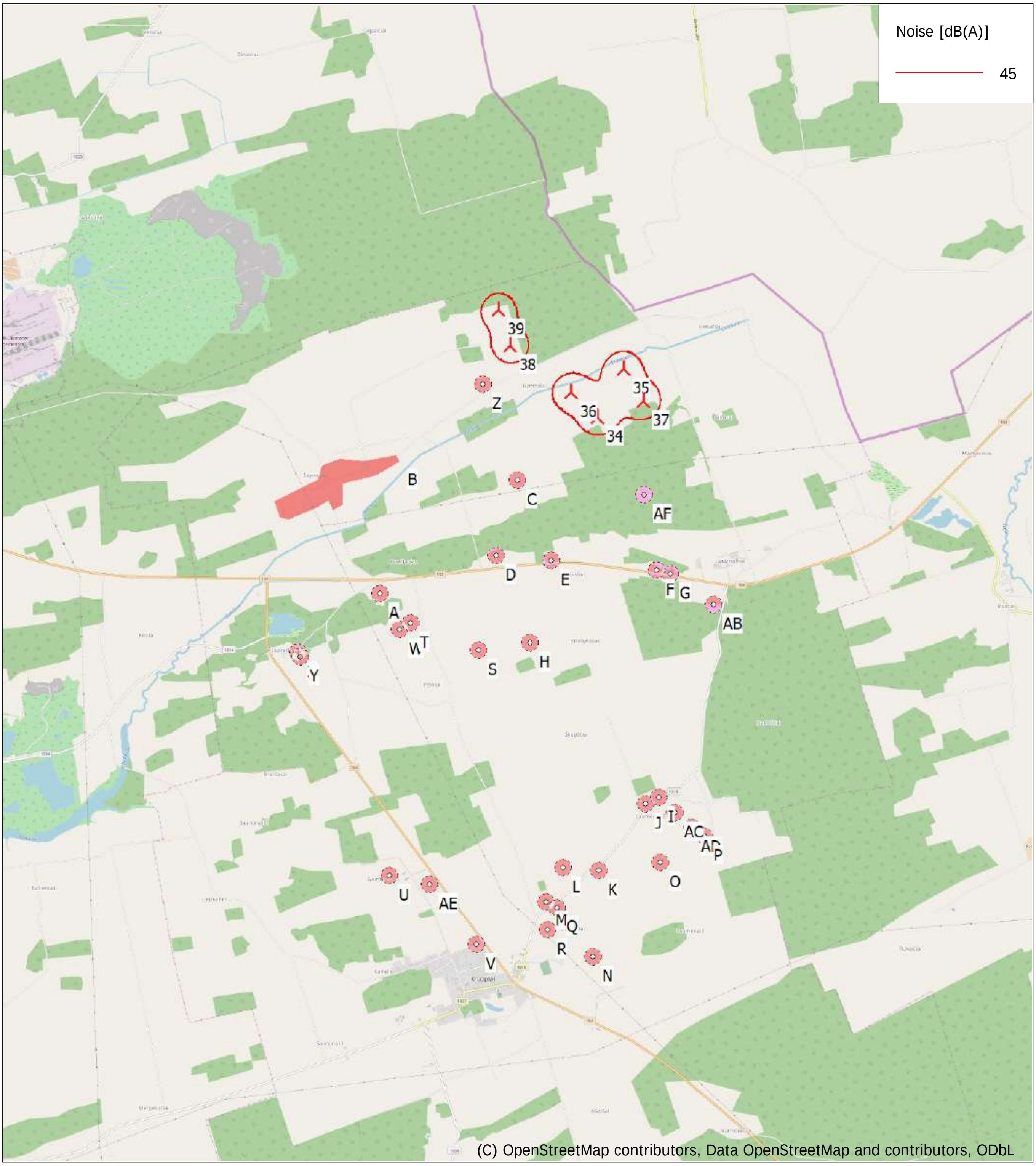
Calculated:
2022-04-11 16:48/3.4.424

DECIBEL - Map 10,0 m/s

Calculation: SAZ 8 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 125 North: 6 239 655

New WTG Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 10,0 m/s
Height above sea level from active line object

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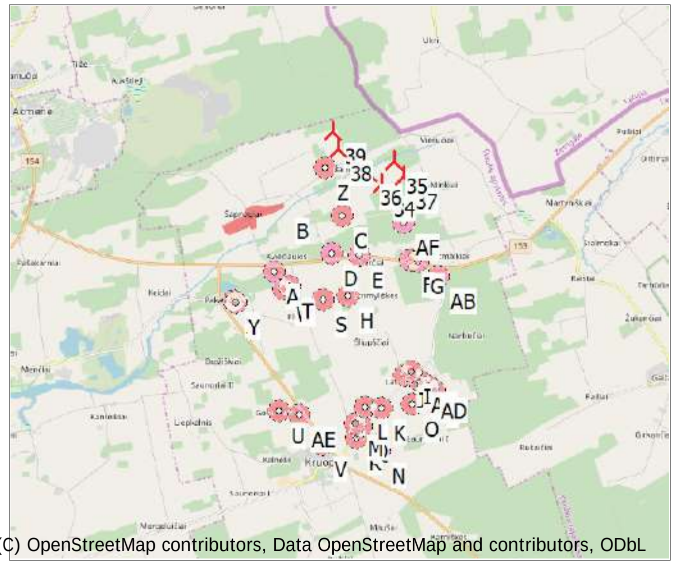
Calculated:
2022-04-11 17:00/3.4.424

DECIBEL - Main Result

Calculation: SAZ 9 v.

Noise calculation model:
 ISO 9613-2 General
Wind speed (in 10 m height):
 10,0 m/s
Ground attenuation:
 General, Ground factor: 0,9
Meteorological coefficient, C0:
 0,0 dB
Type of demand in calculation:
 1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
 All noise values are mean values (Lwa) (Normal)
Pure tones:
 Fixed penalty added to source noise of WTGs with pure tones
 WTG catalogue
Height above ground level, when no value in NSA object:
 1,5 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
 0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
 0,0 dB(A)



Scale 1:200 000
New WTG
Noise sensitive area

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)

WTGs

	Y	X	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	Status	LwA,ref	
			[m]					[kW]	[m]	[m]			[m/s]		[dB(A)]	
34	440 449	6 241 981	75,0	NORDEX N163/6.X 6800 163.0 ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	USER	Level 0_Mode 1_6800 kW_106,4 dB	10,0	From other hub height	106,4	h
35	440 792	6 242 597	76,1	NORDEX N163/6.X 6800 163.0 ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	USER	Level 0_Mode 1_6800 kW_106,4 dB	10,0	From other hub height	106,4	h
36	440 096	6 242 301	75,0	NORDEX N163/6.X 6800 163.0 ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	USER	Level 0_Mode 1_6800 kW_106,4 dB	10,0	From other hub height	106,4	h
37	441 041	6 242 183	75,0	NORDEX N163/6.X 6800 163.0 ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	USER	Level 0_Mode 1_6800 kW_106,4 dB	10,0	From other hub height	106,4	h
38	439 317	6 242 928	77,4	NORDEX N163/6.X 6800 163.0 ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	USER	Level 0_Mode 1_6800 kW_106,4 dB	10,0	From other hub height	106,4	h
39	439 169	6 243 391	78,1	NORDEX N163/6.X 6800 163.0 ...	Yes	NORDEX	N163/6.X-6 800	6 800	163,0	159,0	USER	Level 0_Mode 1_6800 kW_106,4 dB	10,0	From other hub height	106,4	h

h) Generic octave distribution used

Calculation Results

Sound level

Noise sensitive area No.	Name	Y	X	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (2)	437 569	6 239 711	75,0	1,5	45,0	20,9	3 396	Yes
B	Noise sensitive area: User defined (1)	437 806	6 241 513	75,0	1,5	45,0	26,4	1 863	Yes
C	Noise sensitive point: User defined (4)	439 386	6 241 171	75,0	1,5	45,0	31,7	1 106	Yes
D	Noise sensitive point: User defined (5)	439 090	6 240 183	75,0	1,5	45,0	25,9	2 032	Yes
E	Noise sensitive point: User defined (6)	439 819	6 240 113	75,1	1,5	45,0	26,9	1 754	Yes
F	Noise sensitive point: User defined (7)	441 189	6 239 963	78,6	1,5	45,0	26,1	1 931	Yes
G	Noise sensitive point: User defined (8)	441 376	6 239 922	79,0	1,5	45,0	25,6	2 039	Yes
H	Noise sensitive point: User defined (9)	439 522	6 239 041	75,0	1,5	45,0	22,0	2 865	Yes
I	Noise sensitive point: User defined (10)	441 173	6 237 007	81,0	1,5	45,0	16,4	4 810	Yes
J	Noise sensitive point: User defined (12)	441 000	6 236 921	80,5	1,5	45,0	16,3	4 873	Yes
K	Noise sensitive point: User defined (13)	440 369	6 236 062	80,0	1,5	45,0	14,8	5 703	Yes
L	Noise sensitive point: User defined (14)	439 907	6 236 095	80,0	1,5	45,0	14,8	5 694	Yes
M	Noise sensitive point: User defined (15)	439 685	6 235 657	81,0	1,5	45,0	14,1	6 153	Yes
N	Noise sensitive point: User defined (16)	440 283	6 234 920	85,0	1,5	45,0	13,0	6 846	Yes
O	Noise sensitive point: User defined (17)	441 183	6 236 156	82,7	1,5	45,0	14,8	5 654	Yes
P	Noise sensitive point: User defined (18)	441 764	6 236 483	84,1	1,5	45,0	15,2	5 436	Yes
Q	Noise sensitive point: User defined (19)	439 828	6 235 577	81,7	1,5	45,0	14,0	6 218	Yes
R	Noise sensitive point: User defined (20)	439 694	6 235 284	83,0	1,5	45,0	13,5	6 523	Yes
S	Noise sensitive point: User defined (21)	438 848	6 238 952	75,0	1,5	45,0	21,0	3 207	Yes
T	Noise sensitive point: User defined (22)	437 966	6 239 316	75,0	1,5	45,0	20,7	3 418	Yes
U	Noise sensitive point: User defined (23)	437 637	6 236 022	75,8	1,5	45,0	13,9	6 371	Yes
V	Noise sensitive point: User defined (24)	438 766	6 235 103	80,0	1,5	45,0	13,0	6 864	Yes
W	Noise sensitive point: User defined (25)	437 811	6 239 233	75,0	1,5	45,0	20,2	3 584	Yes
X	Noise sensitive point: User defined (26)	436 480	6 238 962	77,7	1,5	45,0	17,3	4 671	Yes
Y	Noise sensitive point: User defined (11)	436 507	6 238 908	76,5	1,5	45,0	17,3	4 699	Yes

To be continued on next page...

DECIBEL - Main Result

Calculation: SAZ 9 v.

...continued from previous page

Noise sensitive area

No.	Name	Y	X	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand	Demands fulfilled ? Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
Z	Noise sensitive point: User defined (27)	438 951	6 242 419	76,3	1,5	45,0	37,2	421	Yes
AB	Noise sensitive point: User defined (32)	441 931	6 239 511	80,0	1,5	45,0	22,9	2 602	Yes
AC	Noise sensitive point: User defined (33)	441 381	6 236 794	82,1	1,5	45,0	16,0	5 053	Yes
AD	Noise sensitive point: User defined (34)	441 603	6 236 606	83,3	1,5	45,0	15,5	5 280	Yes
AE	Noise sensitive point: User defined (35)	438 163	6 235 914	77,6	1,5	45,0	14,0	6 266	Yes
AF	Noise sensitive point: User defined (36)	441 037	6 240 954	76,7	1,5	45,0	32,5	963	Yes

Distances (m)

	WTG					
NSA	34	35	36	37	38	39
A	3667	4326	3618	4262	3661	4013
B	2668	3174	2418	3289	2070	2320
C	1336	2002	1334	1940	1758	2230
D	2254	2954	2345	2794	2754	3209
E	1971	2668	2205	2404	2859	3342
F	2149	2664	2581	2225	3506	3979
G	2258	2738	2701	2286	3643	4111
H	3083	3776	3310	3490	3892	4364
I	5026	5603	5402	5177	6205	6691
J	5090	5680	5455	5262	6238	6724
K	5919	6548	6245	6157	6946	7426
L	5911	6562	6209	6192	6858	7333
M	6370	7027	6656	6665	7280	7751
N	7063	7693	7383	7302	8066	8543
O	5871	6453	6240	6028	7024	7510
P	5653	6191	6052	5745	6894	7379
Q	6434	7086	6729	6716	7368	7841
R	6739	7395	7028	7029	7653	8124
S	3426	4131	3574	3905	4003	4450
T	3642	4330	3667	4204	3856	4249
U	6589	7292	6743	7038	7107	7526
V	7081	7763	7319	7436	7844	8297
W	3809	4495	3825	4374	3990	4374
X	4986	5639	4922	5583	4876	5181
Y	4998	5654	4939	5593	4904	5213
Z	1561	1849	1151	2103	627	996
AB	2880	3289	3339	2816	4302	4762
AC	5270	5833	5655	5399	6472	6958
AD	5497	6045	5891	5605	6722	7208
AE	6483	7181	6673	6898	7108	7544
AF	1183	1661	1643	1229	2618	3070

Project: Akmene

Description: SAZ, 9 v.

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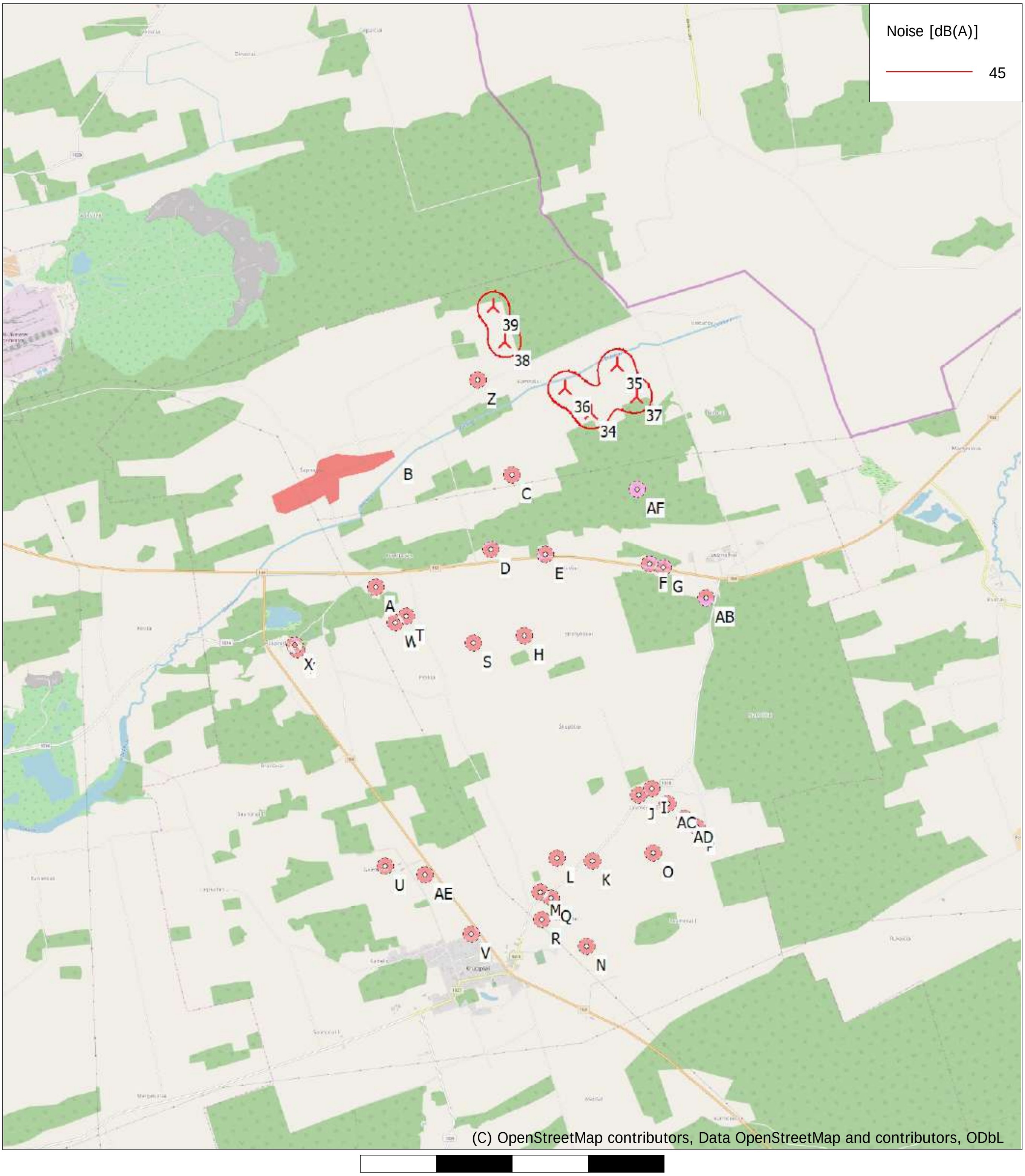
Calculated:
2022-04-11 17:00/3.4.424

DECIBEL - Map 10,0 m/s

Calculation: SAZ 9 v.



Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 125 North: 6 239 655

New WTG   Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 10,0 m/s

Height above sea level from active line object

Project: Akmene

Description: 10 v. suminis

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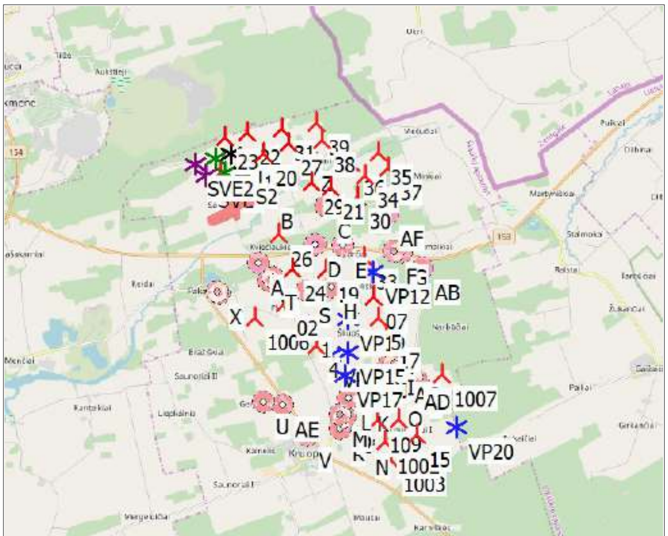
Calculated:
2022-04-12 10:49/3.4.424

DECIBEL - Main Result

Calculation: 10 v. suminis

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
10,0 m/s
Ground attenuation:
General, Ground factor: 0,9
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones
WTG catalogue
Height above ground level, when no value in NSA object:
1,5 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)

All coordinates are in
Lithuanian TM LKS94-LKS94 (LT)



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Scale 1:200 000

New WTG — Existing WTG — Noise sensitive area

WTGs

	Y	X	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data Creator	Name	Wind speed [m/s]	Status	LwA,ref [dB(A)]
02	438 245	6 238 645	75,0	Siemens Gamesa SG 5.0-145 MkII ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	EMD	AM 0 - 109.3dB(A)	10,0	From other hub height	109,3 f
07	440 630	6 238 767	76,4	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
1	438 883	6 238 023	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	139,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
10	440 668	6 235 489	84,3	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	120,9	USER	107,0 Mode	10,0		107,0 h
1002	440 878	6 234 931	85,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	120,9	USER	107,0 Mode	10,0		107,0 h
1003	441 032	6 234 442	85,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	120,9	USER	107,0 Mode	10,0		107,0 h
1006	437 459	6 238 265	75,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	141,0	USER	107,0 Mode	10,0		107,0 h
1007	442 387	6 236 687	84,5	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	120,9	USER	107,0 Mode	10,0		107,0 h
15	441 716	6 235 075	85,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	120,9	USER	107,0 Mode	10,0		107,0 h
17	440 942	6 237 733	80,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	141,0	USER	107,0 Mode	10,0		107,0 h
19	439 365	6 239 502	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
20	437 732	6 242 608	76,2	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
21	439 534	6 241 694	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
22	437 317	6 243 164	77,6	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
23	436 719	6 243 042	78,2	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
24	438 456	6 239 538	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
26	438 129	6 240 455	75,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0		107,0 h
27	438 416	6 242 886	76,6	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
28	436 585	6 242 096	75,3	Siemens Gamesa SG 5.0-145 MkII ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	157,5	EMD	AM 0 - 109.3dB(A)	10,0	From other hub height	109,3 f
29	439 012	6 241 800	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
30	440 217	6 241 414	75,0	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
31	438 230	6 243 267	77,1	VESTAS V162-6.2 6200 162.0 !O! h...	Yes	VESTAS	V162-6.2-6 200	6 200	162,0	149,0	USER	Level 0 - Measured - Mode PO6200 - 05-2021	10,0		104,8 h
33	440 370	6 239 809	77,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	151,0	USER	107,0 Mode	10,0		107,0 h
34	440 449	6 241 981	75,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0		107,0 h
35	440 792	6 242 597	76,1	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0		107,0 h
36	440 096	6 242 301	75,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0		107,0 h
37	441 041	6 242 183	75,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0		107,0 h
38	439 317	6 242 928	77,4	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0		107,0 h
39	439 169	6 243 391	78,1	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	161,0	USER	107,0 Mode	10,0		107,0 h
4	439 084	6 237 509	75,6	Siemens Gamesa SG 5.0-145 MkII ...	Yes	Siemens Gamesa	SG 5.0-145 MkII-5 000	5 000	145,0	127,5	EMD	AM 0 - 109.3dB(A)	10,0		109,3
5	440 728	6 238 225	77,4	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	141,0	USER	107,0 Mode	10,0		107,0 h
9	441 252	6 235 510	85,0	GE WIND ENERGY 6.1-158 6100 15...	No	GE WIND ENERGY	6.1-158-6 100	6 100	158,0	120,9	USER	107,0 Mode	10,0		107,0 h
E1	436 730	6 242 089	75,3	ENERCON E-66/18.70 1800 70.0 !O...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	65,0	USER	97,4	10,0		97,4 h
S1	436 894	6 242 632	76,9	NORDEX N149/4.0-4.5 4500 149.0 !...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	149,0	125,0	EMD	Serrations Mode 00 - 106.1 dB(A) - octave	10,0		106,1
S2	437 205	6 242 132	75,3	NORDEX N149/4.0-4.5 4500 149.0 !...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	149,0	125,0	EMD	Serrations Mode 00 - 106.1 dB(A) - octave	10,0		106,1
SVE1	436 217	6 242 044	76,3	NORDEX N90/2500 LS 2500 90.0 !...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	EMD	Level 0 - - - 04-2010	10,0		103,5
SVE2	435 945	6 242 342	78,8	NORDEX N90/2500 LS 2500 90.0 !...	Yes	NORDEX	N90/2500 LS-2 500	2 500	90,0	80,0	EMD	Level 0 - - - 04-2010	10,0		103,5
VP12	440 594	6 239 423	77,6	Siemens Gamesa SG 6.0-170 6200 ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0 g
VP15	439 909	6 237 291	77,2	Siemens Gamesa SG 6.0-170 6200 ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0 g
VP16	439 439	6 237 238	76,8	Siemens Gamesa SG 6.0-170 6200 ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0 g
VP17	439 822	6 236 701	79,0	Siemens Gamesa SG 6.0-170 6200 ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0 g
VP19	439 917	6 238 180	75,3	Siemens Gamesa SG 6.0-170 6200 ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0 g
VP20	442 748	6 235 292	85,0	Siemens Gamesa SG 6.0-170 6200 ...	Yes	Siemens Gamesa	SG 6.0-170-6 200	6 200	170,0	145,0	EMD	(AM 0, 6.2MW) - 106dB(A)	10,0	Extrapolated	106,0 g
VTP1	436 467	6 242 486	76,5	ENERCON E-66/18.70 1800 70.0 !O...	No	ENERCON	E-66/18.70-1 800	1 800	70,0	63,0	USER	0 - 99.0 dB(A)	10,0	Individual	99,0 h

f) From other hub height
h) Generic octave distribution used
g) Data calculated from data for other wind speed (uncertain)

Calculation Results

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Calculated:
2022-04-12 10:49/3.4.424

DECIBEL - Main Result

Calculation: 10 v. suminis

Sound level

Noise sensitive area						Demands	Sound level		Demands fulfilled ?
No.	Name	Y	X	Z	Immission height	Noise	From WTGs	Distance to noise demand	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	[m]	
A	Noise sensitive point: User defined (2)	437 569	6 239 711	75,0	1,5	45,0	36,9	713	Yes
B	Noise sensitive area: User defined (1)	437 068	6 241 474	75,0	1,5	45,0	39,8	396	Yes
C	Noise sensitive point: User defined (4)	439 386	6 241 171	75,0	1,5	45,0	39,6	356	Yes
D	Noise sensitive point: User defined (5)	439 090	6 240 183	75,0	1,5	45,0	38,2	566	Yes
E	Noise sensitive point: User defined (6)	439 819	6 240 113	75,1	1,5	45,0	39,3	390	Yes
F	Noise sensitive point: User defined (7)	441 189	6 239 963	78,6	1,5	45,0	37,3	560	Yes
G	Noise sensitive point: User defined (8)	441 376	6 239 922	79,0	1,5	45,0	36,1	693	Yes
H	Noise sensitive point: User defined (9)	439 522	6 239 041	75,0	1,5	45,0	40,3	316	Yes
I	Noise sensitive point: User defined (10)	441 173	6 237 007	81,0	1,5	45,0	38,1	518	Yes
J	Noise sensitive point: User defined (12)	441 000	6 236 921	80,5	1,5	45,0	38,2	569	Yes
K	Noise sensitive point: User defined (13)	440 369	6 236 062	80,0	1,5	45,0	39,5	388	Yes
L	Noise sensitive point: User defined (14)	439 907	6 236 095	80,0	1,5	45,0	38,8	400	Yes
M	Noise sensitive point: User defined (15)	439 685	6 235 657	81,0	1,5	45,0	36,4	740	Yes
N	Noise sensitive point: User defined (16)	440 283	6 234 920	85,0	1,5	45,0	40,2	310	Yes
O	Noise sensitive point: User defined (17)	441 183	6 236 156	82,7	1,5	45,0	39,4	379	Yes
P	Noise sensitive point: User defined (18)	441 764	6 236 483	84,1	1,5	45,0	38,4	418	Yes
Q	Noise sensitive point: User defined (19)	439 828	6 235 577	81,7	1,5	45,0	37,1	587	Yes
R	Noise sensitive point: User defined (20)	439 694	6 235 284	83,0	1,5	45,0	35,8	734	Yes
S	Noise sensitive point: User defined (21)	438 848	6 238 952	75,0	1,5	45,0	40,8	352	Yes
T	Noise sensitive point: User defined (22)	437 966	6 239 316	75,0	1,5	45,0	40,1	363	Yes
U	Noise sensitive point: User defined (23)	437 637	6 236 022	75,8	1,5	45,0	30,9	1 726	Yes
V	Noise sensitive point: User defined (24)	438 766	6 235 103	80,0	1,5	45,0	31,5	1 680	Yes
W	Noise sensitive point: User defined (25)	437 811	6 239 233	75,0	1,5	45,0	39,4	411	Yes
X	Noise sensitive point: User defined (26)	436 480	6 238 962	77,7	1,5	45,0	32,9	972	Yes
Y	Noise sensitive point: User defined (11)	436 507	6 238 908	76,5	1,5	45,0	33,2	919	Yes
Z	Noise sensitive point: User defined (27)	438 951	6 242 419	76,3	1,5	45,0	41,1	375	Yes
AB	Noise sensitive point: User defined (32)	441 931	6 239 511	80,0	1,5	45,0	33,5	1 115	Yes
AC	Noise sensitive point: User defined (33)	441 381	6 236 794	82,1	1,5	45,0	37,3	775	Yes
AD	Noise sensitive point: User defined (34)	441 603	6 236 606	83,3	1,5	45,0	37,6	551	Yes
AE	Noise sensitive point: User defined (35)	438 163	6 235 914	77,6	1,5	45,0	32,1	1 484	Yes
AF	Noise sensitive point: User defined (36)	441 037	6 240 954	76,7	1,5	45,0	36,6	757	Yes

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
02	1262	2517	2772	1755	2152	3225	3381	1337	3355	3250	3344	3044	3317	4246	3850	4130	3452	3660	677	727	2692	3580
07	3203	3864	2707	2092	1571	1320	1375	1141	1842	1883	2717	2768	3250	3862	2669	2550	3289	3606	1791	2720	4061	4111
1	2139	3375	3188	2170	2290	3013	3134	1202	2505	2387	2460	2183	2498	3404	2962	3267	2622	2856	930	1585	2357	2922
10	5237	6472	5825	4952	4701	4504	4489	3732	1600	1470	646	973	997	687	843	1480	845	995	3912	4684	3077	1941
1002	5813	7054	6416	5548	5289	5041	5016	4328	2097	1994	1240	1516	1396	595	1262	1787	1233	1235	4504	5264	3420	2119
1003	6305	7551	6927	6060	5799	5523	5491	4840	2569	2479	1750	1999	1814	888	1721	2168	1655	1581	5011	5758	3744	2360
1006	1450	2600	3487	2518	2997	4098	4253	2204	3921	3787	3650	3271	3429	4377	4279	4659	3583	3726	1550	1167	2250	3421
1007	5688	6578	5395	4805	4281	3488	3389	3708	1255	1407	2112	2550	2892	2747	1316	656	2789	3036	4202	5143	4796	3952
15	6220	7425	6526	5743	5383	4916	4859	4532	2007	1980	1670	2077	2113	1441	1205	1409	1954	2033	4822	5661	4187	2950
17	3910	4834	3774	3071	2632	2244	2232	1931	762	814	1766	1938	2427	2889	1595	1496	2427	2749	2423	3371	3721	3413
19	1808	2466	1669	734	761	1881	2054	487	3081	3055	3583	3450	3858	4673	3808	3856	3952	4231	755	1411	3885	4439
20	2901	1098	2191	2779	3253	4353	4527	3991	6573	6559	7057	6866	7220	8100	7317	7333	7336	7582	3822	3300	6586	7576
21	2792	1716	544	1575	1606	2395	2556	2653	4965	4993	5693	5611	6039	6815	5778	5668	6124	6412	2826	2848	5981	6635
22	3462	1706	2873	3468	3946	5024	5195	4675	7264	7248	7730	7528	7871	8761	8003	8025	7991	8230	4481	3902	7149	8190
23	3438	1606	3258	3714	4265	5428	5605	4885	7500	7469	7876	7643	7958	8869	8206	8274	8086	8308	4611	3929	7079	8198
24	904	1918	1879	904	1479	2766	2945	1176	3713	3650	3967	3736	4071	4966	4344	4503	4192	4430	705	538	3610	4446
26	931	998	1447	999	1724	3099	3290	1985	4599	4553	4931	4708	5044	5939	5273	5384	5165	5402	1666	1151	4460	5389
27	3286	1502	1970	2786	3108	4029	4189	4001	6493	6500	7098	6952	7339	8182	7276	7225	7444	7708	3958	3598	6908	7791
28	2580	744	2950	3152	3793	5074	5261	4238	6852	6802	7122	6859	7146	8072	7511	7637	7281	7488	3874	3104	6164	7325
29	2539	1229	732	1619	1870	2848	3019	2806	5257	5268	5896	5775	6180	6996	6047	5987	6276	6551	2853	2695	5939	6701
30	3148	2380	866	1669	1360	1746	1889	2473	4509	4561	5354	5328	5781	6494	5346	5168	5850	6152	2817	3077	5977	6475
31	3617	1804	2394	3202	3532	4435	4592	4419	6917	6924	7515	7365	7748	8595	7699	7649	7854	8116	4359	3960	7269	8181
33	2803	3011	1680	1333	629	833	1012	1144	2915	2956	3747	3743	4208	4890	3742	3606	4266	4575	1747	2454	4670	4972
34	3667	2668	1336	2254	1971	2149	2258	3083	5026	5090	5919	5911	6370	7063	5871	5653	6434	6739	3426	3642	6589	7081
35	4326	3174	2002	2954	2668	2664	2738	3776	5603	5680	6548	6562	7027	7693	6453	6191	7086	7395	4131	4330	7292	7763
36	3618	2418	1334	2345	2205	2581	2701	3310	5402	5455	6245	6209	6656	7383	6240	6052	6729	7028	3574	3667	6743	7319
37	4262	3289	1940	2794	2404	2225	2286	3490	5177	5262	6157	6192	6665	7302	6028	5745	6716	7029	3905	4204	7038	7436

To be continued on next page...

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Calculated:
2022-04-12 10:49/3.4.424

DECIBEL - Main Result

Calculation: 10 v. suminis

...continued from previous page

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
38	3661	2070	1758	2754	2859	3506	3643	3892	6205	6238	6946	6858	7280	8066	7024	6894	7368	7653	4003	3856	7107	7844
39	4013	2320	2230	3209	3342	3979	4111	4364	6691	6724	7426	7333	7751	8543	7510	7379	7841	8124	4450	4249	7526	8297
4	2673	3918	3674	2674	2706	3233	3328	1593	2148	2004	1935	1636	1947	2853	2497	2870	2070	2307	1462	2125	2075	2427
5	3491	4322	3237	2553	2095	1798	1816	1456	1297	1332	2192	2283	2772	3335	2118	2027	2797	3117	2016	2970	3796	3687
9	5587	6796	5960	5149	4821	4453	4414	3932	1499	1433	1041	1467	1574	1134	650	1099	1426	1574	4198	5028	3651	2519
E1	2522	691	2810	3033	3667	4940	5126	4133	6750	6703	7040	6784	7078	8001	7418	7534	7211	7422	3785	3036	6134	7276
S1	2998	1171	2889	3289	3860	5056	5237	4450	7067	7033	7432	7198	7512	8423	7767	7844	7640	7863	4166	3485	6651	7758
S2	2448	668	2383	2711	3303	4536	4720	3863	6481	6446	6845	6614	6933	7841	7179	7259	7060	7286	3579	2917	6125	7200
SVE1	2696	896	3287	3423	4087	5390	5578	4465	7066	7008	7281	7000	7267	8202	7702	7854	7406	7601	4060	3240	6187	7394
SVE2	3092	1299	3635	3815	4469	5758	5945	4867	7469	7412	7681	7397	7660	8596	8105	8257	7800	7991	4463	3639	6542	7769
VP12	3039	3415	2125	1685	1038	803	928	1138	2484	2535	3368	3398	3874	4514	3320	3164	3921	4236	1808	2630	4506	4691
VP15	3366	4566	3915	3006	2823	2963	3012	1792	1295	1152	1312	1196	1649	2400	1706	2023	1716	2018	1971	2806	2602	2468
VP16	3100	4336	3933	2965	2900	3238	3310	1805	1749	1593	1499	1235	1600	2467	2052	2444	1706	1970	1813	2547	2174	2238
VP17	3760	4995	4491	3558	3412	3537	3576	2359	1385	1198	841	612	1053	1840	1466	1954	1124	1423	2453	3207	2288	1915
VP19	2803	3865	3038	2167	1935	2190	2272	947	1718	1661	2166	2085	2534	3280	2387	2508	2604	2904	1319	2258	3139	3285
VP20	6808	7867	6772	6107	5641	4924	4829	4946	2328	2389	2500	2952	3085	2493	1788	1545	2934	3054	5348	6250	5163	3986
VTP1	2986	1151	3201	3490	4107	5353	5538	4604	7222	7177	7516	7258	7549	8473	7893	8005	7683	7891	4261	3506	6569	7732

WTG	W	X	Y	Z	AB	AC	AD	AE	AF
02	731	1793	1758	3839	3786	3641	3928	2732	3623
07	2857	4154	4125	4019	1499	2111	2370	3771	2224
1	1616	2580	2535	4396	3392	2784	3067	2228	3637
10	4709	5440	5385	7139	4215	1487	1457	2541	5477
1002	5283	5966	5909	7732	4699	1930	1825	2887	6025
1003	5773	6415	6357	8244	5148	2378	2238	3224	6512
1006	1030	1202	1149	4414	4642	4189	4464	2454	4476
1007	5236	6330	6285	6683	2860	1012	788	4294	4475
15	5704	6521	6467	7847	4441	1751	1535	3651	5918
17	3472	4628	4588	5091	2034	1037	1306	3321	3222
19	1577	2935	2919	2946	2566	3376	3660	3784	2214
20	3376	3855	3897	1234	5217	6864	7142	6708	3696
21	3004	4097	4114	930	3242	5236	5492	5940	1675
22	3962	4284	4332	1796	5885	7556	7834	7299	4327
23	3962	4087	4139	2317	6295	7795	8079	7272	4796
24	713	2058	2048	2923	3475	4010	4301	3636	2944
26	1263	2224	2241	2129	3917	4897	5185	4541	2950
27	3703	4375	4412	710	4873	6775	7042	6976	3256
28	3114	3136	3189	2388	5938	7149	7437	6380	4596
29	2834	3803	3826	622	3709	5538	5804	5947	2195
30	3247	4469	4477	1616	2561	4764	5004	5871	940
31	4056	4647	4687	1113	5273	7199	7466	7353	3637
33	2623	3981	3966	2971	1589	3180	3432	4477	1325
34	3809	4986	4998	1561	2880	5270	5497	6483	1183
35	4495	5639	5654	1849	3289	5833	6045	7181	1661
36	3825	4922	4939	1151	3339	5655	5891	6673	1643
37	4374	5583	5593	2103	2816	5399	5605	6898	1229
38	3990	4876	4904	627	4302	6472	6722	7108	2618
39	4374	5181	5213	996	4762	6958	7208	7544	3070
4	2143	2982	2932	4912	3480	2406	2676	1842	3960
5	3086	4311	4276	4555	1761	1573	1840	3452	2746
9	5069	5889	5836	7282	4058	1290	1151	3115	5448
E1	3054	3137	3189	2245	5805	7047	7335	6339	4454
S1	3520	3693	3744	2068	5925	7363	7647	6836	4470
S2	2961	3252	3298	1769	5404	6777	7062	6291	4009
SVE1	3231	3093	3149	2759	6250	7364	7653	6431	4941
SVE2	3626	3422	3479	3007	6621	7767	8057	6799	5277
VP12	2789	4140	4119	3417	1340	2744	2992	4269	1594
VP15	2859	3814	3767	5216	3003	1554	1827	2224	3833
VP16	2575	3424	3374	5204	3373	1992	2254	1839	4045
VP17	3233	4035	3982	5784	3513	1562	1783	1836	4423
VP19	2354	3525	3487	4347	2414	2016	2306	2865	2991
VP20	6317	7263	7213	8075	4297	2031	1743	4627	5915
VTP1	3519	3524	3578	2485	6221	7519	7807	6787	4820

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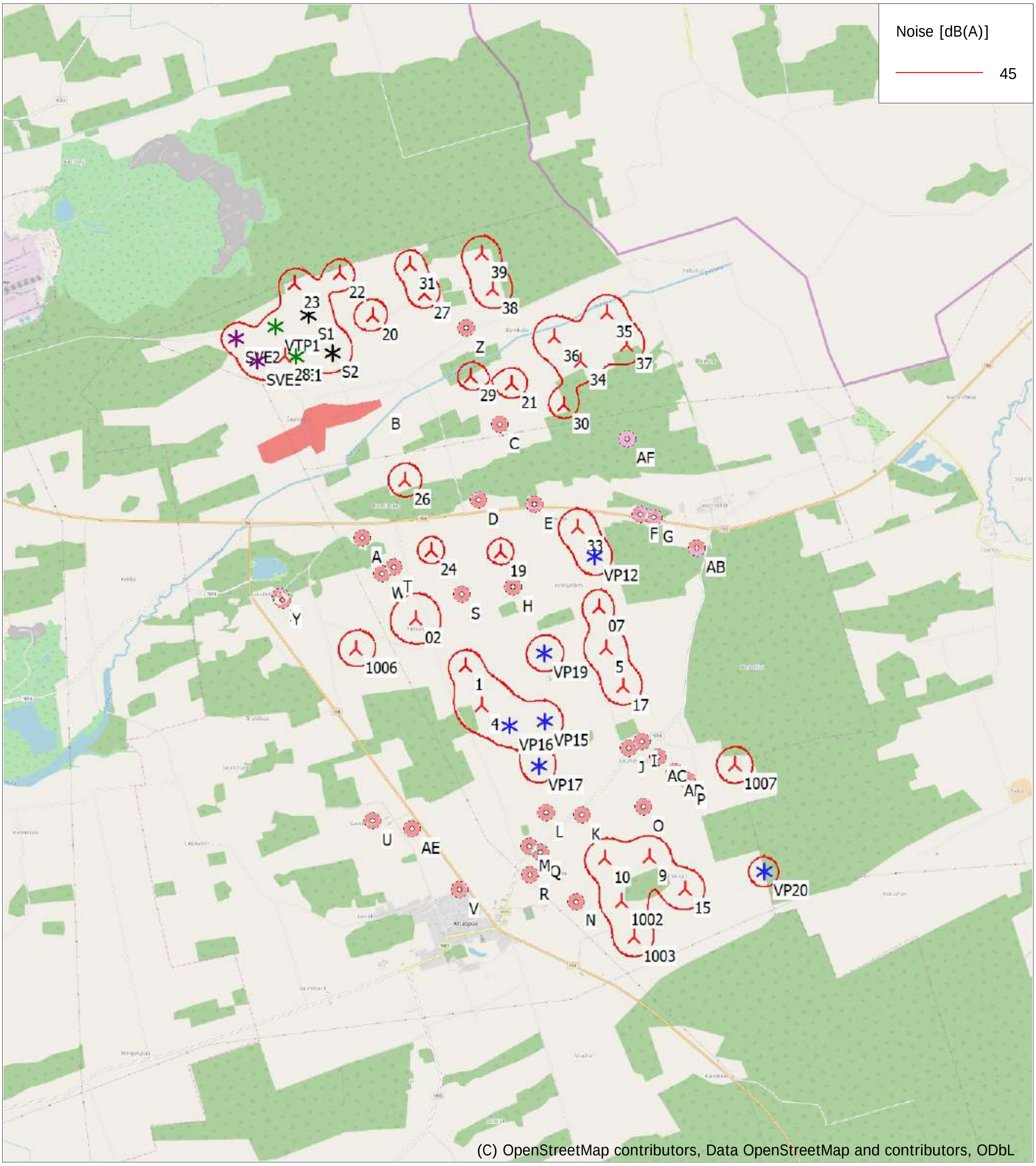
2022-04-12 10:49/3.4.424

DECIBEL - Map 10,0 m/s

Calculation: 10 v. suminis



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 439 347 North: 6 238 916

New WTG Existing WTG Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 10,0 m/s

Height above sea level from active line object

DETALŪS METADUOMENYS	
Dokumento sudarytojas (-ai)	Lietuvos Respublikos aplinkos ministerija, A. Jakšto g. 4, 01105 Vilnius
Dokumento pavadinimas (antraštė)	SUMMARY OF THE EIA REPORT FOR PROJECT "WINDFARM OF UP TO 6 WIND TURBINES IN AKMENĖ DISTRICT MUNICIPALITY, KRUOPIŲ ELDERSHIP, C1 ZONE"
Dokumento registracijos data ir numeris	2022-05-19 Nr. (10)-D8(E)-2732
Dokumento specifikacijos identifikavimo žymuo	ADOC-V1.0, GEDOC
Parašo paskirtis	Pasirašymas
Parašą sukūrusio asmens vardas, pavardė ir pareigos	VITALIJUS AUGLYS, Grupės vadovas
Parašo sukūrimo data ir laikas	2022-05-19 13:22:40
Parašo formatas	Parašas, pažymėtas laiko žyma
Laiko žymoje nurodytas laikas	2022-05-19 13:22:57
Informacija apie sertifikavimo paslaugų teikėją	ADIC CA-A
Sertifikato galiojimo laikas	2021-10-04 - 2024-10-03
Parašo paskirtis	Registravimas
Parašą sukūrusio asmens vardas, pavardė ir pareigos	Lina Krasauskienė, Vedėja
Parašo sukūrimo data ir laikas	2022-05-19 14:47:40
Parašo formatas	Trumpalaikis skaitmeninis parašas, kuriame taip pat saugoma sertifikato informacija
Laiko žymoje nurodytas laikas	
Informacija apie sertifikavimo paslaugų teikėją	RCSC IssuingCA
Sertifikato galiojimo laikas	2021-01-07 - 2023-01-07
Pagrindinio dokumento priedų skaičius	1
Pagrindinio dokumento pridedamų dokumentų skaičius	0
Programinės įrangos, kuria naudojantis sudarytas elektroninis dokumentas, pavadinimas	Elektroninė dokumentų valdymo sistema VDVIS, versija v. 3.04.02
El. dokumento įvykius aprašantys metaduomenys	
Informacija apie elektroninio dokumento ir elektroninio (-ių) parašo (-ų) tikrinimą (tikrinimo data)	El. dokumentas atitinka specifikacijos keliamus reikalavimus. Visi dokumente esantys elektroniniai parašai galioja. Tikrinimo data: 2022-05-20 17:10:24
Elektroninio dokumento nuorašo atspausdinimo data ir ją atspausdinęs darbuotojas	2022-05-20 atspausdino Mindaugas Raulinaitis
Paieškos nuoroda	