



Coastal Research and Planning Institute

**SCREENING DOCUMENTS FOR THE ENVIRONMENTAL IMPACT
ASSESSMENT OF THE INSTALLATION OF A 150 MW BATTERY ENERGY
STORAGE SYSTEM IN KELMĒ DISTRICT**



**Organisers of the planned
economic activity:**

UAB Ignitis Renewables Projekta 8

**Preparer of the EIA screening
documents:**

**Public Institution Pajūrio Research and
Planning Institute**



Coastal Research and Planning Institute

Environmental Impact Assessment (EIA) screening documents for the construction of a 150 MW electricity storage system in the Kelmė district

Location of the planned economic activity:

Kelmė District Municipality, Kražiai Eldership, Dvarviečiai Village. Land plot cadastral No. 5407/0001:499

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1. INFORMATION ABOUT THE ORGANISERS OF THE PLANNED ECONOMIC ACTIVITY

1.1 Contact details of the organisers of the planned economic activity (PEA)

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In accordance with the Procedure for the Screening of Planned Economic Activities for Environmental Impact Assessment, approved by Order No. D1-845 of the Minister of the Environment of the Republic of Lithuania dated 16 October 2017 (consolidated version in force from 7 October 2023), the requirements of paragraph 44, Annex 1 to the screening document for environmental impact assessment contains a declaration signed by the preparer of the environmental impact assessment (hereinafter – EIA) signed by the preparer of the EIA documents, declaring that the preparer of the EIA documents complies with the requirements set out in Article 5(3) of the Law of the Republic of Lithuania on the Environmental Impact Assessment of Planned Economic Activities.

2. DESCRIPTION OF THE PLANNED ECONOMIC ACTIVITY

2.1. Name of the planned economic activity

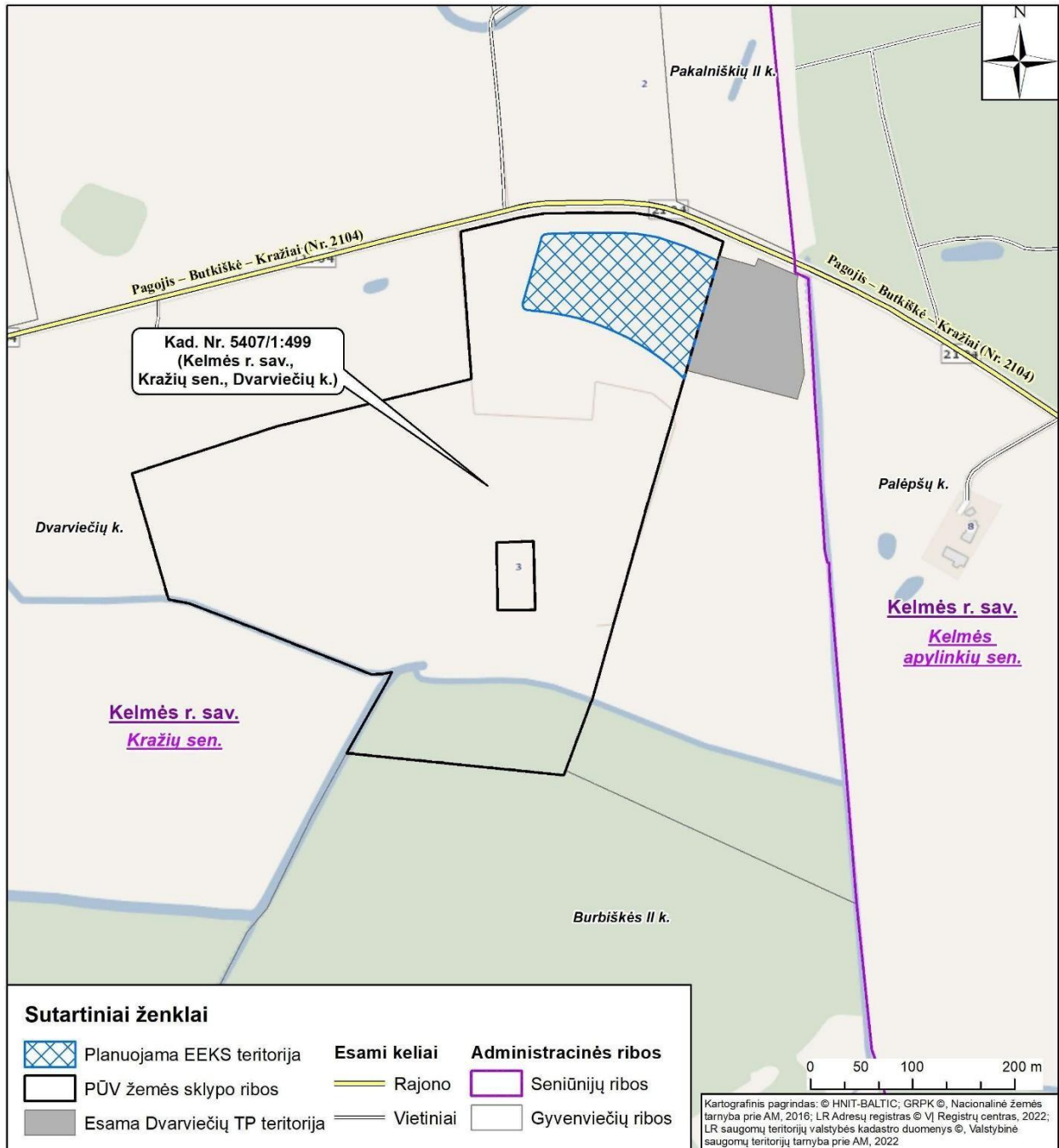
Proposed economic activity (hereinafter – PEA) – the installation and operation of a 150 MW electricity storage system (hereinafter – BESS or Storage Facilities) with ancillary equipment in Kelmė District Municipality, Kražiai Eldership, Dvarviečiai village, land plot cadastral No. 5407/0001:499, unique property No. 4400-5315-5847. The area of the PEA plot is 17.1132 ha. The area of the site planned for the BESS is approximately 1.69 ha.

The screening documents are being prepared in accordance with sub-paragraph 10.2 of paragraph 10 of Annex 2 to the Law of the Republic of Lithuania on the Environmental Impact Assessment of Planned Economic Activities (hereinafter referred to as the EIA Law) No. I-1495, ‘Engineering and other structures’: ‘urban development projects (excluding residential buildings where their construction is provided for in municipal-level master plans), including shopping or entertainment centres, bus or trolleybus depots, car parks or garage complexes, sports and wellness centres, where the area occupied by the facility and its ancillary structures exceeds 1 ha’.

The screening information has been prepared in accordance with the Procedure for the Screening of Planned Economic Activities for Environmental Impact Assessment, approved by Order No. D1-845 of the Minister of the Environment of the Republic of Lithuania dated 16 October 2017 ‘On the Approval of the Procedure for the Screening of Planned Economic Activities for Environmental Impact Assessment’.

The aim of the planned economic activity is to store electrical energy by purchasing it from the grid and, where necessary, to transmit it via underground cable lines to the existing, newly constructed Dvarviečiai transformer substation (hereinafter referred to as ‘TS’) and onwards to the electricity transmission networks.

The location of the project is shown in Figures 2.1.1a and 2.1.1b.

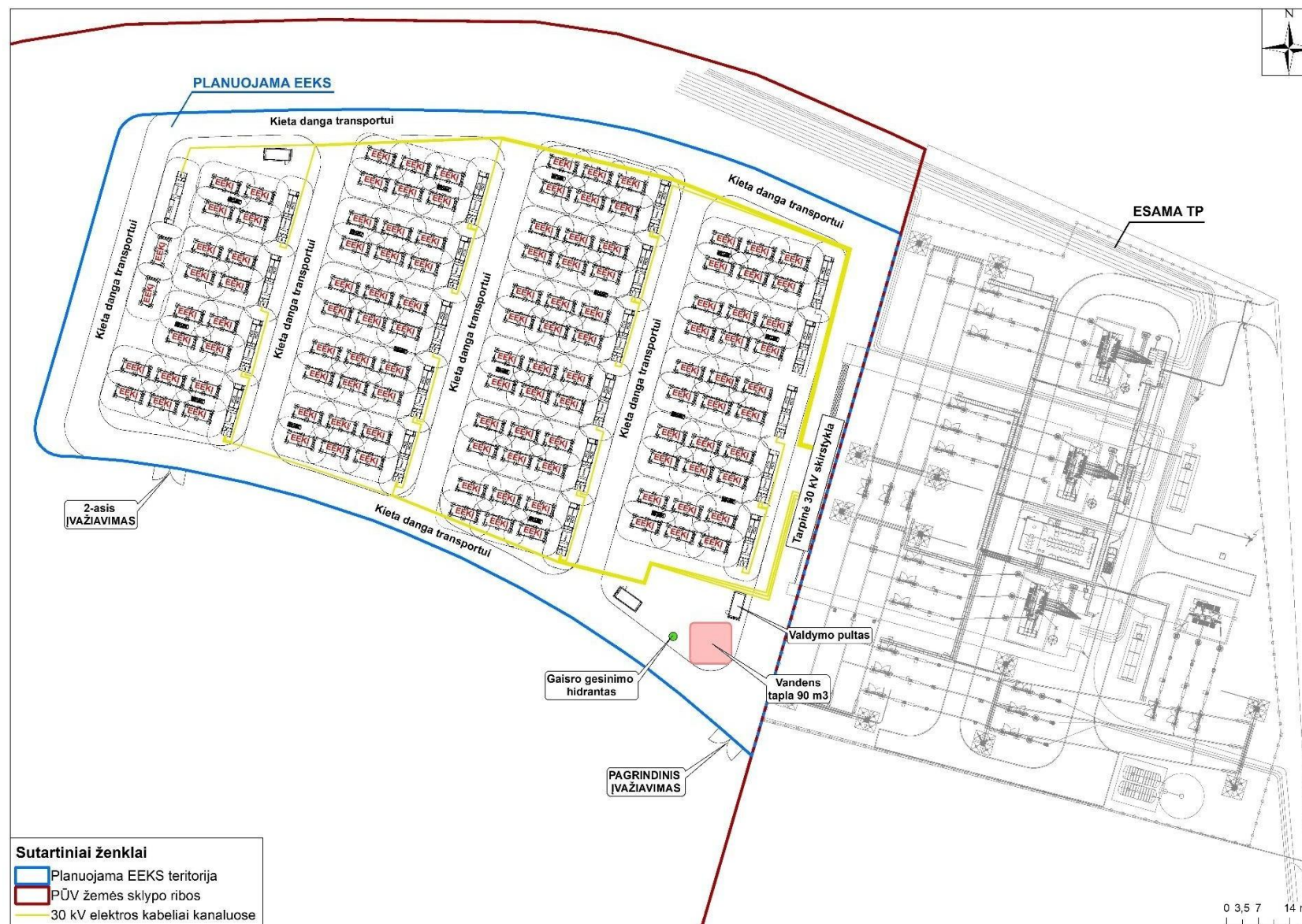


2.1.1 Fig. b. Site plan of the project.

2.2. Physical characteristics of the project

It is planned to install BESS with a capacity of up to 150 MW (up to 300 MWh) and associated facilities on a site covering an area of approximately 1.69 ha. The BESS is understood to comprise containerised energy storage units (hereinafter BESUs), power conversion systems (hereinafter 'PCS'), a distribution point, a control room and a system of electrical cables, see Figure 2.2.1. The layout and quantity of the planned BESS installations shown in the figure are preliminary; they may change during the technical design phase but must not exceed the quantities, total power, capacity and area values, and other physical parameters specified in this document.

The BESS comprises various components and systems designed for the efficient storage, transmission and management of electrical energy. The main components and systems of the BESU are: lithium-ion battery cells (hereinafter referred to as 'batteries' or 'Storage Units'), the Storage Unit management system, ventilation and Storage Unit temperature control systems, internal fire suppression, remote monitoring and other auxiliary systems.



2.2.1 Fig. Site plan of the planned 150 MW electricity storage system and associated facilities.

Dimensions of the preliminarily planned BESS container¹: length approx. 6 m × width approx. 2.5 m × height approx. 3.0 m. Weight – from 33.5 t to 47.25 t (Fig. 2.2.2a). The nominal electricity charging capacity of the BESU is between 1.4 and 3 MW. The planned number of BESU units to be installed is up to 116¹.

A PCS set (Fig. 2.2.2b) may preliminarily consist of: 1–2 inverters, designed to convert voltage from direct current (DC) to alternating current (AC), a medium-voltage transformer, designed to step up voltage from low to medium voltage; a medium-voltage switchyard, designed to connect medium-voltage cable lines; and a control system. Preliminary dimensions of the complete PCS unit: length up to 10 m × width approx. 2.5 m × height approx. 2.2 m. Weight – approx. 24.5 t. It is planned to install up to 41 inverters and up to 21 transformers.¹



a)

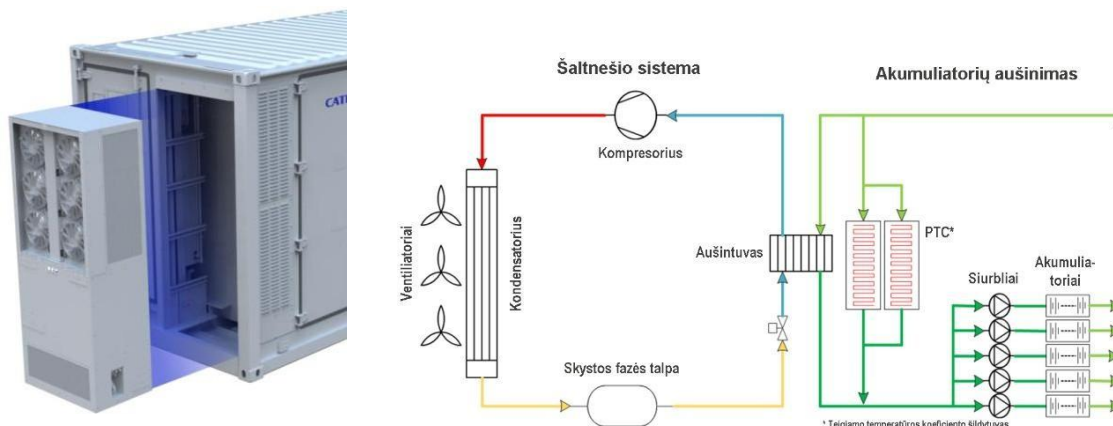


b)

2.2.2 Fig. Preliminary examples of the BESU container (a) and PCS equipment (b).

All container-type BESU and PCS units will be interconnected via electrical cables laid in underground ducts. The BESS, together with its associated underground cables, will be connected to the existing Dvarviečiai transformer substation (TP) via a closed 30 kV intermediate switchyard.

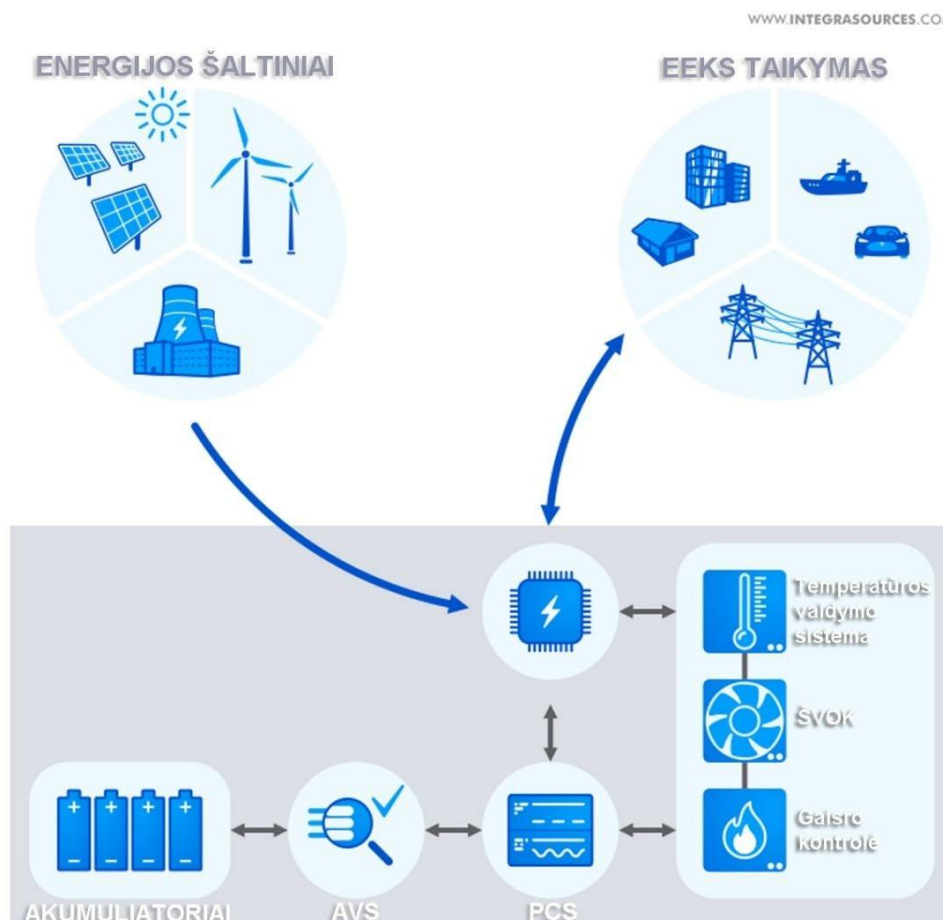
¹ The data provided is preliminary; depending on the BESU supplier, the number and dimensions of the units may change, but must not exceed the total electrical power and capacity values of the project. To be finalised during the technical design phase.



2.2.3 Fig. BESU battery temperature control system.

The battery temperature control system (hereinafter referred to as the TCS) is a factory-manufactured, tested and integrated closed cooling and heating system within the BESU, comprising two closed systems: a heat pump (air conditioner) with a refrigerant, and a battery system with a 50:50 ethylene glycol–water mixture for cooling or heating. The BTM can have a cooling capacity of up to 40 kW. These parameters are selected and finalised during the design phase. The refrigerant used in the BESU is selected to comply with European Union (hereinafter ‘EU’) environmental standards: it must not deplete the ozone layer, must have a low global warming potential, and must be non-flammable and non-toxic.

PCS inverters are usually air-cooled (in rare cases, water-cooled), whilst transformers are oil-cooled.



2.2.4 Fig. Schematic diagram and components of the electricity storage and management system.

Within the project area (Fig. 2.2.1), there are plans to install an underground water tank with a capacity of approximately 90 m³ for firefighting and/or cooling the BESU containers; however, this solution depends on the chosen supplier. The final decision will be made during the preparation of the technical design.

A continuous supply of electrical energy is required to support the battery management and condition monitoring system (hereinafter 'BMS'), the TVS and other BESS functions; under normal operating conditions, this will be supplied from the existing Dvarviečiai substation via the AB Litgrid grid. In order to ensure uninterrupted support for these functions, it is planned to install an additional (emergency) power supply source from the ESO electricity grid.

2.3. Nature of the project: production, technologies and capacity

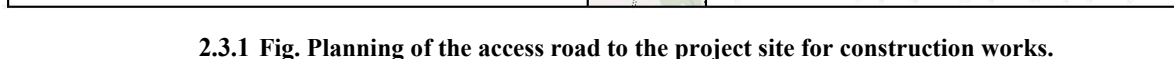
The purpose of the 150 MW BESS is to store electricity by purchasing it from the grid and, where necessary, to transmit it via underground cable lines to the Dvarviečiai substation and onwards to the electricity transmission networks. No production or products will be generated during operation.

Construction, operational and maintenance works will be carried out in accordance with the approved technical design and building permits. The following works may have an impact on the environment:

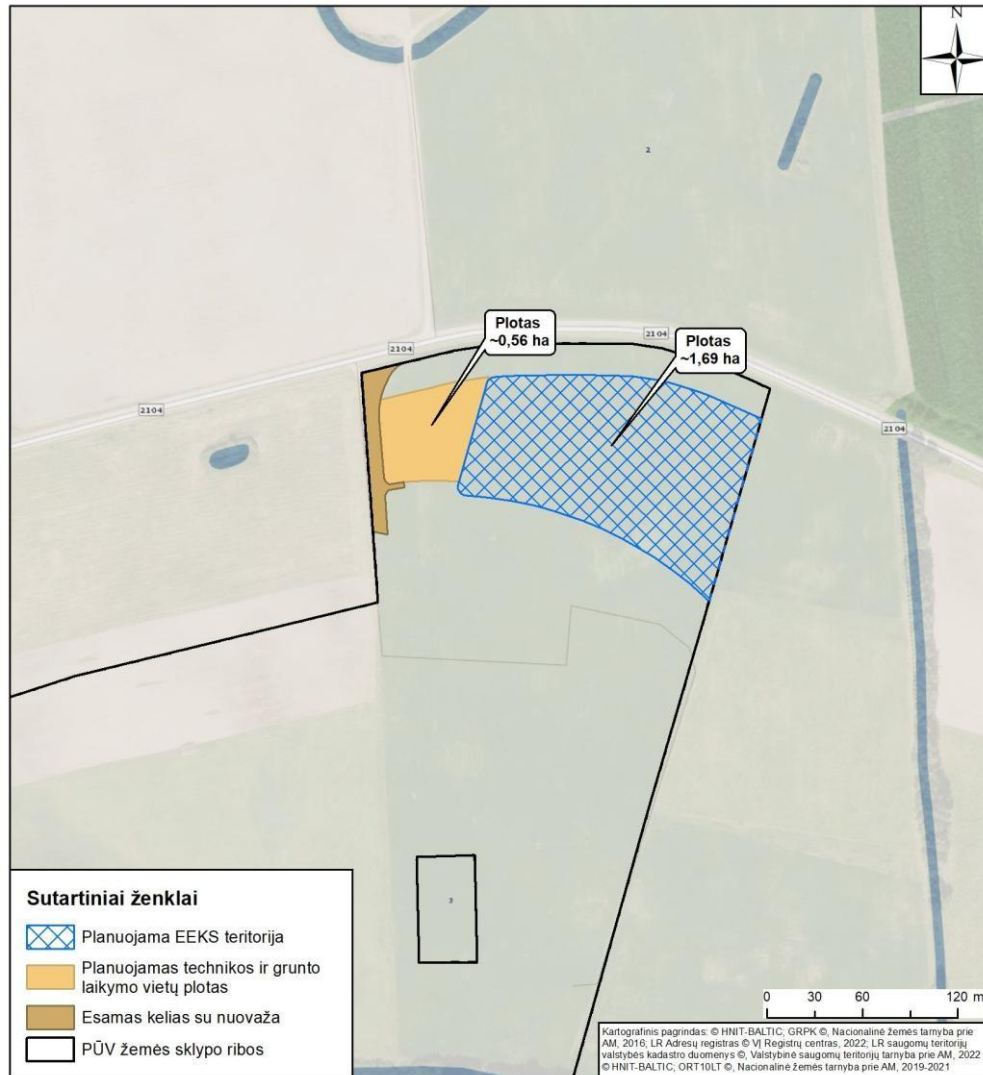
- construction of the site and access road, and laying of a hard surface;
- installation of reinforced concrete foundations for the BESS facilities and underground cable ducts;
- the operation and movement of construction vehicles, and the movement of lorries;
- troubleshooting and regular preventive maintenance of the BESS facilities;
- replacement of individual components of the BESS installations, including lithium-ion batteries, and waste management.

Preparation of the access road, construction site and site clearance

The preliminary plan for the access road for heavy construction machinery to the project site is regional road No. 2104 Pajūjis–Butkiškė–Kražiai. It can be accessed near Pajūjis from the A12 Riga–Šiauliai–Tauragė–Kaliningrad national trunk road (Fig. 2.3.1).



Access to the project site is planned via the road in the western part of the plot, which has an existing access ramp for heavy goods vehicles from district road No. 2104 Pagojis–Butkiškė–Kražiai.



2.3.2 Fig. Layout of the project site for construction works.

Construction works are planned to be carried out in the following sequence ²:

- the fertile soil layer is to be excavated/removed from the BESS and the temporary site area; the excavated soil is to be transported to a temporary storage site near the construction site;
- excavation of the soil beneath the topsoil down to the solid subsoil as assessed in the technical design;
- relocation of the existing drainage system, installation of a new drainage system and a water reservoir;
- backfilling of the underground water storage tank;
- filling with sand, i.e. a frost-resistant layer of soil, for hard surfaces;
- spreading crushed stone over the sand (as a sub-base for the construction site) in the required areas, i.e. forming and compacting the hard surface;
- construction of roads, pavements, kerbs and foundations;
- excavation of part of the surface, with underground ducts for electrical cables and water mains installed in their place, if provided for;
- installation of equipment on reinforced concrete foundations (Fig. 2.3.3): accumulators, converters with transformers and couplers, an intermediate enclosed 30 kV switchyard with a local-use transformer, a control panel container, an electric generator with an above-ground fuel tank, etc.;
- installation of lightning conductors, lighting systems, perimeter fencing with gates, and CCTV systems;

² The solutions will be finalised during the design phase.

- final works on the site's surfacing;
- landscaping works, such as spreading topsoil and sowing grass;
- connection of the BESS to the existing power supply network, commissioning and adjustment works.



2.3.3 Fig. Example of the organisation of the BESS construction site and equipment unloading (photo source: <https://enmin.lrv.lt/lt/naujienos/energy-cells/>).

The construction of the PEA electrical installations will be carried out in accordance with the Rules for the Installation of Switchgear and Substation Equipment³.

The total area occupied by the concrete foundations beneath the BESS equipment and the electrical cable ducts may be up to 0.34 ha (to be finalised during the design phase). This accounts for approximately 20 per cent of the total planned BESS site area. Between the foundations and the electrical cable ducts, a compacted, surface-water-permeable surface is planned, suitable for light vehicles, maintenance vehicles and forklift trucks.

The entire surface of the BESS site is planned to be at a single level, taking into account the heights of the equipment foundations and electrical cable ducts (up to 30 cm above ground level) and the required gradient for the open drainage of surface rainwater.



2.3.4 Fig. Example of site development within the BESS area (photo source: BEIConstruction.com).

³ Order of the Minister of Energy of the Republic of Lithuania 'On the Approval of the Rules for the Installation of Electrical Equipment in Distribution Centres and Substations', 15 December 2011, No. 1-303

It is planned to cover the majority of the project site with a surface water-permeable surface: near or beneath the installations, and around enclosed electrical cable ducts – crushed stone; access routes for heavy goods vehicles and fire service vehicles to the main installations, intermediate substations, water and fuel storage tanks, and for circulation – compacted soil mixed with sand and crushed stone or another solid road base, ranging from 6.0 m to 3.5 metres in width (see Figures 2.3.4 and 2.2.1).

Upon completion of construction works within the boundaries of the planned BESS site (where applicable) and beyond the site boundaries, the protected topsoil layer shall be backfilled to the extent that the ground surface has been excavated or disturbed, and spread in a layer of 20 ± 5 cm. The area is rolled and, if specified in the technical design, sown with a grass mixture.

During the construction period, any existing access roads and the area surrounding the project site that have been damaged must be restored to their original condition. Prior to the works, an inspection of the site conditions is to be carried out and documented with photographs.

No new permanent jobs are expected to be created during the operation of the BESS.

2.4. Use and generation of raw materials, products (including by-products and intermediate products), chemical substances and mixtures

No production will take place during the planned economic activity; consequently, no raw materials will be used. During the construction and connection of the 150 MW power plant to the transmission grid, all necessary equipment will be delivered fully manufactured and assembled. Unloading, installation and fixing will take place on site. No welding work of any significant scale will be carried out. Concrete works will be carried out using ready-mixed concrete.

Other imported materials and products will be used for the site preparation of the project area: sand, crushed stone, concrete kerbs and underground cable ducts with covers.

Road surfacing – crushed stone or other surfacing specified in the technical design. The thickness of the surfacing is selected in accordance with the Design Rules for Standardised Road Surfacing Structures KPT SDK 19⁴.

No hazardous chemicals and/or preparations (mixtures) or radioactive materials are expected to be used during the project implementation phase.

2.5. Extent of natural resource use and regeneration potential

The planned economic activity is not associated with activities requiring the use of natural resources (such as mining, the exploitation of water bodies or forests, or other similar activities).

During the operation of the planned economic activity, only the generation, transmission, reception and consumption of electrical energy will take place.

Prior to the start of construction, the topsoil covering an area of approximately 1.69 ha will be moved to a designated open storage area (Fig. 2.3.2). The removed topsoil, which is stored during site preparation, may be reused, subject to its quality and the approval of the technical supervisor.

Other excavated soil (sand, sandy loam, loam) shall be used to backfill the foundations and compacted; the compaction ratio is specified in the technical design. If the excavated soil is unsuitable for backfilling or for use on the construction site, it shall be removed from the site at the contractor's initiative and suitable soil shall be brought in.

No other natural resources are expected to be used during the project.

2.6. Data on energy, fuel and fuel consumption

During the implementation of the project, the following vehicles and construction machinery will be used in accordance with safety requirements: lorries with trailers, cranes, dump lorries for soil, a soil compactor, bulldozers, small excavators, a road-laying machine, concrete mixers, a vibratory roller, etc., all of which will run on diesel fuel. Information on the anticipated fuel consumption is provided in Section 2.9.1 below.

During operation, electricity will be consumed to maintain the control system (AVS), to ventilate BESU containers or to cool and heat battery cells (TVS), and to cool PCS inverters. Total instantaneous electricity consumption of the BESS, required to maintain smooth operation during service, may reach approximately 0.6–1 MW.

⁴ Approved by Order No. V-16 of 25 January 2019 of the Director of the Lithuanian Road Administration under the Ministry of Transport and Communications

2.7. Generation of hazardous, non-hazardous and radioactive waste

According to a clarification from the Ministry of the Environment of the Republic of Lithuania⁵:

“The principle of producer responsibility applies in the field of waste management. Under the principle of producer responsibility, producers and importers of electrical and electronic equipment (hereinafter ‘EEE’) are responsible for the environmental impact of the products and packaging they supply to the domestic market throughout their entire life cycle, from production to the safe disposal of waste, including the organisation and/or financing of collection, transport, recycling, recovery and disposal, the organisation and/or financing of such systems, the fulfilment of specified waste management obligations for products and packaging, the provision of information on products, packaging and the management of their waste to users of these products and waste managers, the acceptance and management of returned products and the waste generated from their use, and financial responsibility for such activities.”

“From 1 January 2018, producers and importers shall register in the Register of Producers and Importers using the Unified Information System for Products, Packaging and Waste (GPAIS).”

Construction phase of the PEA

It is planned that BESU containers will be delivered without packaging, whilst PCS units will likely be packaged in LDPE/HDPE films with VCI (volatile corrosion inhibitors), known as VCI Stretch or VCI elastic films. It is estimated that each PCS unit will generate approximately 5 kg of plastic packaging waste; however, the amount of waste may vary depending on the BESS supplier and the packaging materials used. Small quantities of packaging waste made of wood (e.g. pallets), cardboard and paper (e.g. boxes) and/or steel (e.g. strapping) may also be generated.

All waste generated during construction works shall be sorted and stored in containers until it is removed and handed over to waste management operators, in such a way as to avoid any adverse impact on public health and the environment. Construction waste will be managed in accordance with the Rules on the Management of Construction Waste of the Republic of Lithuania (approved by Order No. D1-637 of the Ministry of the Environment of the Republic of Lithuania dated 29 December 2006) and/or other legislation.

A construction waste generation log must be kept at the construction site, i.e. a record must be kept of the construction waste generated and transferred for management, specifying its quantity, and waste accounting reports must be submitted in accordance with the Waste Management Rules⁶ and the Rules on the Accounting and Reporting of Waste Generation and Management⁷.

The following waste generated on the construction site must be sorted and temporarily stored separately:

- household waste – food waste, textiles, other domestic waste and other waste which, by its nature or composition, is similar to household waste;
- inert waste – concrete, bricks, ceramics and other waste in which no noticeable physical, chemical or biological changes take place;
- waste suitable for recycling and reuse, secondary raw materials – metal, paper, glass, plastic and other waste suitable for direct recycling and/or materials derived from waste that are suitable for recycling or reuse;
- waste unsuitable for recycling (insulation materials, etc.).

No forestry waste (stumps, branches, etc.) is expected to be generated during the project.

Upon completion of the construction works, the construction site must be cleared so that no waste generated during the works remains on site.

Information on the estimated quantities of waste expected to be generated during the construction of the BESS and the methods of waste management is provided in Table 2.7.1.

⁵<https://am.lrv.lt/lt/areas-of-activity-1/waste-policy/waste/information-for-manufacturers-and-importers/on-products-subject-to-the-principle-of-producer-responsibility-fulfilment-of-manufacturers-and-importers-obligations-1/>

⁶ Order of the Minister of the Environment of the Republic of Lithuania ‘On the Approval of Waste Management Rules’, 14 August 1999, No. 217;

⁷ Order of the Minister of the Environment of the Republic of Lithuania ‘On the Approval of Rules for the Accounting and Reporting of Waste Generation and Management’, 3 May 2011, No. D1-367.

2.7.1 Table. Preliminary waste quantities during the construction of the BESS, waste management

Technol ogical process	Waste					Source of generation	Planned waste management methods
	Name	Quantity	Physical state	Code according to the list	Hazardous mass		
1	2	3	4	5	6	7	8
BESS constructi on works	Municipal waste	~0.2 t	mixed	20	Non-hazardous	Domestic premises, toilet	Transferred to the waste management company specified in the contract
	Metal mixtures	~0.2 t	solid	17 04 07	Non-hazardous	Remains during construction and during unpacking products	
	Plastic and cardboard packaging	~0.3 t	solid	15 01			
	Insulation materials	~0.1 t	solid	17 06 04			
	Forestry waste (branches, stumps)	—	solid	02 01 07	Non-hazardous		

Operational phase of the PEA

No continuous generation of waste is anticipated during the operational phase of the PEA. The generation of electrical and electronic equipment, as well as liquid or gaseous waste, is anticipated when replacing, repairing or upgrading BESS components.

The EEE unit incorporates a closed-circuit temperature control unit filled with a heat transfer medium and coolant (see section 2.2). The temperature control unit is tested at the factory prior to being placed on the market. In the event of repair, replacement or maintenance, the work shall be carried out in accordance with the manufacturer's instructions and recommendations to prevent accidental leaks and/or environmental pollution (Figure 2.2.3 shows an example of how the work might be carried out, i.e. by removing the entire unit). Lithium-ion batteries, electrical and electronic equipment, coolant, battery cooling water–glycol solution, transformer oil, water contaminated with petroleum products or other chemical waste will be collected in designated sealed tanks, containers, pressurised containers and handed over to a waste manager registered in the Waste Management Register (hereinafter 'WMR'), in accordance with the environmental regulations in force in the Republic of Lithuania and the EU at that time.

Information on the waste expected to be generated during the operation of the BESS is provided in Table 2.7.2.

2.7.2 Table: Waste expected to be generated during the operation of the BESS, waste management

Technological process	Waste					Source of generation	Expected waste management methods
	Name	Quantity	Physical form	Code according to the waste list	Hazard level		
1	2	3	4	5	6	7	8
BESS Operation	Batteries and accumulators	As required	Mixed/solid	16 06	Hazardous	BESU	Transfer to a waste management operator or the manufacturer/supplier.
	Other disused electronic equipment		Solid	16 02 02	Hazardous	All BESS	

Technological process	Waste					Source of generation	Planned waste management methods
	Name	Quantity	Physical form	Code according to the waste list	Hazard level		
1	2	3	4	5	6	7	8
	Refrigerant waste		Gaseous	14 04	Hazardous	BESU	To be handed over to a waste management operator
	Waste heat transfer oils and other liquids		Liquid	13 03	Hazardous	BESU, Transformers	

When planning the project, proposals are received from potential BESS suppliers stating that they can accept end-of-life lithium-ion batteries for recycling and/or recovery in accordance with EU regulations, even though these batteries do not meet the definition of ‘waste’ under the Waste Management Act, as the capacity of lithium-ion batteries will be approximately 65 per cent.

The quantity of waste listed in Table 2.7.2 during the operational period is difficult to predict, as it will depend on the type and quantity of equipment planned in the technical design, the conditions of use of the equipment, wear and tear, and the frequency of emergency situations.

Waste generation and management following the end of the project’s operational life

Upon decommissioning, the dismantled process equipment and individual equipment components shall be transported to a storage, reuse, sorting and recycling facility designated by the project organiser, or handed over to a waste collection company authorised to manage such waste.

The mixed waste that will be generated upon the decommissioning of the energy storage system comprises BESU containers, PCS equipment, the control panel and other electrical and electronic equipment, which will not be dismantled but will be removed in a configuration and weight similar to that in which it was assembled by the manufacturer and delivered during construction. Any resulting scrap metal and electrical cables will be sorted and sent to a scrap metal collection point.

Reinforced concrete (RC) foundation slabs or foundations will, where possible, be dismantled, with metal and concrete segments separated and delivered to a waste collection company authorised to handle such waste. Where possible, reinforced concrete slabs and reinforced concrete ducts for electrical cables will be reused or sold for secondary use. The sites of the electrical equipment, PCS and electrical cable ducts will be reclaimed by backfilling with fertile soil.

All construction waste generated during the dismantling of the BESS is sorted and stored in containers until it is transported and handed over to waste management operators. Construction waste will be managed in accordance with the Rules on the Management of Construction Waste (approved by Order No. D1-637 of the Ministry of the Environment of the Republic of Lithuania dated 29 December 2006).

The waste generated will be transferred to specialised companies that manage/recycle this type of waste, which operate in accordance with the Waste Management Law of the Republic of Lithuania, the Rules on Waste Management, the Rules on the Management of Electrical and Electronic Equipment and Waste Thereof, the Rules on the Management of Construction Waste, and other legal acts, and will be managed in accordance with the requirements of the waste management legislation of the Republic of Lithuania in force at that time.

2.8. Wastewater generation, estimated volume and management

During the construction of the BESS, water for the domestic needs and drinking of workers will be delivered. Temporary portable toilets will be installed for the workers’ use, and a contract has been concluded with a company providing toilet maintenance services.

In accordance with Section III, paragraph 7 of the Surface Wastewater Management Regulations⁸: ‘When planning areas and the economic activities to be carried out therein, as well as changes and/or modernisation of existing economic activities, and when designing

⁸ Order of the Minister of the Environment of the Republic of Lithuania ‘On the Approval of the Surface Water Management Regulations’, 2 February 2002, No. D1-193 (current version in force from 1 May 2024)

and when upgrading surface water management systems, the feasibility of applying the following technical solutions must first be examined:

7.1. to reduce the generation and/or collection of surface water, *as few impervious surfaces as possible must be installed* (except in areas likely to be contaminated), facilities for the infiltration of clean surface water into the ground must be installed, areas at risk of contamination should be kept as small as possible, etc.)”.

The project developer plans to comply with the requirement set out in paragraph 7.1 of the aforementioned Act and intends to ensure that approximately 80 per cent of the site’s surface is permeable to rainwater and snowmelt, i.e. does not generate surface runoff. Rainwater from electrical equipment containers, metal cabinets and buildings will also run off onto the surface covering, where it will naturally seep into the ground near the equipment, and no surface runoff will accumulate.

The PEA site will not be polluted as a result of the ongoing BESS operational processes; in other words, it is not considered a potentially polluted site. Electrical equipment will be housed in sealed, corrosion-resistant containers and metal cabinets, or will otherwise be resistant to outdoor weather conditions, and there will be no direct pollution.

With regard to potential surface contamination of the site, only the following BESS equipment can be identified: transformers for local needs and transformers for PCS equipment (up to 21 units).

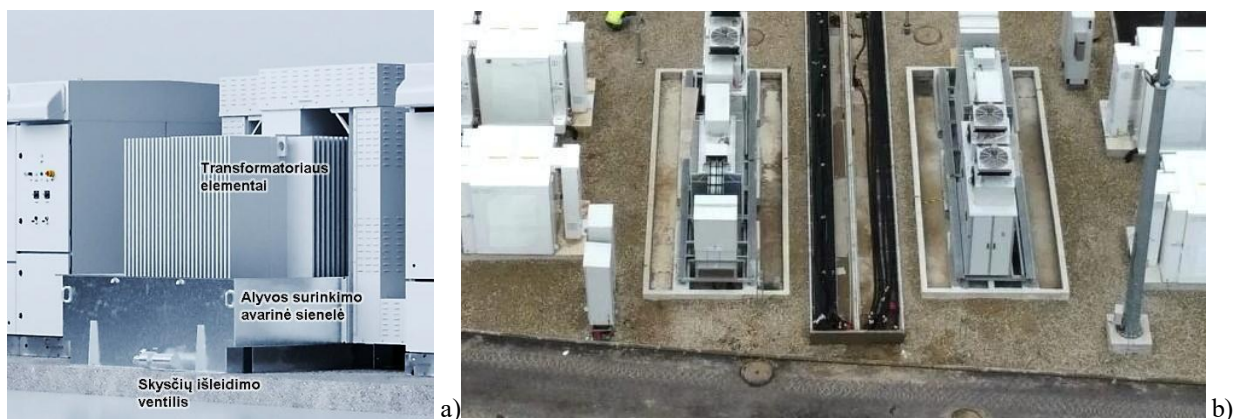
The transformer for the BESS is planned to be installed in an enclosed 30 kV intermediate substation; therefore, there is no risk of surface contamination of the site.

Depending on the type selected by the manufacturer, the PCS transformer may be open-type but adapted for outdoor operation, corrosion-resistant and not emitting harmful chemicals into the environment. The transformer and its associated equipment are installed on a shared or separate reinforced concrete foundation for the PCS (Figs. 2.8.1 a and b).

During operation, no cooling oil is released into the environment.

In rare cases, an emergency or accident may occur in which the oil used to cool the transformer may leak from the unit. To prevent any adverse impact on the environment, the Rules for the Installation of Electrical Equipment in Switching Stations and Substations⁹ must be followed during the preparation of the technical design.

Depending on the chosen equipment manufacturer and installation method (to be determined during the preparation of the technical design), there may be several ways to collect leaked transformer oil: Figure 2.8.1a shows a stainless-steel wall-mounted unit (oil reservoir) included in the factory-supplied equipment set, fitted with a drain valve; a concrete oil sump may be installed next to or downstream of each potentially contaminated piece of equipment (Fig. 2.8.1b), and other methods complying with the above-mentioned rules. One of the main rules is that the oil sump must be capable of holding all the oil present in the unit. In this case, no leakage of polluting substances onto the surface of the site is anticipated.



2.8.1 Fig. Examples of PCS transformer installation in accordance with environmental requirements.

The area of the oil collection tank or sump may be approximately 6–10 m² (to be specified during the technical design phase according to the selected equipment, the area it occupies and the volume of oil it contains).

⁹ Order of the Minister of Energy of the Republic of Lithuania ‘On the Approval of the Rules for the Installation of Electrical Equipment in Switching Stations and Substations’, 15 December 2011, No. 1-303.

In accordance with Section IV, paragraph 15 of the Surface Water Management Regulations: ‘Surface water generated on potentially polluted areas with a (the wastewater collection area) exceeds 0.01 ha (100 m²), must be treated in wastewater treatment plants before being discharged into the environment, the capacity and efficiency of which enable the conditions set out in paragraph 18 to be met. This requirement does not apply if the pollution level of the wastewater generated does not exceed the standards set out in paragraph 18. / 18.2. where discharged into the ground: / 18.2.2. maximum instantaneous concentration of petroleum products – 1 mg/l (no average annual concentration is specified)’.

During the operation of the facility, no surface contamination of an area larger than 0.01 ha (100 m²) is anticipated; only in rare, isolated cases (malfunctions, accidents) will oil spill into a collection tank or pit covering an area of 6–10 m². Spilled transformer oil will be collected immediately and will not enter the environment (within the project site).

2.9. The occurrence of chemical pollution and its prevention

2.9.1 Air pollution

No air pollution is anticipated during the operation of the 150 MW power system whilst generating, transmitting and receiving electricity.

During the implementation of the project, there may be a temporary and localised increase in air pollution due to the use of fuel-powered equipment (earth-moving, transport, construction and other machinery) during construction works.

Air pollution during construction

Depending on the type of fuel, the following pollutants will be emitted from internal combustion engines: carbon monoxide (CO); carbon dioxide (carbonic acid or carbon dioxide, CO₂); nitrogen oxides (NO_x); and particulate matter (PM).

The following construction machinery is expected to be used during the installation of engineering facilities and electrical infrastructure within the 150 MW BESS site: heavy-duty lorries with trailers (or tractor units with trailers), a heavy-duty crane, tipper lorries for transporting soil, a soil compactor, bulldozers, small excavators, a vibratory roller and/or other vehicles as required. Not all construction machinery will be used at the same time; that is, different types of construction machinery will be used at different stages of the project. In total, it is planned that the construction machinery will be in operation for up to 9 months.

In order to assess the quantities of air pollutants emitted during construction, the indicative operating time and fuel consumption of the construction machinery with internal combustion engines are calculated.

Emissions from sources of ambient air pollution are calculated in accordance with the European Environment Agency’s methodology for accounting for atmospheric emissions (*English: EMEP/EEA Air Pollutant Emission Inventory Guidebook – 2023, Chapter 1.A.4 ‘Non-road mobile machinery 2023’, Section 3.2.1, which sets out the summarised Tier 1 calculation algorithm*) and the methodology set out in Order No. 125 of the Ministry of the Environment of the Republic of Lithuania dated 13 July 1998 ‘On the Approval of the Methodology for the Assessment of Pollutants Emitted into the Atmosphere from Machinery with Internal Combustion Engines’. Calculations are carried out in accordance with the summarised Tier 1 calculation algorithm set out in the methodology, intended for calculating the quantities of pollutants emitted by non-road vehicles and machinery, based on the calculation of pollutant quantities according to average fuel consumption and the operating time of the pollution source (hours/year). The projected air pollutant emissions and their quantities are presented in Table 2.9.1.

Table 2.9.1. Quantities of air pollutants emitted by motor vehicles at the time of EEC installation

Pollutant	Emission factor for a diesel engine, kg/t of fuel	Amount of fuel consumed t/m	Coefficients			Amount of pollutant emitted (t)
			K1	K2	K3	
1	2	3	4	5	6	7
Carbon monoxide	130	15.0	1	1.1	1	2.145
VOC (hydrocarbons)	40.7		1	1.1	1	0.672
Nitrogen oxides	31.3		1	1.05	1	0.493
Sulphur dioxide	1		1	1	1	0.015
Particulate matter	4.3		1	1.1	1	0.071
Total:						3.395

It is emphasised that the relatively small amount of pollutants calculated in Table 2.9.1 is attributable to the sporadic and short-term nature of the project's implementation (only during construction works); therefore, no significant adverse impact on ambient air quality is anticipated.

Air pollution abatement measures

According to the mathematical calculations of air pollution carried out, the air pollution caused by the project does not exceed the established limit values; therefore, additional technical measures to reduce air pollution are not necessary; however, in order to minimise air pollution from existing and planned economic activities, preventive air pollution reduction measures are applied:

- to prevent dust formation, roads likely to generate dust during the construction of the BESS site will be watered, taking into account weather conditions and as required;
- to prevent dust, loose and potentially dust-generating loads (such as sand) will be transported with the loads covered.

Air pollution control measures

According to the mathematical modelling of air pollution carried out, the air pollution caused by the project does not exceed the established limit values; therefore, additional technical measures to reduce air pollution are not necessary; however, in order to minimise air pollution from existing and planned agricultural activities, preventive measures to reduce air pollution are being implemented:

- to prevent dust formation, roads likely to generate dust during the construction of the BESS site will be watered, taking into account weather conditions and as required;
- to prevent dust, loose loads and those likely to cause dust (such as sand) will be transported with the loads covered.

2.9.2 Soil contamination

Impact on the soil and subsoil is possible during construction due to earthworks. The excavated soil will be stored within the boundaries of the construction site, at the location specified in the technical design (see Section 2.3, Figure 2.3.1).

To prevent chemical soil contamination, waste generated at temporary storage areas for materials and construction machinery must be managed appropriately, and technically sound vehicles and machinery must be used.

A temporary access road must be constructed to provide access to the construction site; its exact location and parameters will be finalised at a later stage of the BESS design process.

No soil contamination is anticipated during the operation of the project. Rare leaks of petroleum products from equipment (transformers, fuel tanks) may occur due to equipment failure or emergency situations; however, the local preventive measures described above (Sections 2.3 and 2.8) minimise the risk of soil contamination.

2.9.3. Water pollution

No water will be used during the planned economic activity, and no wastewater will be generated. In this respect, the planned economic activity is not expected to have any impact on surface water bodies. The area of the planned economic activity does not fall within the protection zones of water bodies or water supply sources.

During the construction of the BESS, the need to lower surface and groundwater levels will be determined by the site manager, taking into account the need to carry out construction works safely and to a high standard, as well as the levels of groundwater and subsurface water (the latter may vary depending on the time of year and weather conditions).

To prevent water pollution during construction works, it is important that construction equipment is in good working order and that health and safety requirements are adhered to.

It is anticipated that the operation of the BESS will have no impact on surface water, groundwater or deeper aquifers. Further information is provided in Section 3.7.

2.10. The formation of odour pollution

The planned economic activity does not involve any technological processes from stationary sources of air pollution during which chemical substances with an odour threshold, as defined in Hygiene Standard HN 35:2007 'Maximum Permissible Concentrations of Chemical Substances (Pollutants) in Residential and Public Areas', which came into force on 10 May 2007, 'Maximum permissible concentrations of chemical substances (pollutants) in the air of residential and public buildings', which came into force on 10 May 2007.

2.11. The occurrence of physical pollution and its prevention

2.11.1. Predicted noise

Temporary and permanent physical pollution (noise) will be generated during the planned economic activity. Temporary physical pollution will occur during the construction and installation of the planned economic activity. Permanent physical pollution (noise) will occur during the course of economic activity.

Noise in residential and public buildings and their surroundings is assessed by comparing the results obtained through measurement and/or modelling with the maximum permissible noise levels set out in the relevant Lithuanian Hygiene Standard *HN 33:2011 'Noise limit values in residential and public buildings and their surroundings'* (Table 2.11.1).

2.11.1 Table. Noise limit values in residential and public buildings and their surroundings

No.	Name of facility	Time of day, hours*	Equivalent sound pressure level (L _{AeqT}), dBA
1	2	3	4
1.	In the vicinity of residential buildings (houses) and public buildings (excluding catering and cultural facilities), excluding traffic noise	Day Evening Night	55 50 45
2.	In the vicinity of residential buildings (houses) and public buildings (excluding catering and cultural facilities) affected by traffic noise	Day Evening Night	65 60 55

* The start and end times of the periods of the day (day, evening and night) are to be understood as defined in the definitions of the daytime noise indicator (L_{day}), evening noise indicator (L_{evening}) and night-time noise indicator (L_{night}).

In accordance with Section 1, point 2 of HN 33:2011, the noise level was assessed in the vicinity of residential buildings, covering the boundaries of land plots within a distance of no more than 40 m from the façade of the residential building experiencing the highest noise level.

2.11.1.1. Description of noise sources at the project site, their characteristics and location Noise at the project site (temporary)

During the construction and installation of the BESS, temporary noise will be generated by construction machinery and heavy goods vehicles (tractors with trailers, tippers). The main construction works will consist of concreting, road and site works, ground compaction, excavation and the installation of utility networks. Heavy goods vehicles will be used to deliver construction materials and equipment (the BESS and its ancillary facilities) and to remove excavated soil. The noise generated during construction and installation is temporary and will cease once the works are completed.

Taking into account the specific nature of the construction works, the assessment of temporary noise has been divided into two different scenarios. Scenario 1 covers all construction and installation works carried out within the project site. Scenario 2 covers the movement of heavy goods vehicles on the national district road No. 2104.

Scenario 1 – construction works

The construction works are expected to involve the use of lorries with trailers, cranes, tippers, bulldozers, soil compactors, excavators, road-laying machinery, concrete mixers and vibratory rollers. This scenario assesses

the worst-case noise assessment scenario, where all construction machinery is operating simultaneously. Working hours are expected to be during the day only, from 7 am to 7 pm.

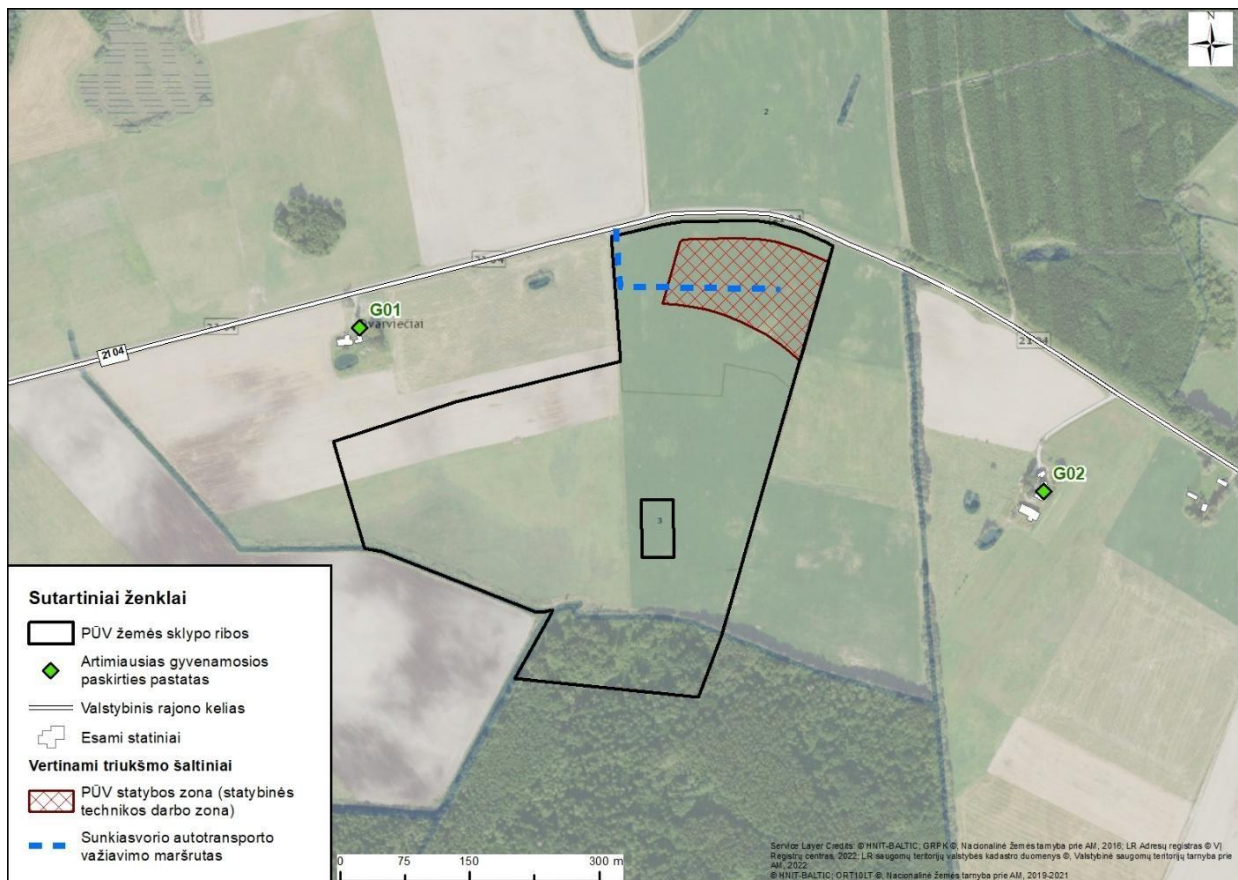
Information on the noise sources assessed in Scenario 1 and their noise characteristics is provided 2.11.2 in the table, whilst the layout of the noise sources is shown in Figure 2.11.1.

2.11.2 Table. Characteristics of the noise sources assessed for Scenario 1 of the PEA

Noise source under assessment	Quantity of Quantity	Operating hours	Sound level, dBA
1	2	3	4
Tractor unit with trailer	5 units	7 am–7 pm	101*
Crane	2 units	7 am–7 pm	101*
Dump lorry	5 units	7 am–7 pm	101*
Bulldozer	3 units	7 am–7 pm	103*
Soil compactor	3 units	7 am–7 pm	101*
Excavator	3 units	7 am–7 pm	93*
Road construction machine	2 units	7 am–7 pm	104**
Concrete mixer	2 units	7 am–7 pm	101*
Vibratory roller	3 units	7 am–7 pm	106*

* STR 2.01.08:2003 'Control of noise emitted into the environment by equipment used in outdoor conditions'.

** Road construction (or asphaltting) machinery may not be present during the development of the project (to be confirmed during the technical design phase), but is assessed as an additional noise source under the worst-case scenario.



2.11.1 Fig. Diagram showing the distribution of noise sources for Scenario 1 of the PEA.

Scenario 2 – heavy goods vehicles

It is anticipated that heavy goods vehicles will travel to and from the project area(s) via the national district road No. 2104. The increase in heavy goods vehicle traffic on district road No. 2104 will be temporary, lasting until the completion of construction and

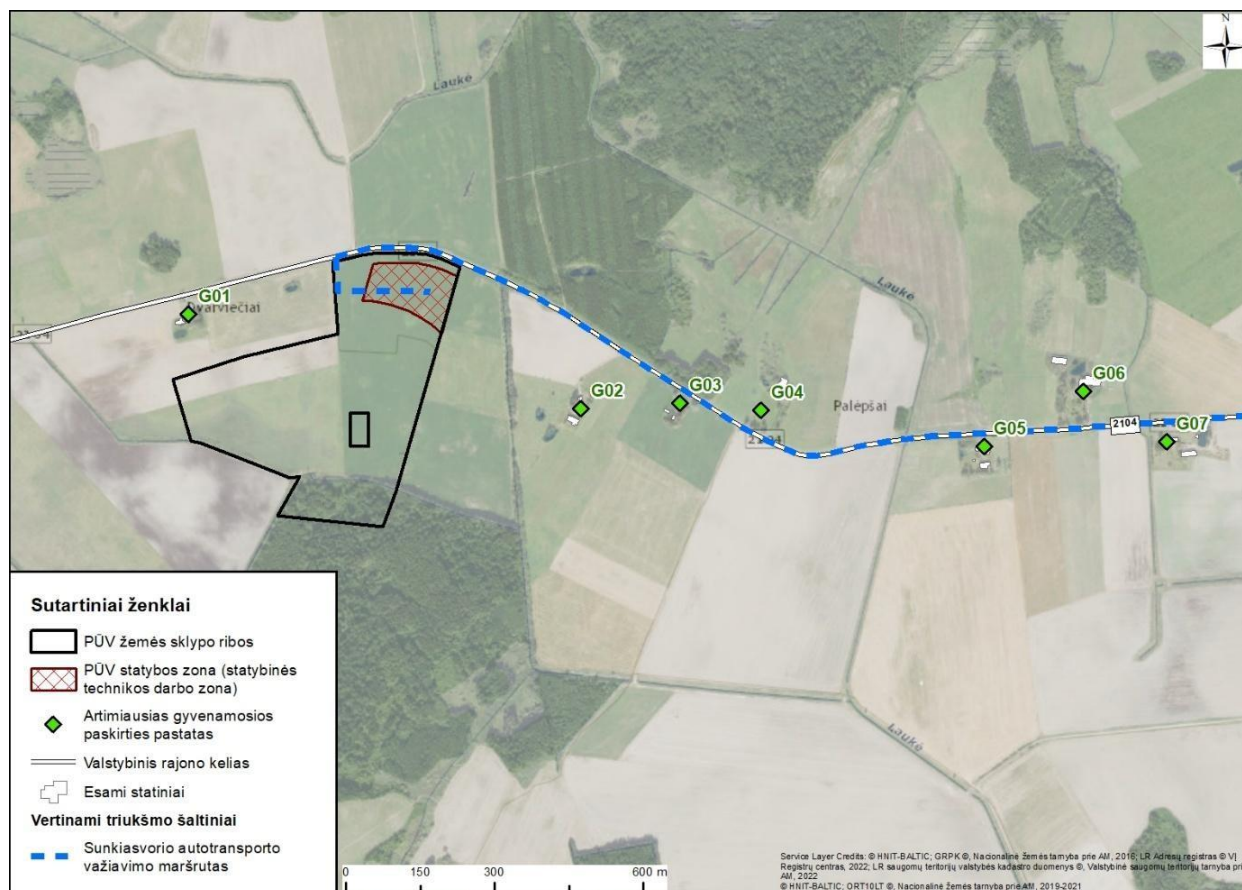
installation works. The total daily traffic will consist of articulated lorries, tippers and concrete mixers. Traffic is expected to take place only during the day, from 7 am to 7 pm.

Information on the noise sources assessed in Scenario 2 and their noise characteristics is provided in 2.11.3 in the table, whilst the layout of the noise sources is shown in Figure 2.11.2.

2.11.3 Table. Characteristics of the noise sources assessed for Scenario 2 of the PEA

Noise source under assessment	Number of noise sources	Operating time	Sound level, dBA
1	2	3	4
Tractor unit with trailer	5 units per hour	7 am–7 pm	101*
Dump lorry	5 units per hour	7 am–7 pm	101*
Concrete mixer	1 unit / hour	7 am–7 pm	101*

* STR 2.01.08:2003 'Control of noise emitted into the environment by equipment used outdoors'.



2.11.2 Fig. Traffic flow diagram for heavy goods vehicles in Scenario 2 of the PEA.

Project noise (continuous)

Scenario 3 assesses the operational phase of the PEA. The main sources of continuous noise will be the power conversion system (PCS) inverters and container-type energy storage units (BESU), in which noise is generated by fans. It is planned to install up to 116 BESU units and up to 42 converters. The continuous electricity supply would be provided from the existing Dvarviečiai transformer substation (TP) located nearby.

According to data from the manufacturer of a similar ESS, the sound pressure level at a distance of one metre from the unit is 75 dBA. The noise generated by PCS inverters has been estimated based on the technical specifications provided by the manufacturer of a similar unit and amounts to 80 dBA at a distance of one metre.

The calculations assume that all noise sources operate 24 hours a day.

Information on the noise sources assessed in Scenario 3 and their noise characteristics is provided in 2.11.4 in the table, whilst the layout of the noise sources is shown in Figure 2.11.3.

2.11.4 Table. Characteristics of noise sources in Scenario 3 of the assessed PEA

Noise source under assessment	Number of noise sources	Operating hours	Sound level, dBA
1	2	3	4
Scenario 3. Planned economic activity (operational phase)			
BESU facilities	116 units	0–24 hours	75 dBA* (at a distance of 1 m)
PCS converters	42 units	0–24 hours	80 dBA* (at a distance of 1 m)

* Information taken from the technical specifications of similar equipment (Annex 4).



2.11.3 Fig. Layout diagram of stationary noise-generating equipment for Scenario 3 of the PEA.

2.11.1.2. Noise calculation

Noise propagation in the analysed area was calculated using the CadnaA software. CadnaA (Computer Aided Noise Abatement) is software designed for the calculation, visualisation, assessment and prediction of noise impact. The CadnaA programme assesses all groups of noise pollution sources (in accordance with Directive 2002/49/EC), to which the relevant methodologies and standards in force in the European Union and Lithuania apply:

- Industrial noise (ISO 9613);
- Road traffic noise (NMPB-Routes-96)

In the Law on Noise Management of the Republic of Lithuania (LRS, 26 October 2004, No. IX-2499), the noise indicators – L_{day} , $L_{evening}$, L_{night} – are defined as:

- daytime noise indicator (L_{day}) – an indicator of noise-induced annoyance during the day (from 7.00 am to 7.00 pm) – the average long-term A-weighted sound level, determined as the annual daily average;
- evening noise indicator (L_{vakaro}) – an indicator of noise-induced annoyance during the evening (from 7.00 pm to 10.00 pm) – the average long-term A-weighted sound level, determined as the annual average for the evening;

- Night-time noise indicator (L_{night}) – an indicator of sleep disturbance caused by noise during the night (from 10.00 pm to 7.00 am) – the average long-term A-weighted sound level, calculated as the annual average for night-time.

2.11.1.3. Noise modelling conditions

When calculating noise levels in accordance with the ISO 9613 calculation methodology, the following conditions and indicators were adopted:

- noise level calculation height – 1.5 m, receptor grid spacing – 5 m;
- air temperature +10 °C, relative humidity – 70 per cent;
- noise attenuation due to built-up areas, the acoustic characteristics of ground surfaces and the height of existing structures was taken into account;
- terrain relief assessed¹⁰;

In accordance with the NPMB-Routes-96 calculation methodology, the following conditions and parameters were adopted:

- noise attenuation was assessed based on building development and the acoustic characteristics of the road surface;
- road traffic flow is assessed as a linear noise source, defined as the sound power radiating in a specific direction along a one-metre-long section of road, according to the relevant octave frequency bands;
- taking into account the type of road surface, corrections are applied in the calculations of road traffic noise propagation and the following road surface parameters are assessed: smooth asphalt;
- the parameter applied for the direction of motor vehicle traffic is two-lane, two-way, with traffic travelling on the right-hand side of the road;
- Within the project area, the speed of heavy goods vehicles is assumed to be up to 20 km/h, and on regional road No. 2104, up to 90 km/h.

2.11.1.4. Noise modelling results: noise generated by the project

The calculated maximum predicted noise indicators for the project area – L_{day} , L_{evening} and L_{night} – are presented in Table 2.11.5 and are compared with the maximum permissible noise limit regulated by *HN 33:2011 'Noise Limit Values in Residential and Public Buildings and Their Surroundings'* for the surroundings of residential buildings (houses) and public buildings (excluding catering and cultural buildings), with the exception of traffic-generated noise (scenarios 1 and 3) and in an operational transport environment (noise scenario 2). Noise propagation maps are provided in Annex 3.

2.11.5 Table. Calculated projected noise indicators for the proposed development in the immediate residential environment

Immediate residential environment	Calculated noise level, dBA*		
	Daytime, dBA	Evening, dBA	Night, dBA
Scenario 1. Construction works			
Kelmė District Municipality, Kražiai Eldership, Dvarviečiai Village 1 (marked G01)	52.0	–	–
Kelmė District Municipality, Kelmė Sub-district, Palėpšai village, 8 (ref. G02)	48.4	–	–
<i>HN 33:2011 limit value</i>	55	50	45
Scenario 2. Heavy goods vehicles			
Kelmė District Municipality, Kražiai Eldership, Dvarviečiai Village 1 (marked G01)	34.5	–	–
Kelmė District Municipality, Kelmė Sub-district, Palėpšai village, 8 (ref. G02)	46.4	–	–
Kelmė District Municipality, Kelmė Sub-district, Palėpšų village, 7 (marked G03)	59.8	–	–

¹⁰ Digital spatial data on laser-scanned ground surface points for the territory of the Republic of Lithuania (2009–2010). Data source: National Land Service under the Ministry of Agriculture.

Nearest residential area	Calculated noise indicator, dBA*		
	Lday, dBA	Evening, dBA	Lnight, dBA
Kelmė District Municipality, Kelmė Sub-district, Palėpšų village 5 (marked G04)	61.0	–	–
Kelmė District Municipality, Kelmė Sub-district, Palėpšų village, 4 (marked G05)	62.0	–	–
Kelmė District Municipality, Kelmė Sub-district, Palėpšų village, 3 (marked G06)	50.4	–	–
Kelmė District Municipality, Kelmė Sub-district, Palėpšų village, 2 (marked G07)	53.0	–	–
HN 33:2011 limit value	65	60	55
Scenario 3. Planned economic activity (operational phase)			
Kelmė District Municipality, Kražiai Eldership, Dvarviečiai Village 1 (marked G01)	37.4	37.4	37.4
Kelmė District Municipality, Kelmė Sub-district, Palėpšai village, No. 8 (marked G02)	41.3	41.3	41.3
HN 33:2011 limit value	55	50	45

* In accordance with Section 1, Point 2 of HN 33:2011, the noise indicator was assessed in the vicinity of residential buildings, covering the boundaries of land plots within a distance of no more than 40 m from the façade of the residential building experiencing the highest noise level.

The projected results of noise scenarios 1, 2 and 3 for the proposed development indicate that the noise limit values specified in the Lithuanian hygiene standard *HN 33:2011 'Noise limit values in residential and public buildings and their surroundings'* for Lday, Levening and Lnight will not be exceeded in the immediate residential environment.

Total noise

There are existing noise-generating facilities in the vicinity of the project site (equipment at the Dvarviečiai transformer substation (hereinafter 'TS') and existing wind farms (hereinafter 'WF')), with which the project may contribute to the cumulative noise impact on the nearest residential area. The Dvarviečiai TP is equipped with power transformers (3 units) and a shunt reactor (1 unit). The neighbouring WPPs generate different maximum noise levels at different times of the day. During the day and in the evening, the sound power level is 106.6 dBA; at night, the sound power level of WP No. 17 is limited to 101.0 dBA, and that of WP No. 30 to 105.5 dBA. The acoustic characteristics of the existing noise-generating installations are presented in Table 2.11.6.

2.11.6 Table. Technical characteristics of existing noise-generating installations in the vicinity

Noise source	Number of noise sources	Operating time	Sound level, dBA
Dvarviečiai transformer substation			
Power transformer	3	0–24	68 dBA* (at a distance of 2 m)
Shunt reactor	1	0–24	90 dBA* (sound power)
Existing VE			
Wind turbine No. 17 Nordex N163, tower height 158.5 m	1	0–24	106.6 dBA (during the day and evening); 101.0 dBA* (at night)
VE No. 30 Nordex N163, tower height 158.5 m	1	0–24	106.6 dBA (during the day and evening); 105.5 dBA* (at night)

* see Annex 4.

As the noise generated by existing facilities is compared with the maximum permissible noise levels set out in *HN 33:2011 'Noise limit values in residential and public buildings and their surroundings'*, **excluding traffic-generated noise**; the total noise level has been calculated by assessing Scenarios 1 and 3 of the PEA.

The calculated maximum predicted total noise levels L_{day} , $L_{evening}$ and L_{night} are presented in Table 2.11.7 and are compared with the maximum permissible noise limit regulated by HN 33:2011 'Noise Limits in Residential and Public Buildings and Their Surroundings' which regulate the maximum permissible noise limit levels in the vicinity of residential buildings (houses) and public-use buildings (excluding catering and cultural facilities), excluding traffic-generated noise (Scenarios 1 and 3). Noise propagation maps are provided in Annex 3.

2.11.7 Table. Calculated projected total noise indicators in the immediate residential environment

Immediate residential environment	Calculated noise level, dBA*		
	Daytime, dBA	Evening, dBA	Night, dBA
Scenario 1. Construction works			
Kelmė District Municipality, Kražiai Eldership, Dvarviečiai Village 1 (marked G01)	52.6	–	–
Kelmė District Municipality, Kelmė Sub-district, Palėpšai village, 8 (ref. G02)	49.9	–	–
HN 33:2011 limit value	55	50	45
Scenario 3. Planned economic activity (operational phase)			
Kelmė District Municipality, Kražiai Eldership, Dvarviečiai Village 1 (marked G01)	42.6	42.6	40.3
Kelmė District Municipality, Kelmė Sub-district, Palėpšai village, 8 (ref. G02)	44.2	44.2	43.0
HN 33:2011 limit value	55	50	45

* In accordance with Section 1, Point 2 of HN 33:2011, the noise indicator was assessed in the vicinity of residential buildings, covering the boundaries of land plots within a distance of no more than 40 m from the façade of the residential building experiencing the highest noise level.

The projected total noise results indicate that the noise limit values specified in the Lithuanian hygiene standard HN 33:2011 'Noise Limit Values in Residential and Public Buildings and Their Surroundings' for L_{day} , $L_{evening}$ and L_{night} will not be exceeded during noise scenarios 1 and 3.

Conclusions

The predicted noise levels from the proposed development and the combined noise levels in the immediate residential environment will not exceed the noise limits specified in the Lithuanian Hygiene Standard HN 33:2011 'Noise limit levels in residential and public buildings and their surroundings' for the different periods of the day: L_{day} , $L_{evening}$ and L_{night} .

During the implementation of the project, equipment from other suppliers may be selected; therefore, its technical and acoustic characteristics may differ from those assessed in the calculations. During the preparation of the technical design, once the layout and quantity of the equipment have been finalised (the quantity will not exceed that assessed) and acoustic characteristics, the developer will carry out repeat noise modelling calculations and ensure compliance with the maximum permissible noise limits applicable to the surroundings of residential and public buildings in accordance with HN33:2011.

2.11.2. Electromagnetic field

The planned economic activity is not expected to have any significant impact on the residential environment in terms of electromagnetic fields (hereinafter 'EMF'). Electric energy storage facilities (EESF), power conversion systems (PCS) and the control panel are housed in enclosed metal containers (cabinets), whilst electrical cables are laid in underground ducts. A closed 30 kV intermediate substation is planned to be installed in the centre of the proposed BESS site, adjacent to the boundary of the existing TP site (see Figure 2.2.1 in Section 2.2). At the boundary of the BESS site, the total electromagnetic field intensity is expected to be close to 0.

2.11.3. Lighting

Lighting will be installed within the project area to enable work to be carried out during the hours of darkness, as well as security lighting. The area's lighting is controlled by motion sensors; therefore, during the hours of darkness, the main lighting will be switched off unless essential repair work is being carried out. The main lighting will switch on when the motion detection and intruder alarm systems are triggered. Provision is made for switching to manual operation mode.

No other forms of physical pollution (vibration, heat) are anticipated.

2.12. Biological pollution and its prevention

Biological pollution (pathogenic microorganisms, parasitic organisms) is not characteristic of the planned economic activity.

2.13. Risk of vulnerability of the planned economic activity due to extreme events and/or resulting emergency situations

The main sources of risk are the constant high voltage present in the facilities of the 150 MW electricity storage system (BESS) and the electric current flowing through underground power cables.

Extreme events that may occur during the operation of the BESS and which may affect the environment and local residents include accidents involving mechanical damage to equipment or overheating of equipment, which may result in a fire in one or more units. The most common technical accidents are caused by equipment wear and tear. Such isolated and rare accidents do not have a significant impact on the environment or people.

Accidents may occur due to a failure to comply with health and safety regulations when operating heavy construction machinery, lifting loads or carrying out electrical work. In such cases, there is no impact on the environment; the potential impact on workers includes fatal injuries, injuries or loss of working capacity.

Accidents caused by natural phenomena, such as icing, flooding, strong gusts of wind or lightning, are unlikely, as the impact of such phenomena is assessed when preparing the technical design.

The BESU and PCS fall under the 'product' category – they are delivered, installed, connected and operated in accordance with the manufacturer's instructions. It is planned that the BESU will have an autonomous fire-extinguishing system with fire and smoke detection sensors, as well as a ventilation and cooling system to protect the equipment's components from overheating (see Fig. 2.2.4). These individual installations are not subject to the 'General Fire Safety Regulations' ¹¹ drawn up by the Fire and Rescue Department under the Ministry of the Interior. These Regulations apply to the BESS site and the entire electrical installation system, including connections, cables, lightning protection, lighting, premises, etc.

It is planned to install an underground 90 m³ water tank for fire-fighting and cooling purposes, complete with a hydrant, within the project site (this solution depends on the chosen supplier. The final decision will be made during the preparation of the technical design). Convenient and wide (from 6 m to 3.5 m) hard-surfaced roads suitable for Fire and Rescue Service vehicles will be constructed throughout the site (see Section 2.2, Figure 2.2.1). Fire extinguishers are to be provided at the control panel container and the intermediate distribution board during the design phase.

The entire area where construction work is taking place and where the BESS will subsequently be operated must be secured against unauthorised access. Hazardous areas within the project implementation zone must be marked, information signs and motion sensors installed, and maintenance staff must receive additional instruction and training on how to act in the event of an accident or emergency.

2.14. Risks to human health posed by the planned economic activity

During the construction works for the planned economic activity, the risks to human health are associated with increased noise levels and ambient air pollution caused by operating construction machinery. This impact will be localised and short-term. Information on potential air pollution is provided in Section 2.9.1.

Information on potential aggregate noise levels during operation is provided in Section 2.11.1.

Once the Project has been implemented, it is not anticipated that EML values exceeding the permissible limits for residential areas will occur outside the Project site.

As with most civil engineering works, the impact of the PEA on human health and other ongoing industrial and economic activities will only be felt during the construction phase. To mitigate this impact, the following general measures are envisaged:

¹¹ Order of the Director of the Fire and Rescue Department under the Ministry of the Interior: 'On the Approval of General Fire Safety Rules', 18 February 2005 No. 64

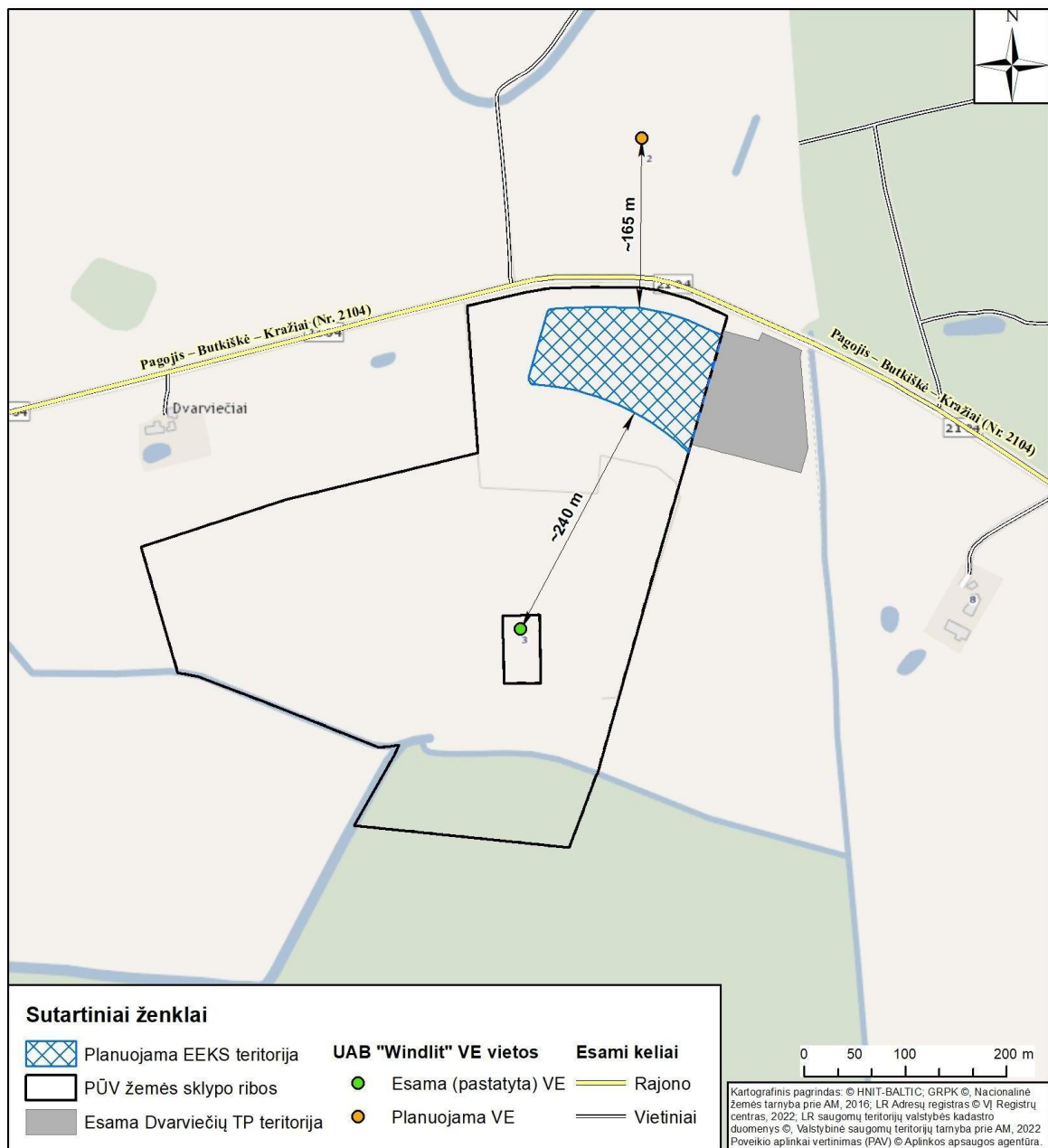
- Noisy earthworks and structural assembly works must be carried out during the day;
- to clear the construction site and restore the original environment outside the boundaries of the project area. No adverse impact on public health due to chemical pollution from the 150 MW power plant is anticipated.

2.15. Interaction of the planned economic activity with other ongoing economic activities

There are two economic activities in the vicinity of the project area: the Dvarviečiai transformer substation and a wind farm.

The protection zones established for the power transmission system under analysis and the existing Dvarviečiai substation – to which the power transmission system will be connected via an intermediate enclosed 30 kV switchyard – coincide with the boundaries of their respective territories. In accordance with Section 24 of Chapter 4 of the Law of the Republic of Lithuania on Special Conditions for Land Use (No. XIII-2166 of 6 June 2019):

‘The protection zone of a transformer substation, distribution substation or current conversion station corresponds to the area occupied by the buildings and equipment of the transformer substation, distribution substation or current conversion station, and the airspace above it. Protection zones are not established for enclosed transformer substations.’



2.15.1 Fig. Infrastructure facilities in the vicinity of the planned BESS

An operational wind farm operated by UAB 'Windlit' is located approximately 240 m from the planned BESS site, and a wind farm is planned approximately 165 m away in accordance with the EIA decision¹². Section 2.11.1 and Annex 3 provide information on the combined noise level and dispersion of the proposed project and other economic activities in the surrounding area (the Dvarviečiai TP and UAB 'Windlit' wind farms, including the planned one). The BESS itself will not have any adverse impact on the operation of the wind farms (see Figure 2.15.1).

An indirect positive impact on the environment will be that the 'green' energy generated by the wind farms will also be fed into the general electricity grid and, where necessary, stored in the BESS, thereby contributing to the balancing of the electricity networks.

No other potential additional restrictions on the development of other activities (agriculture, forestry, industry or others) in neighbouring areas have been identified as a result of the planned economic activity.

2.16. Timeline and sequence of the planned economic activity

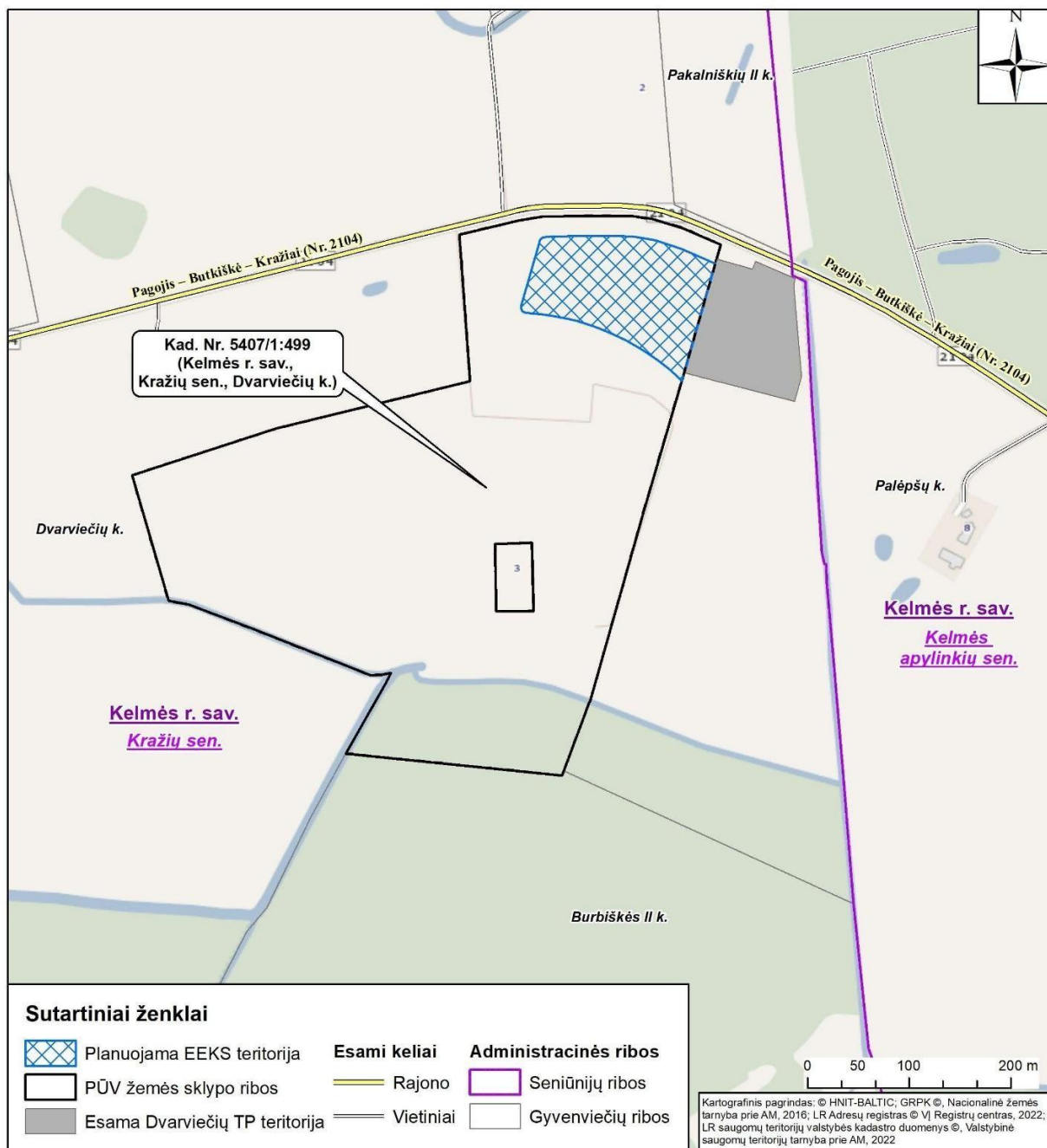
The planned works are scheduled to commence in the first quarter of 2026 and conclude in the first quarter of 2027. The duration of the BESS construction works is 12 months. The sequence of works is described in Section 2.3.

3. LOCATION OF THE PLANNED ECONOMIC ACTIVITY

3.1. Location of the planned economic activity

The planned economic activity involves the installation and operation of a 150 MW electricity storage system (BESS) with ancillary facilities in Kelmė District Municipality, Kražiai Eldership, Dvarviečiai village. Land plot cadastral No. 5407/0001:499, unique property No. 4400-5315-5847. The area of the planned economic activity plot is 17.1132 ha. The area of the BESS territory planned for development is 1.69 ha (Fig. 3.1.1).

¹² Decision of the Environmental Protection Agency regarding the environmental impact assessment of UAB 'Windlit's' proposed development – the construction of a wind farm in Kelmė District Municipality, 19 May 2022, No. (30.2)-A4E-5922.

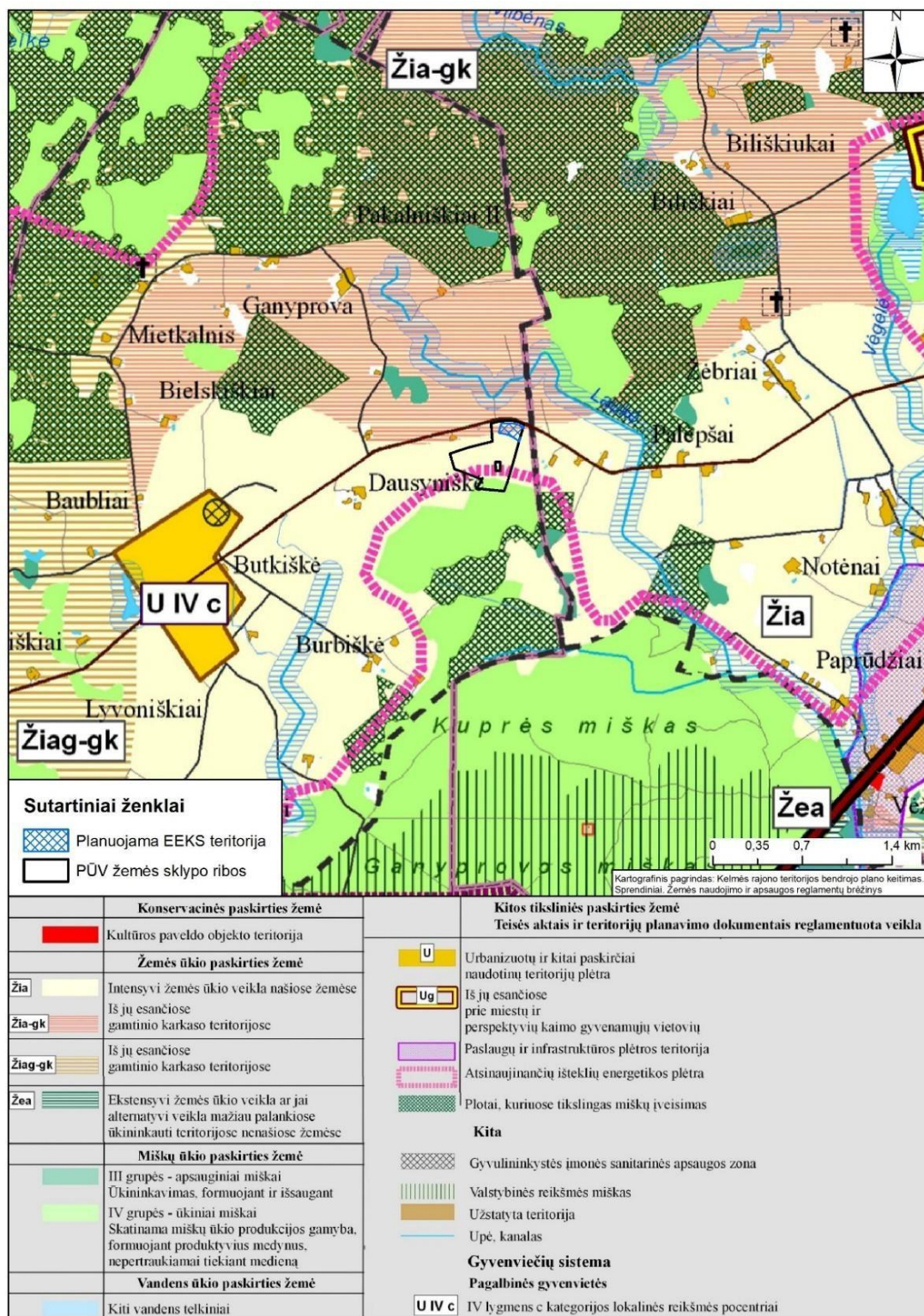


3.1.1 Fig. Site plan of the proposed development.

3.2. Functional zoning of the planned economic activity area, adjacent land plots or areas, and land use regulations in accordance with approved spatial planning documents; special land use conditions apply

General Plan for the Territory of Kelmė District Municipality

The amendments to the General Plan for the Kelmė District (hereinafter referred to as the ‘GP’) were approved by Kelmė District Municipal Council Resolution No. T-94 of 29 March 2013 ‘On Amendments to the General Plan for the Kelmė District’. An extract from the drawing of the land use and protection regulations of the General Plan for the Kelmė District Municipality, showing the designated PEA area, is presented in Figure 3.2.1.



3.2.1 Fig. Zones of activity priorities in the analysed area according to the drawing of the current Kelmė District Municipality General Plan.

The PEA area falls within the agricultural zone and the area designated in the BP for the development of renewable energy. The planned economic activity complies with the provisions of the current spatial planning documents.

Information on the special land use conditions (hereinafter 'SLUCs') registered for the land parcels under analysis is presented in Figure 3.2.2, Table 3.2.1 and Annex 2.

3.2.1 Table. Information on special land use conditions registered on the land plots covered by the planned economic activity

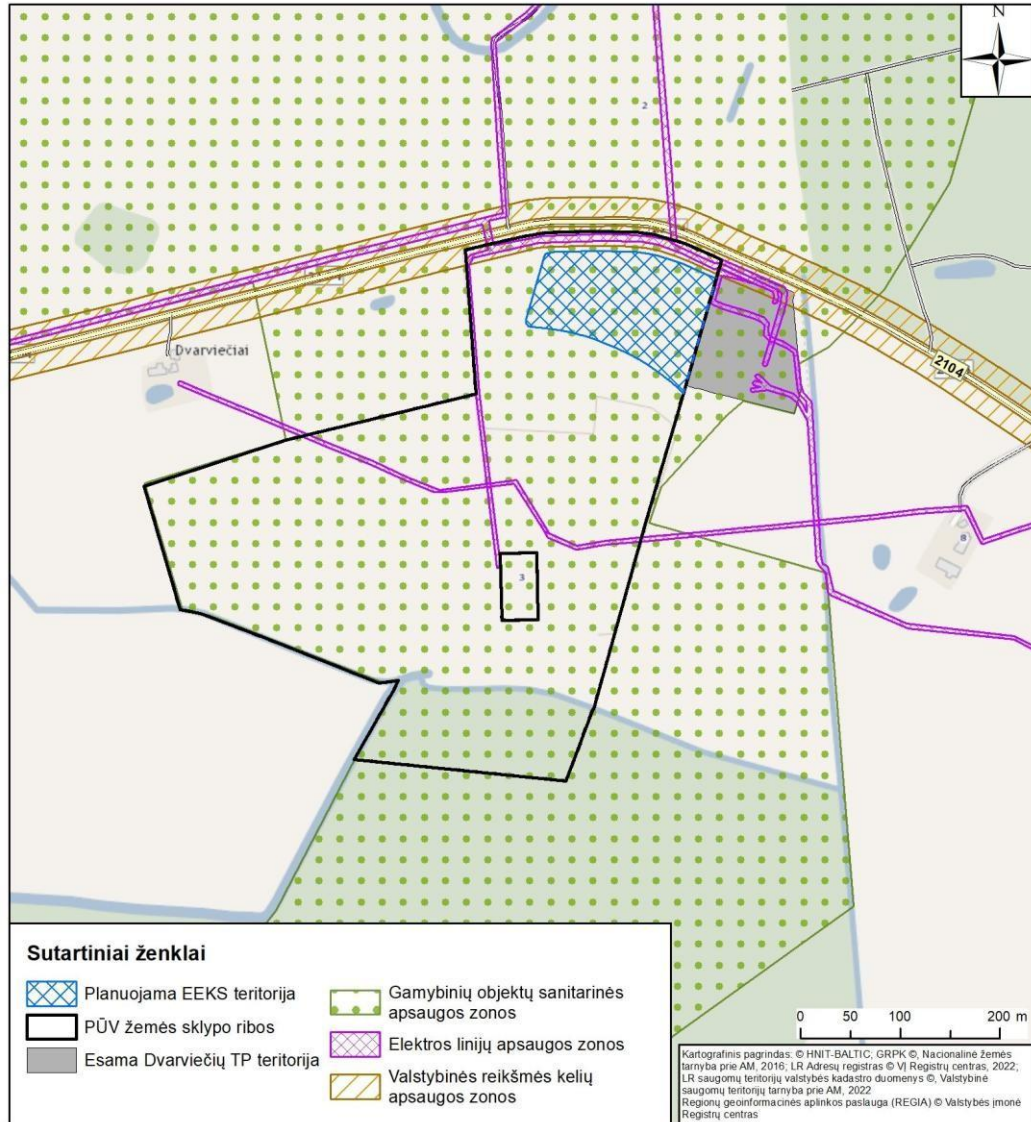
No.	Unique property number, area	Address	Primary intended use	Method of land use	Immovable property/Details of registered areas where the SZNS applies
Information on the plot of land planned for the installation of the BESS					
1.	4400-5315-5847 (cadastral No. 5407/0001:499 Butkiškės cadastral area), 171,132 m ²	Kelmė District Municipality, Kražiai Eldership, Dvarviečiai village	Agricultural	Other plots of land for agricultural use	No entries / 11.1 Road protection zones (Chapter III, Section 2), unique no. 100650211, 3,671 m²; Electricity network protection zones (Chapter III, Section 4): 11.2 unique no. 100696823, 2,665 m²; 11.3 unique no. 100645168, 677 m²; 11.4 unique no. 100420954, 420 m²; 11.5 Unique No. 100417843, 271 m²; 11.6 Unique No. 100195217, 115 m²; Sanitary protection zones for industrial facilities (Chapter IV, Section 1): 11.7 Unique No. 100402200, 171,132 m²; 11.8 Unique No. 100355279, 94,405 m²;
					Data on unregistered areas where sanitary protection zones apply
					8.1 Sanitary protection zones for public utilities (Chapter IV, Section 1), 171,132 m²; 8.2 Sanitary protection zones for industrial facilities (Chapter IV, Section 1), 171,132 m²; 8.3 Protection zones for electricity networks (Chapter III, Section 4), 1,794 m²; 8.4 Forest land (Chapter VI, Section 3), 16,893 m²; 8.5 Protection zones for reclaimed land and land reclamation structures (Chapter VI, Section 2), 154,174 m²; 6. Road protection zones (Chapter III, Section 2), 4,301 m².

A land parcel formation and reorganisation project is being prepared for the implementation of the PEA, the aim of which is to separate a part of the land parcel (3.1261 ha) BESS with appurtenances, and to change the primary land use designation and/or the land use category(ies) of the separated part to 'Land for other purposes', 'Areas for transport and engineering infrastructure facilities'.

A 0.367 ha (3,671 m²) protection zone for regional road No. 2104 (Pagojis–Butkiškė–Kražiai) is registered on the PEA plot; the planned BESS area does not fall within this zone.

Five electricity network protection zones, to which the SŽNS apply, are registered on the PEA plot. The planned BESS area does not fall within any of them.

Sanitary zones for the production facilities of UAB 'Windlit' are also registered on the project site.

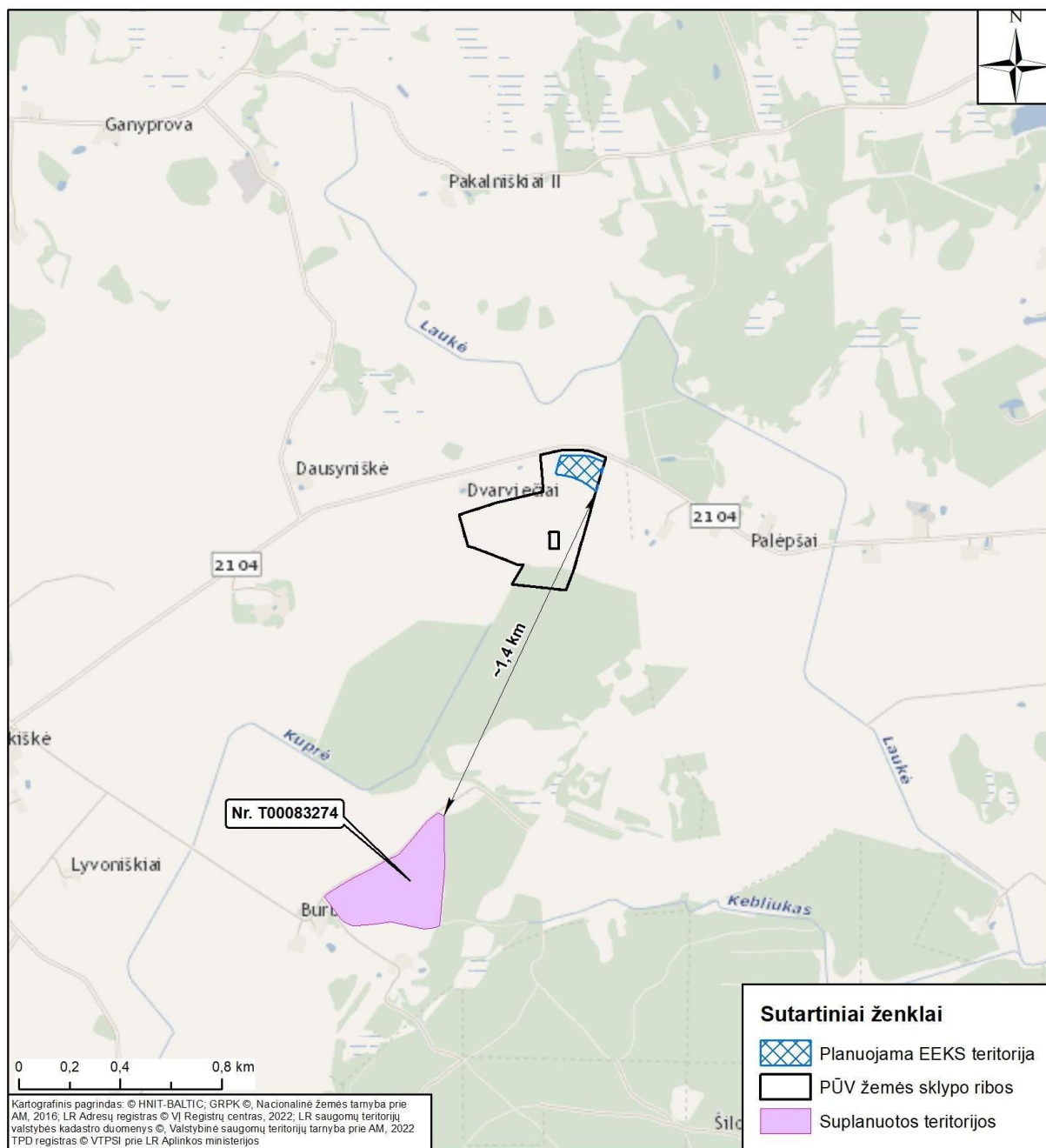


3.2.2 Fig. Protection zones for infrastructure and production facilities located on the project site and in the vicinity.

According to the database of spatial planning documents prepared and registered by the State Territorial Planning and Construction Inspectorate under the Ministry of the Environment, one spatial planning document is being prepared in the vicinity of the project site, approximately 1,400 m to the south-west. Detailed information is provided in Figure 3.2.3 and Table 3.2.2.

3.2.2 Table. Information on spatial planning documents being prepared in the surrounding area

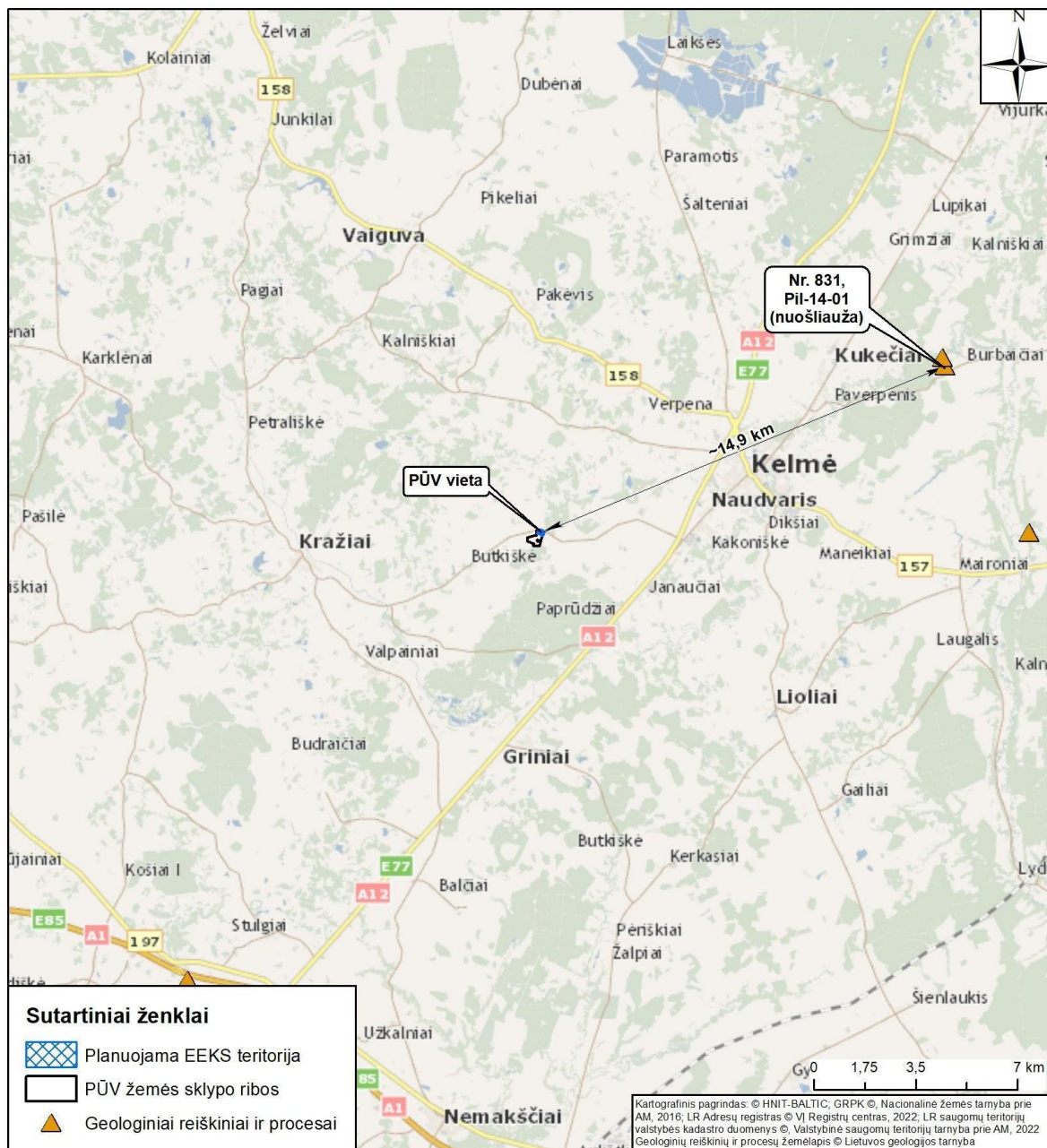
No.	Document title	Distance to the PEA
1	2	3
1. T00083274	Rural development land-use plan for the plot of land (cadastral No. 5407/0001:0101), situated in Burbiškės II village, Kražiai Eldership, Kelmė district municipality, Šiauliai county, for the selection of a site for the construction of buildings required for agricultural activities	1.4 km



3.2.3 Fig. Information on the most recent spatial planning documents registered in neighbouring areas.

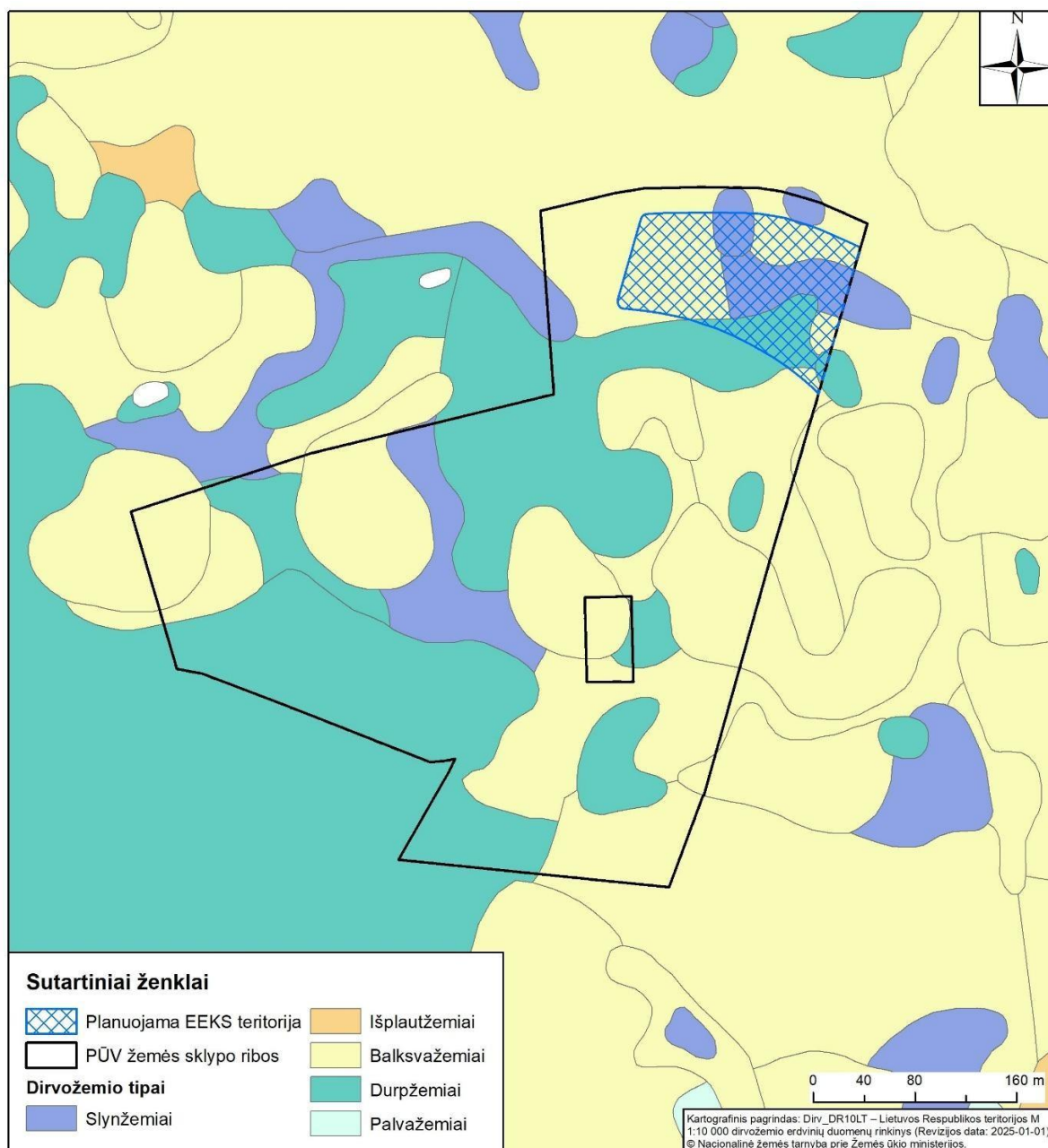
The proposed economic activity complies with the objectives of the Law on Spatial Planning of the Republic of Lithuania No. I-1120 of 12 December 1995, and in this respect no infringements of the rights of other natural or legal persons are anticipated.

According to the GEOLIS geological information system, the project area under analysis and the adjacent plots of land do not fall within a karst region. The nearest location where geological phenomena have been recorded is landslide No. 831, situated approximately 14.9 km away (Fig. 3.3.3).



3.3.3 Fig. Location of the project site in relation to geological phenomena.

Within the BESS area of the PEA plot, light-coloured and alluvial soil types predominate, and there is also a significant area of peat soils (Fig. 3.3.4).

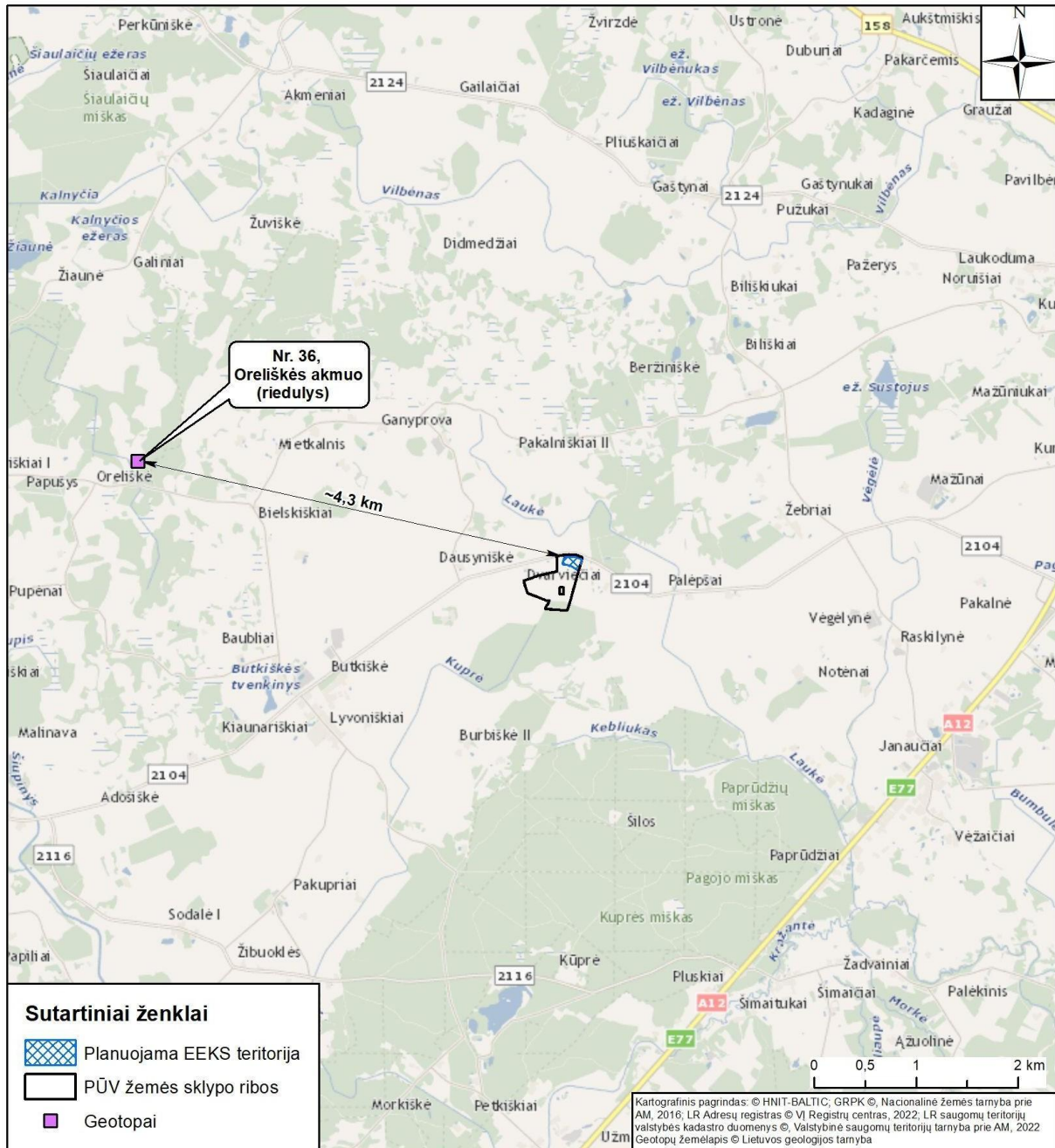


3.3.4 Fig. Predominant soil types within the PEA area.

The proposed development is planned on land designated for agricultural use. Until recently, this plot was actively used for the cultivation of agricultural produce. According to the 2023 statistics on soil fertility assessment in the Republic of Lithuania ⁽¹³⁾, the average soil fertility in Kelmė District is rated at 35.38 points (out of a possible 100). The average for Lithuania is 39.8 points.

Based on the Lithuanian Geological Survey's geotope map (Fig. 3.3.5), it has been established that the PEA area does not border on or intersect with any sites classified as geotopes. The nearest geotope in the vicinity of the planned BESS is the Oreliškės stone (boulder), located approximately 4.3 km to the west.

¹³<https://zisis.lt/duomenys/dirv/statistika/2023-metu-statistika/>



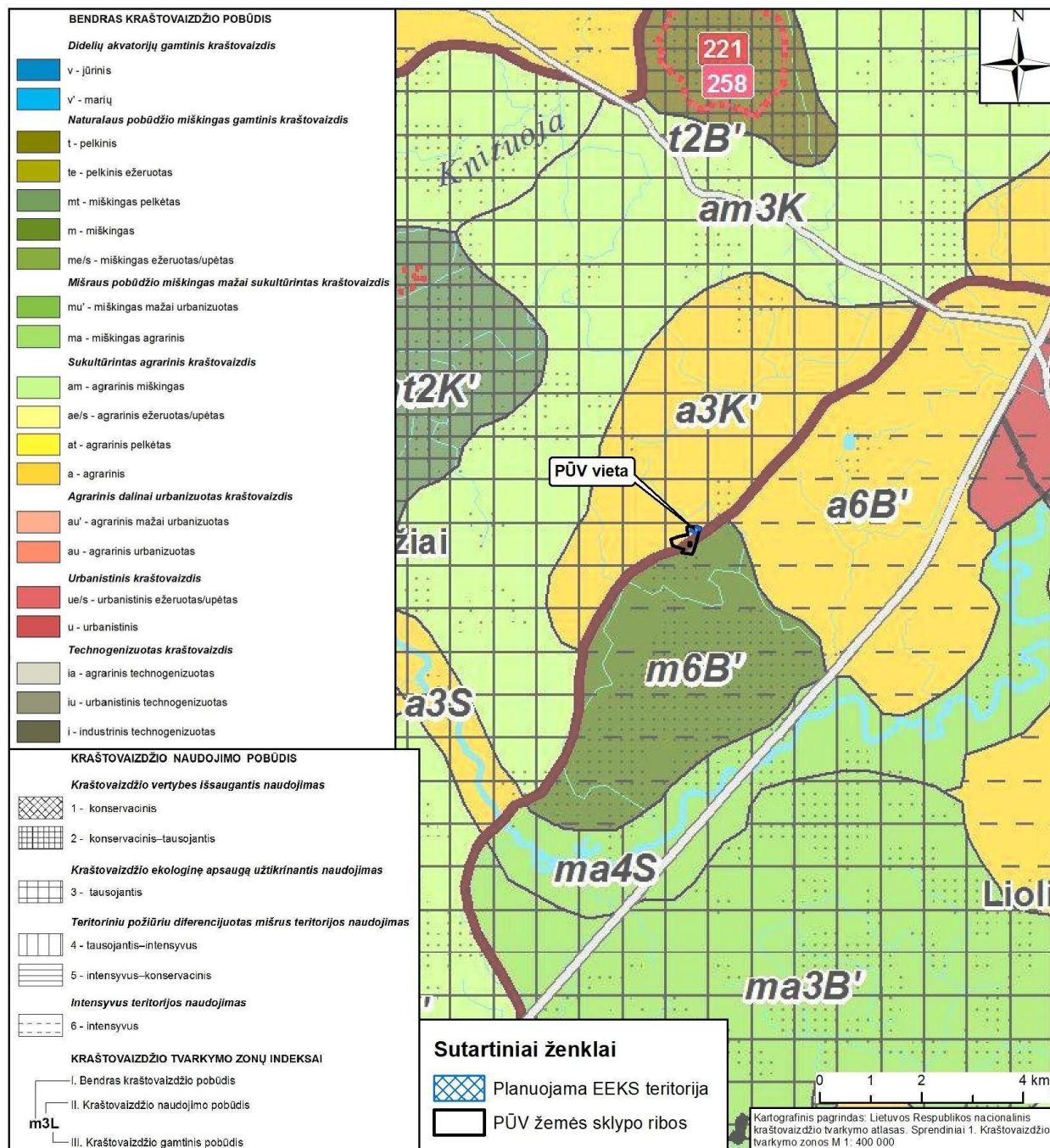
3.3.5 Fig. Location of the planned economic activity in relation to geotopes.

3.4. Information on the landscape, its characteristics, natural framework and topography within the area of the planned economic activity and on adjacent land plots or territories

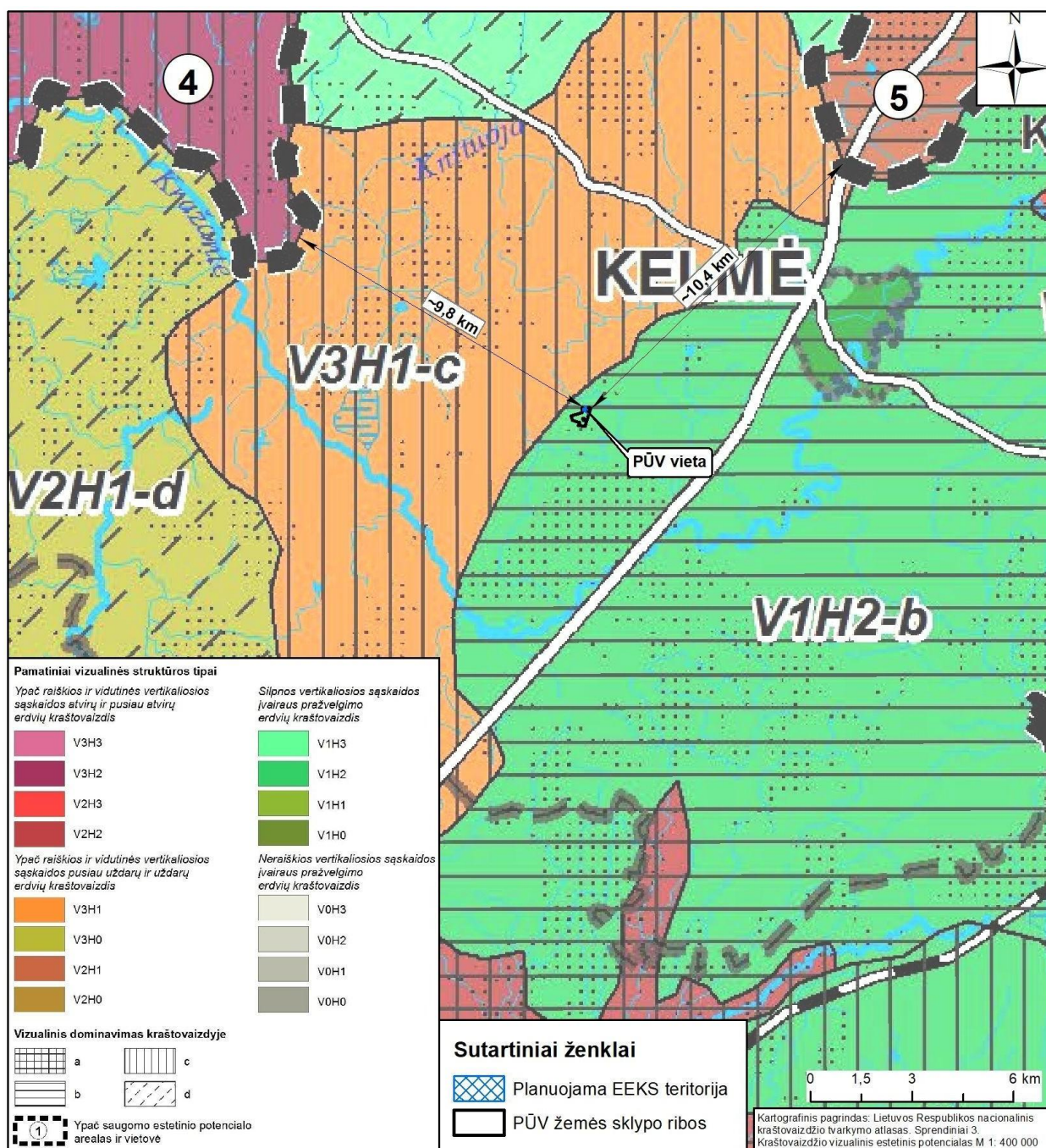
The area of the planned economic activity, located in the village of Dvarviečiai, Kražiai Eldership, Kelmė District Municipality, is dominated by a cultivated agricultural landscape bordering a forested landscape. The surrounding areas, which are dominated by agricultural fields, contain features that fragment and urbanise the local landscape – wind turbines, a transformer substation, telecommunications masts and roads.

According to the National Landscape Management Plan of the Republic of Lithuania, the area under analysis is classified as part of the Curonian-Samogitian Uplands (C), the Samogitian Uplands region (V), the sparsely forested agricultural hilly terrain of Central Samogitia (13), and almost borders the marshy, agricultural, sparsely urbanised upland (plain) of Eastern Samogitia (15).

The landscape of the planned economic activity area is dominated by an agricultural, sustainably managed, loamy morainic hilly landscape (a3K'). A short distance away lies an area of forested, intensively used, loamy undulating upland landscape (m6B') (Fig. 3.4.1).



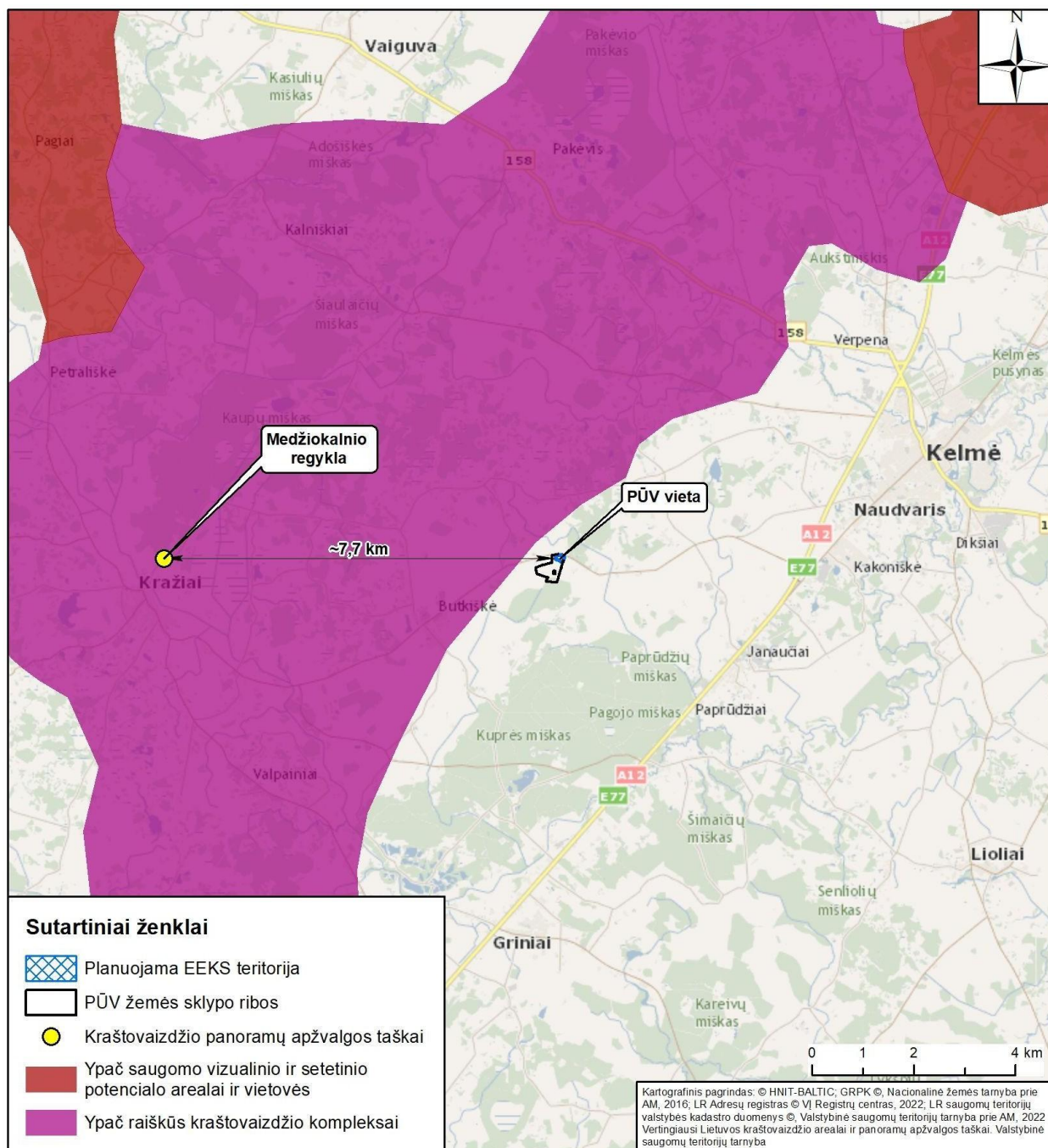
According to the study on the diversity of the spatial structure of the landscape of the Republic of Lithuania and the identification of its types (<https://am.lrv.lt/>), the PEA area is designated with the index VIH2-b, with visual dominance of type b (Fig. 3.4.2), which means that the project area is characterised by a landscape of spaces with varying views and weak vertical contrast. The predominant visual and aesthetic potential of the local landscape is not classified among the most valuable and distinctive landscape types.



3.4.2 Fig. The project area in the National Landscape Management Atlas of the Republic of Lithuania, in terms of the structure of visual-aesthetic potential.

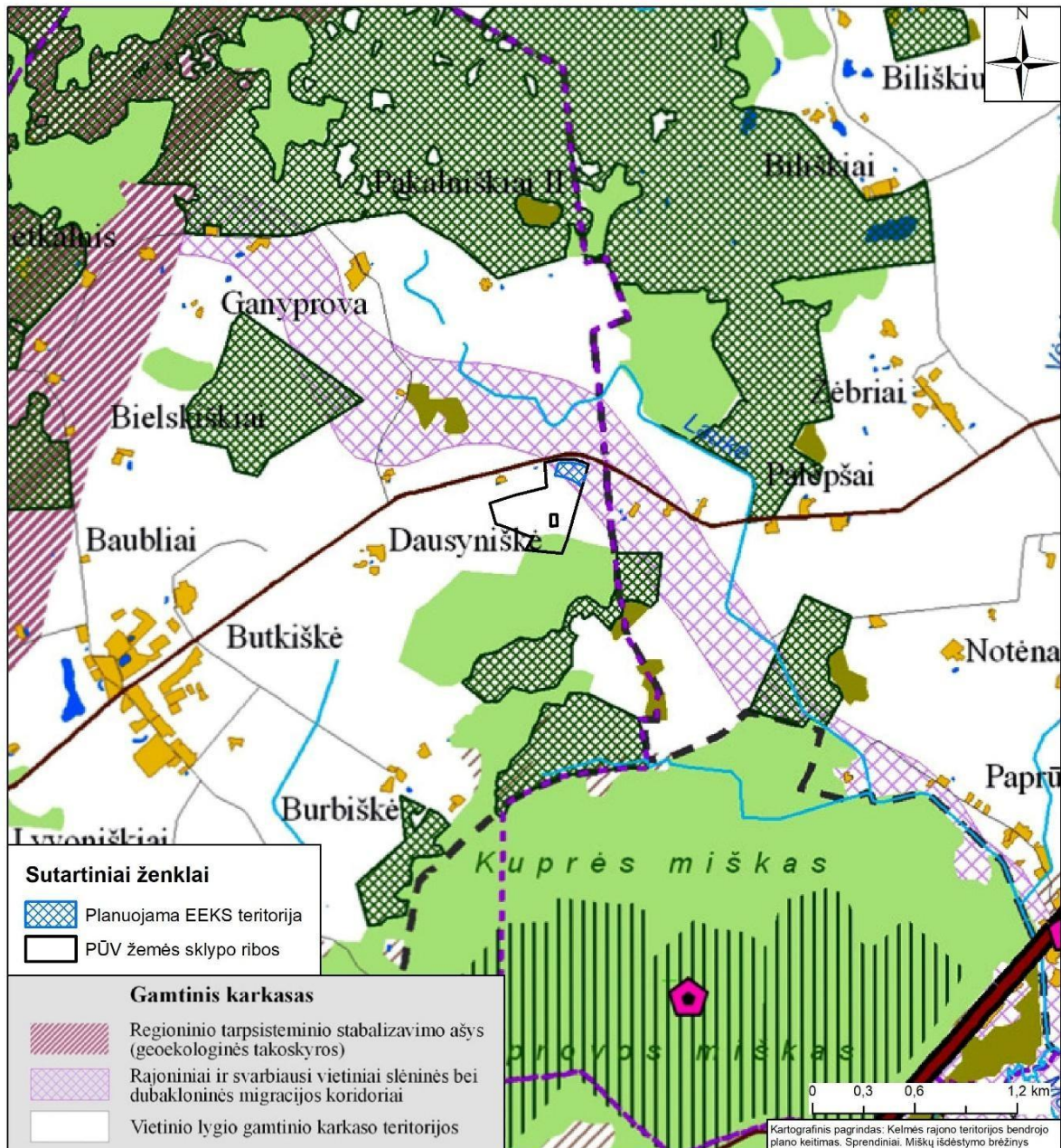
The area under analysis does not fall within the areas and sites of the country's visual and aesthetic potential designated for special protection in the National Landscape Management Plan, nor within the landscape complexes of very high and high aesthetic potential – particularly and moderately distinctive landscape areas (YS).

The nearest vantage point for viewing landscape panoramas – the Medžioklnis viewpoint (near the town of Kražiai) – is situated approximately 7.7 km west of the project site (Fig. 3.4.3).



3.4.3 Fig. Information on areas and sites of the country's visual and aesthetic potential under special protection in the immediate vicinity, as well as identified vantage points for the country's most valuable landscape panoramas.

According to the 'Natural Environment' map of the 2013 General Plan for the Kelmė District Municipality, the project area partially falls within a district-level and local valley and hollow migration corridor (Fig. 3.4.4). This migration corridor is essentially formed by the River Laukė, which flows through areas of cultivated land situated between forests.

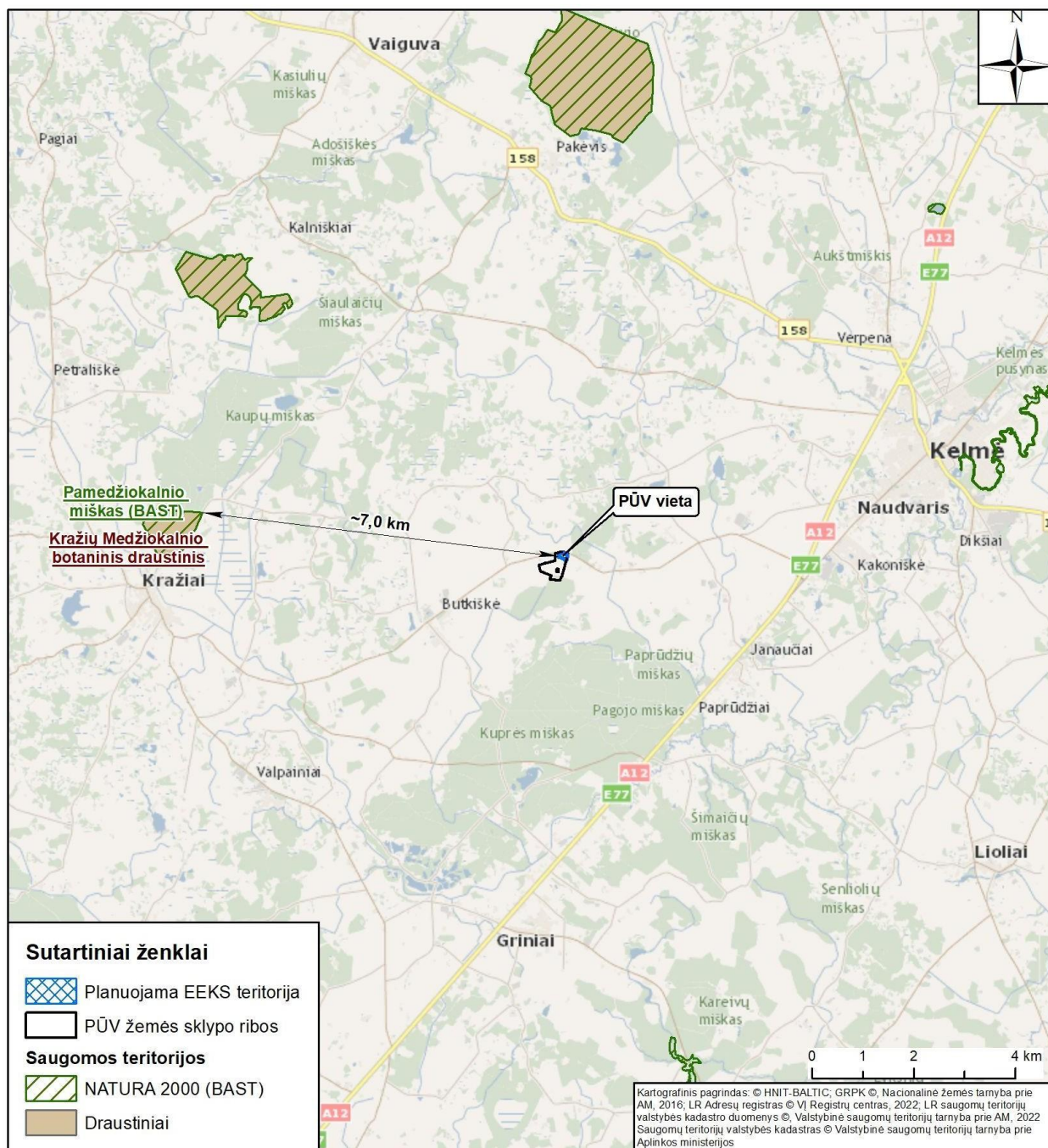


3.4.4 Fig. Elements of the natural framework of the project area in Kelmė District Municipality (BP, 2013).

In accordance with paragraph 15 of the Provisions on the Natural Framework, approved by Letter No. D1-96 of the Minister of the Environment of the Republic of Lithuania dated 14 February 2007, planned economic activities are not prohibited within the natural framework areas of the PEA. However, in accordance with: ‘When planning economic activities within a Natural Framework area that are listed in Annexes 1 and 2 to the Law of the Republic of Lithuania on the Environmental Impact Assessment of Planned Economic Activities (hereinafter referred to as the EIA Law) , the relevant procedures for assessing the impact on the natural landscape and biodiversity shall be carried out, and measures shall be envisaged to compensate for anthropogenic impacts and to conserve or restore the natural landscape and biodiversity’. It is on the basis of Annex 2 to the EIA Act that the document on the screening of the proposed development for EIA purposes is being prepared.

3.5. Information on protected areas located within the area of the planned economic activity and on adjacent plots of land or in neighbouring areas

The area of the planned economic activity does not fall within the boundaries of any protected areas or ‘Natura 2000’ sites. The nearest ‘Natura 2000’ site to the planned economic activity site – Medžiokalnio Forest – is approximately 7.0 km from the boundary of the land plot under analysis (see Table 3.5.1 and Figure 3.5.1).



3.5.1 Fig. Nearest protected areas and ‘Natura 2000’ sites.

Table 3.5.1. Information on protected areas and the assets protected within them (based on the protected areas cadastre data. Available online at <http://stk.am.lt/>).

No.	Protected area		Area, ha	Purpose of establishment and protected assets	Distance from the boundary of the BESS territory
1	2		3	4	5
1.	Pamedžiokalnio Forest	‘Natura 2000’, BAST	77.42739163	9020 Broad-leaved and mixed forests.	~ 7.0 km
2.	Kražiai Medžiokalnio Botanical Reserve	State-owned botanical reserve	77.42739163	To preserve plant communities of scientific value.	~ 7.0 km

3.6. Information on biodiversity within the area of the planned economic activity and on adjacent land parcels or areas:

3.6.1 Information on biotopes and habitats: forests, their purpose and protection regime; meadows, marshes, water bodies and their protection zones and buffer strips; the marine environment, etc., including their abundance, quantity, quality and potential for regeneration, as well as the resilience of the natural environment

As mentioned in previous sections, the PEA site is situated in areas used for agriculture; therefore, no sites of significance for biodiversity have been identified in this location.

Based on the map of the inventory of habitats of European Community (hereinafter 'EC') importance, it has been established that the nearest EC-important grassland and forest habitats are the Fennoscandian herb-rich forests with common spruce (*Picea abies*) (9050), situated approximately 348 m from the BESS site, and species-rich Fennoscandian lowland grasslands (6270), situated approximately 424 m away (Fig. 3.6.1.1 and Table 3.6.1.1).

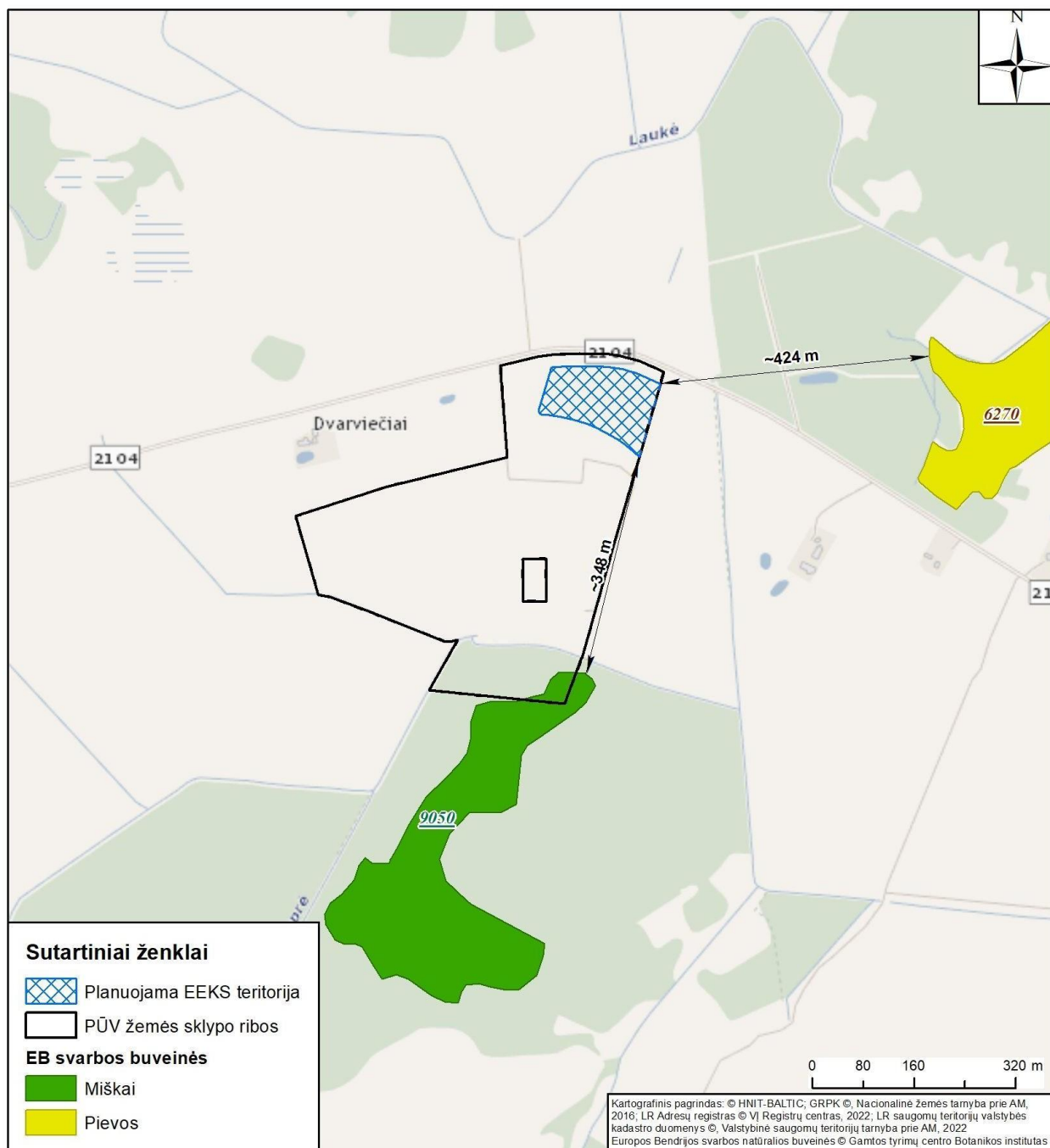
3.6.1.1 Table: Information on the nearest natural habitats of EC importance

No.	Habitat	Distance from the boundary of the BESS site
1	2	3
1.	9050 Fennoscandian herb-rich forests with Norway spruce (<i>Picea abies</i>)	~ 348 m
2.	6270 * Species-rich Fennoscandian lowland grasslands (from dry to moderately moist)	~ 424 m

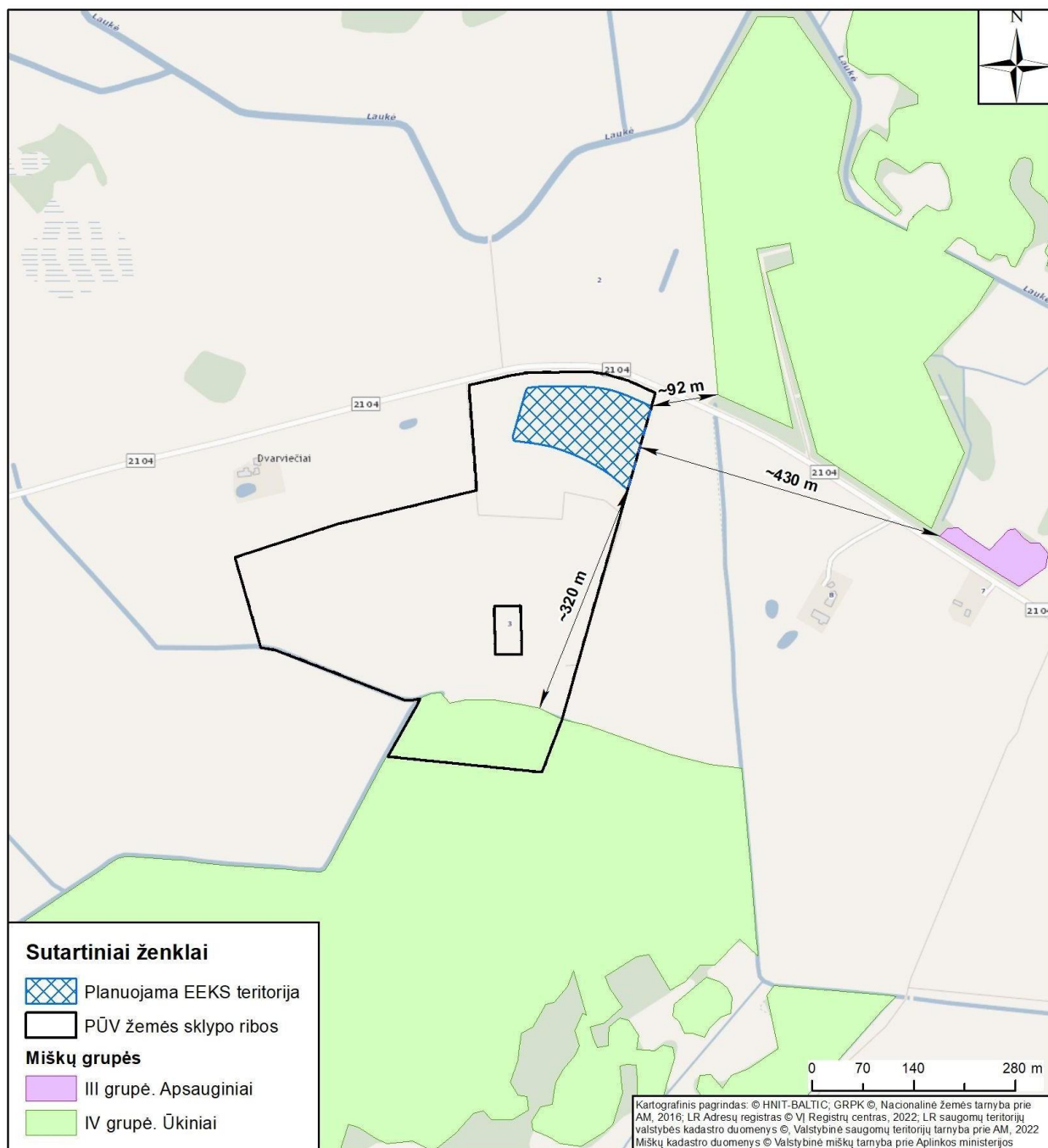
The nearest Group IV (commercial) forest is situated approximately 92 m from the boundary of the BESS territory (Fig. 3.6.1.2 and Table 3.6.1.2). A small area of Group III (protective) forest is situated approximately 430 metres away.

3.6.1.2 Table: Information on the nearest forests

No.	Forest group	Distance from the boundary of the BESS site
1	2	3
1.	Group IV. Farm buildings	~ 92 m
2.	Group III. Protective	~ 430 m
3.	Group IV. Farm buildings	~ 320 m



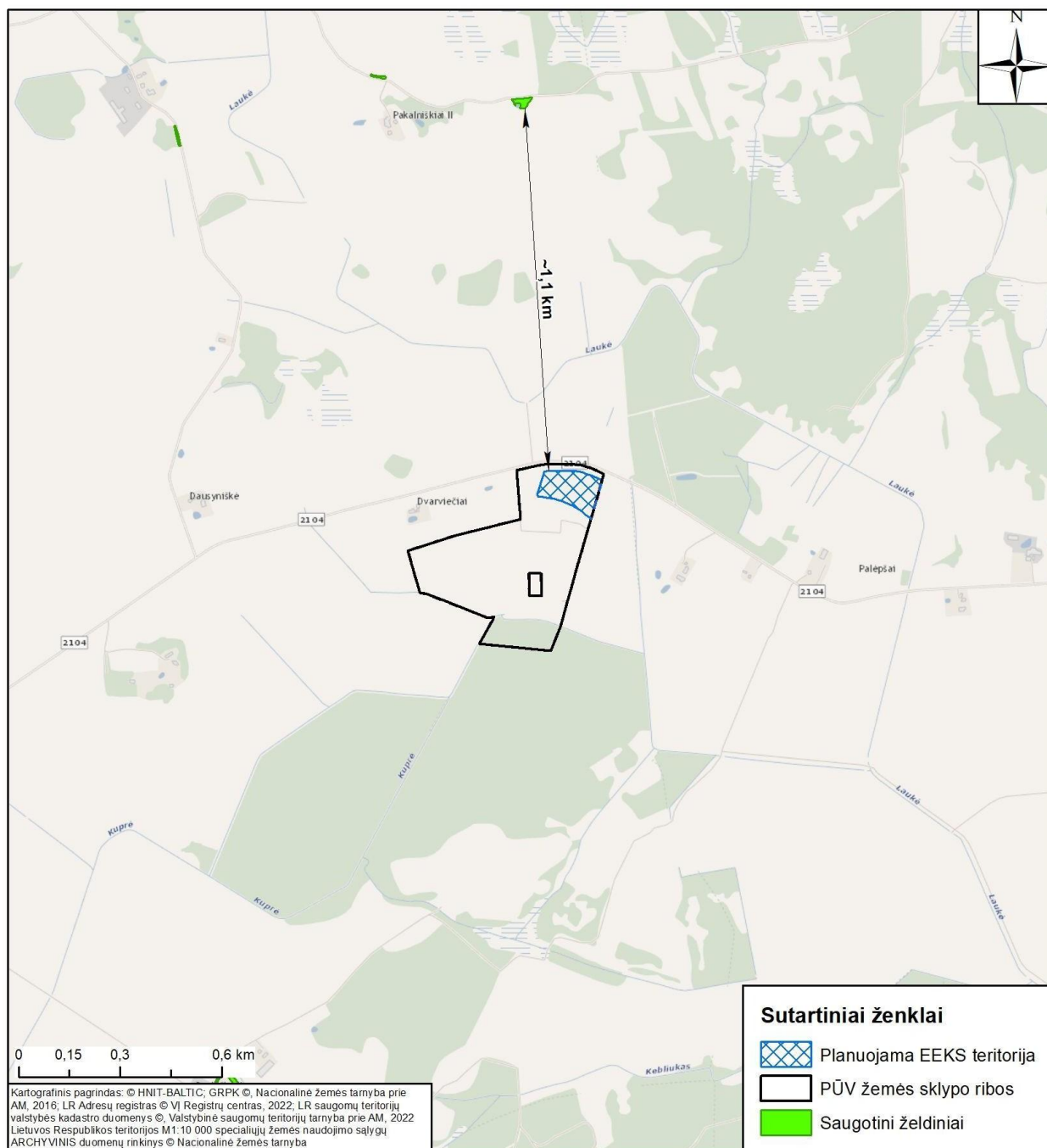
3.6.1.1 Fig. Nearest habitats of European Community importance.



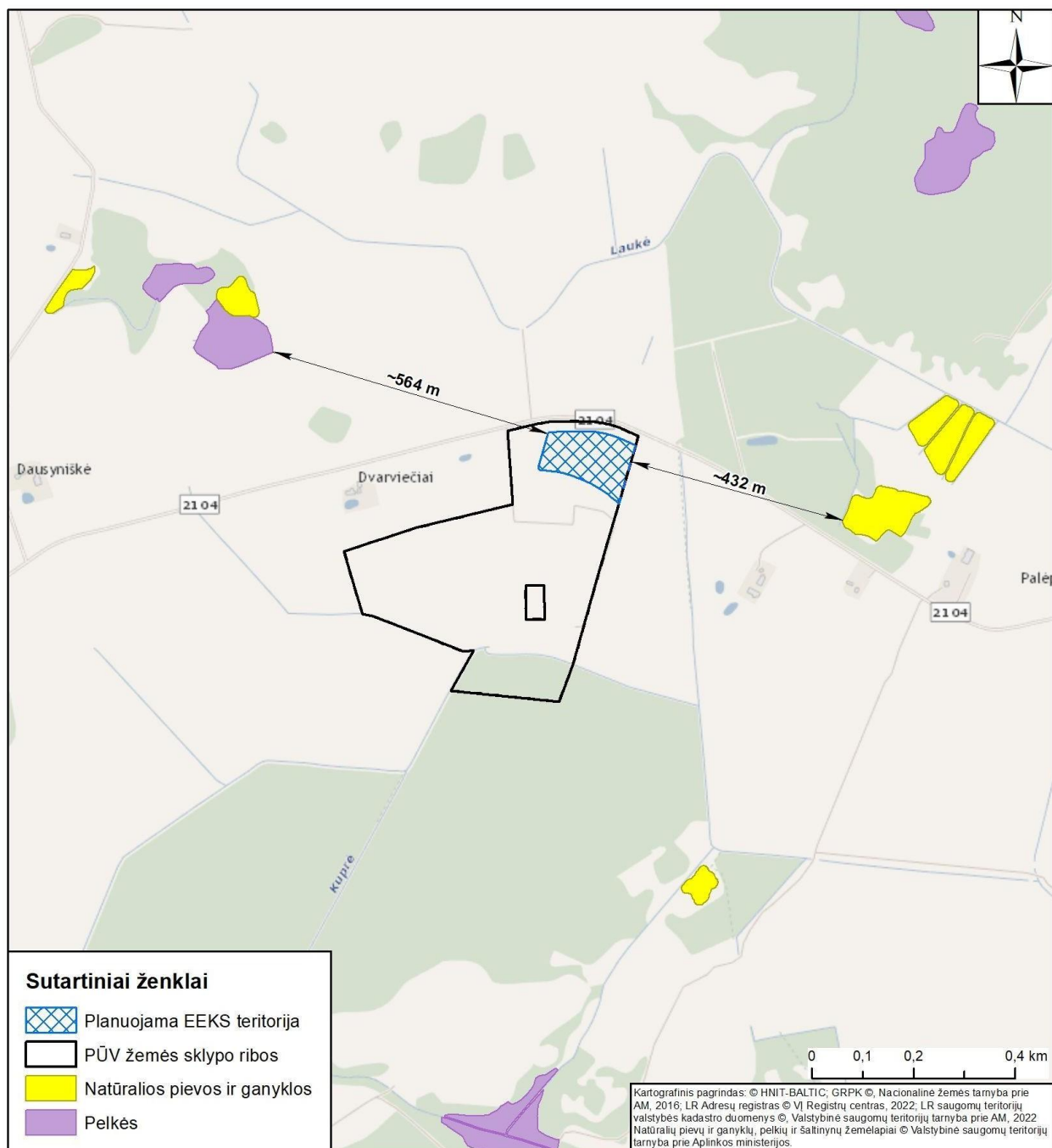
3.6.1.2 Fig. The nearest forest in relation to the planned development area.

The planned development area is situated approximately 1.1 km from the nearest protected woodlands (Fig. 3.6.1.3).

According to data from the State Cadastre of Protected Areas of the Republic of Lithuania, the distance to the area of natural meadows, where special land-use conditions apply, is approximately 432 m, and to the bog ~ 564 m (Fig. 3.6.1.4).



3.6.1.3 Fig. Information on protected vegetation.



3.6.1.4 Fig. Information on natural meadows and pastures, marshes and springs.

According to information from the Invasive Species Information System of the Ministry of the Environment of the Republic of Lithuania, the project site does not fall within the habitats of trees and plants not native to Lithuania, which displace native plants and thus pose a threat to the diversity of the local dendroflora and vegetation in general. One of the nearest recorded invasive plant species is the Japanese knotweed, which is located approximately 2.3 km from the project area (Fig. 3.6.1.5).



3.6.1.5 Fig. Distribution of invasive plant species in the vicinity of the project area.

3.6.2 Protected plant, animal and fungal species

Information on the locations of protected species in the vicinity of the project area is provided in Table 3.6.2.1 and 3.6.2.1 Fig. Data obtained under contract from the database of the Information System on Protected Species (SRIS) of the Ministry of the Environment of the Republic of Lithuania.

The population of white storks is more abundant and closer to the PEA site. According to observations from 2024, two white stork nests (registered in SRIS) are located in the nearest inhabited farmsteads, approximately 305–350 metres from the BESS site. The nests or feeding sites of other registered protected species in the immediate vicinity – the common buzzard, lesser spotted eagle, whooper swan, black stork, white-tailed eagle, spotted eagle and little bittern – are more than 530 m away from the BESS site.

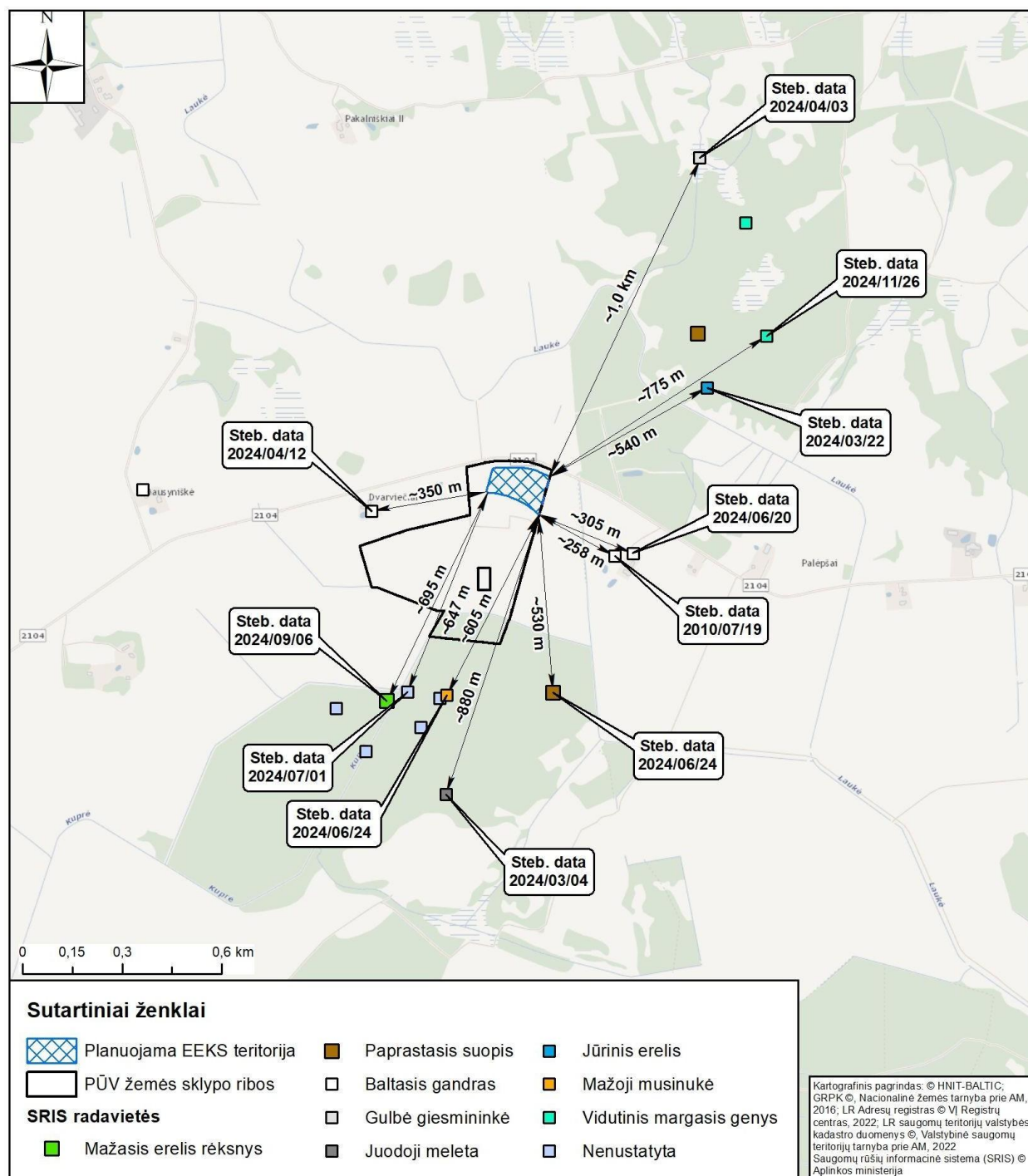


Fig. 3.6.6. Existing and nearest locations of protected animals within the PEA recorded in the SRIS system.

Table 3.6.2.1. Observations of protected animals recorded in SRIS

Species	Kingdom	Date of observation	Stage of development	Signs of activity
1	2	3	4	5
White stork	Animals (Birds)	12 April 2024	Adult	Nest, hollow, etc.
Whooper Swan	Animals (Birds)	3 April 2024	Adult	Observed alive (flying past, feeding, etc.)
Medium Spotted Woodpecker	Animals (Birds)	26 November 2024	Adult	Observed alive (flying past, feeding, etc.)

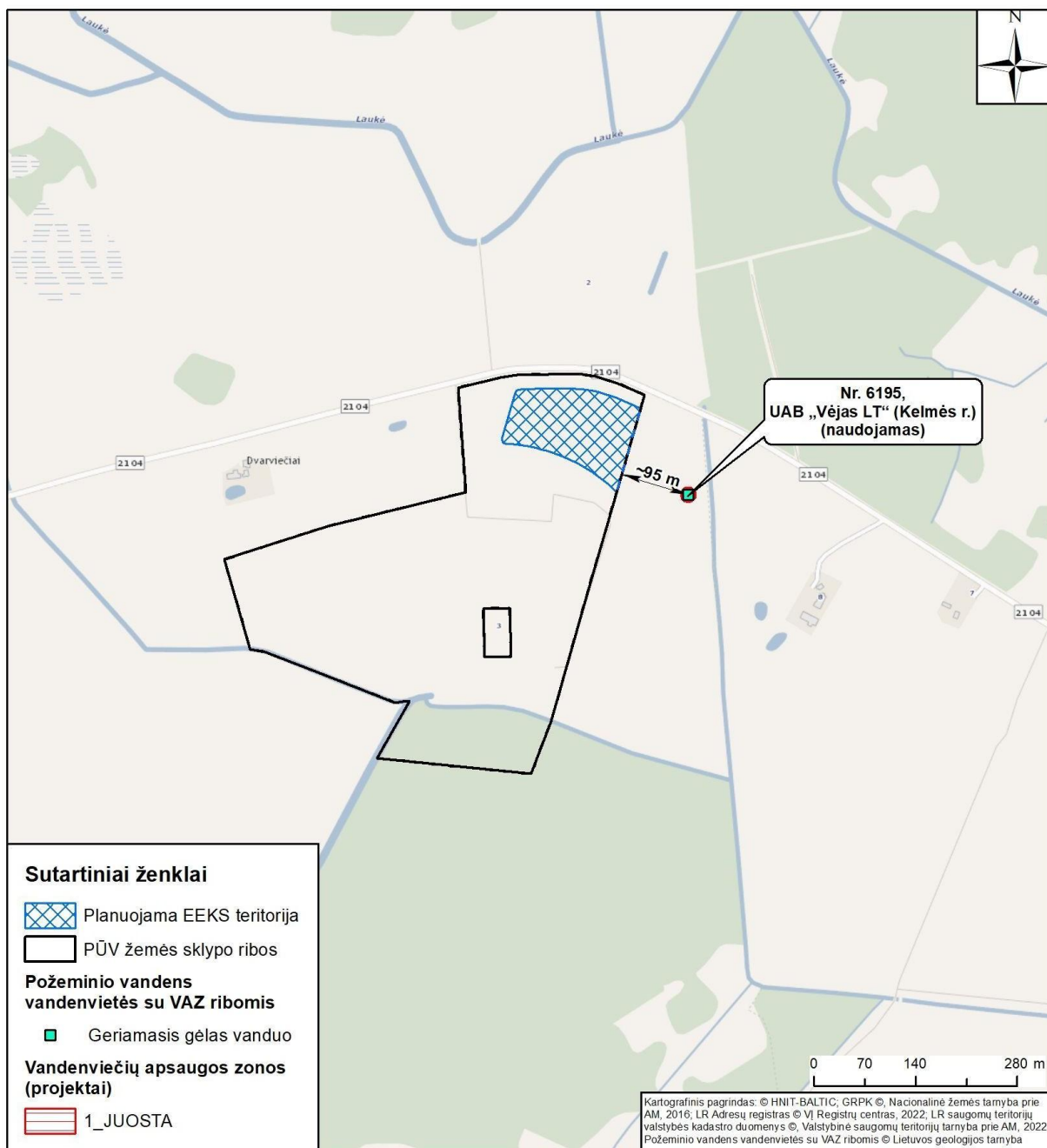
Species	Kingdom	Date of observation	Stage of development	Signs of activity
1	2	3	4	5
White-tailed eagle	Animals (Birds)	22 March 2024	Adult	Nest, hollow, etc.
White stork	Animals (Birds)	20 June 2024	Young, immature individual	Nest, hollow, etc.
White stork	Animals (Birds)	19 July 2010	Young, immature individual	Nest, hollow, etc.
Common Kestrel	Animals (Birds)	24 June 2024	Young, immature individual	Nest, hollow, etc.
Black woodpecker	Animals (Birds)	4 March 2024	Adult	Other signs of presence (calls, etc.)
Little Flycatcher	Animals (Birds)	24 June 2024	Adult	Other signs of presence (calls, etc.)
Not identified	Animals (Birds)	1 July 2024	Adult	Nest, hollow, etc.
Lesser Spotted Eagle	Animals (Birds)	6 September 2024	Young, immature individual	Nest, hollow, etc.

No protected species of fungi and/or plants have been identified in the vicinity of the planned economic activity.

3.7. Information on environmentally sensitive areas within the planned economic activity site and on adjacent land parcels or territories – water body protection zones and riparian protection strips, floodplains, karst regions, groundwater abstraction points and their protection zones

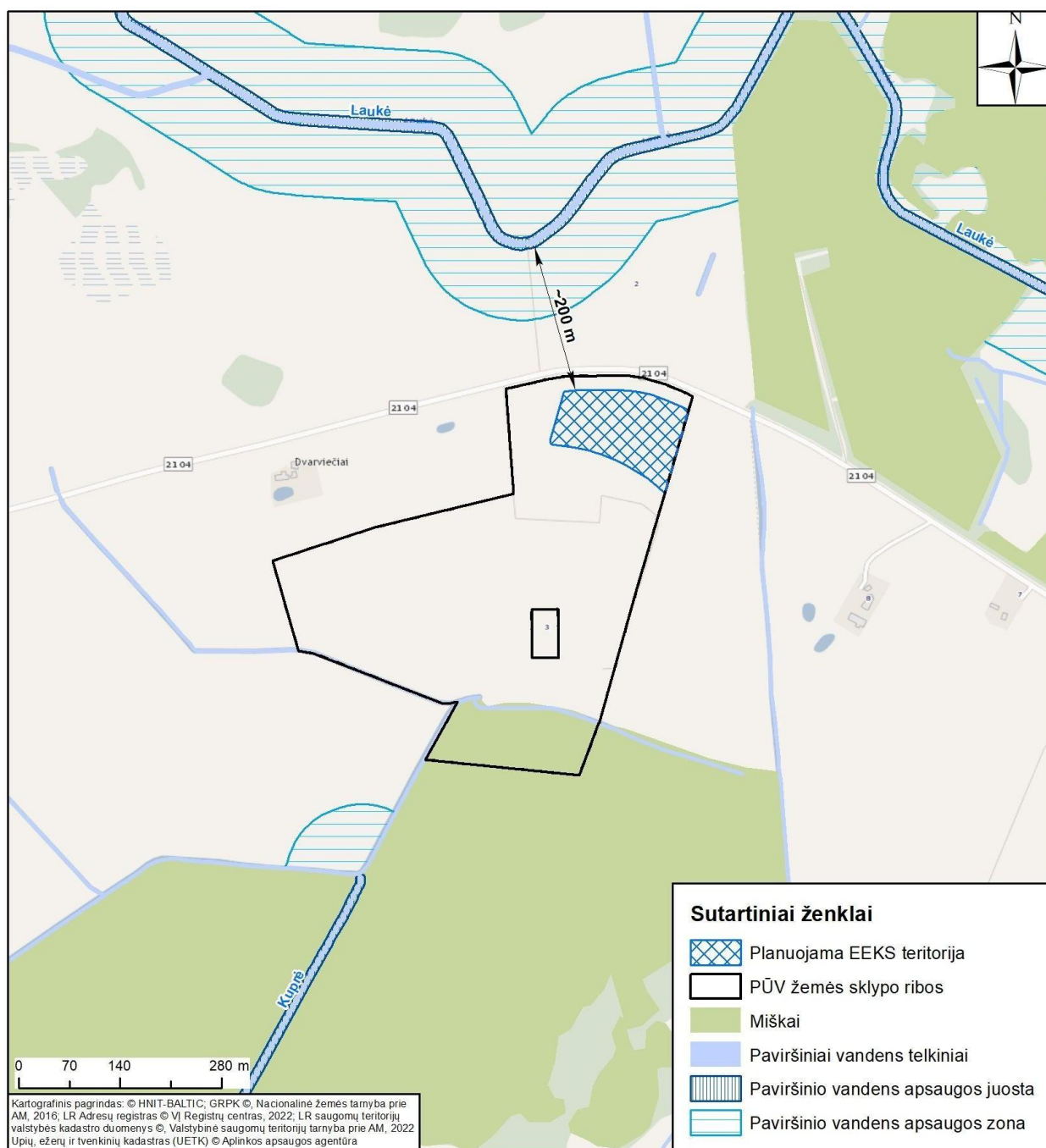
There are no registered water supply sources, water bodies or their protection zones within the planned BESS area.

Approximately 95 metres from the project site is a newly established Group II fresh water supply source No. 6195 (Fig. 3.7.1). This water source is used for fire-fighting and other purposes at the existing Dvarviečiai TP and could be utilised to fill the planned BESS water reservoir, thereby obviating the need to install a new water source (to be decided during the design phase).



3.7.1 Fig. Groundwater sources.

The nearest body of water – the Laukė stream – is situated approximately 200 metres from the boundary of the project area (Fig. 3.7.2). According to the flood hazard and risk map (<https://potvyniai.aplinka.lt/map>), this stream is not considered to pose a flood risk; furthermore, the Laukė stream and the BESS site are separated by district road No. 2104.



3.7.2 Fig. Information on protection strips and zones along the shores of surface water bodies.

Based on the same flood hazard and risk map, the project area is analysed as being approximately 3.8 km away from the nearest flood-risk area (Fig. 3.7.3). At this distance, the River Kražantė does not pose a threat to the planned economic activity.

According to the global ‘Think Hazard’ map ¹⁴of potential floods influenced by climate change over the next 10 years, the risk of river flooding in the Kelmė district is assessed as ‘very low’. The website provides information and advice for business developers on the likelihood of various natural phenomena, which varies as the climate changes.

¹⁴<https://www.thinkhazard.org/en/report/19149-lithuania-siauliu-kelmes-raj/FL>



Fig. 3.7.3. Flood threats and risks in relation to the planned economic activity area.

3.8. Information on past pollution in the planned economic activity area and neighbouring land plots or areas

There are no potentially polluting enterprises within the planned economic activity area, and no environmental monitoring is carried out. There is no information to suggest that the planned economic activity area or adjacent land parcels may have been polluted in the past.

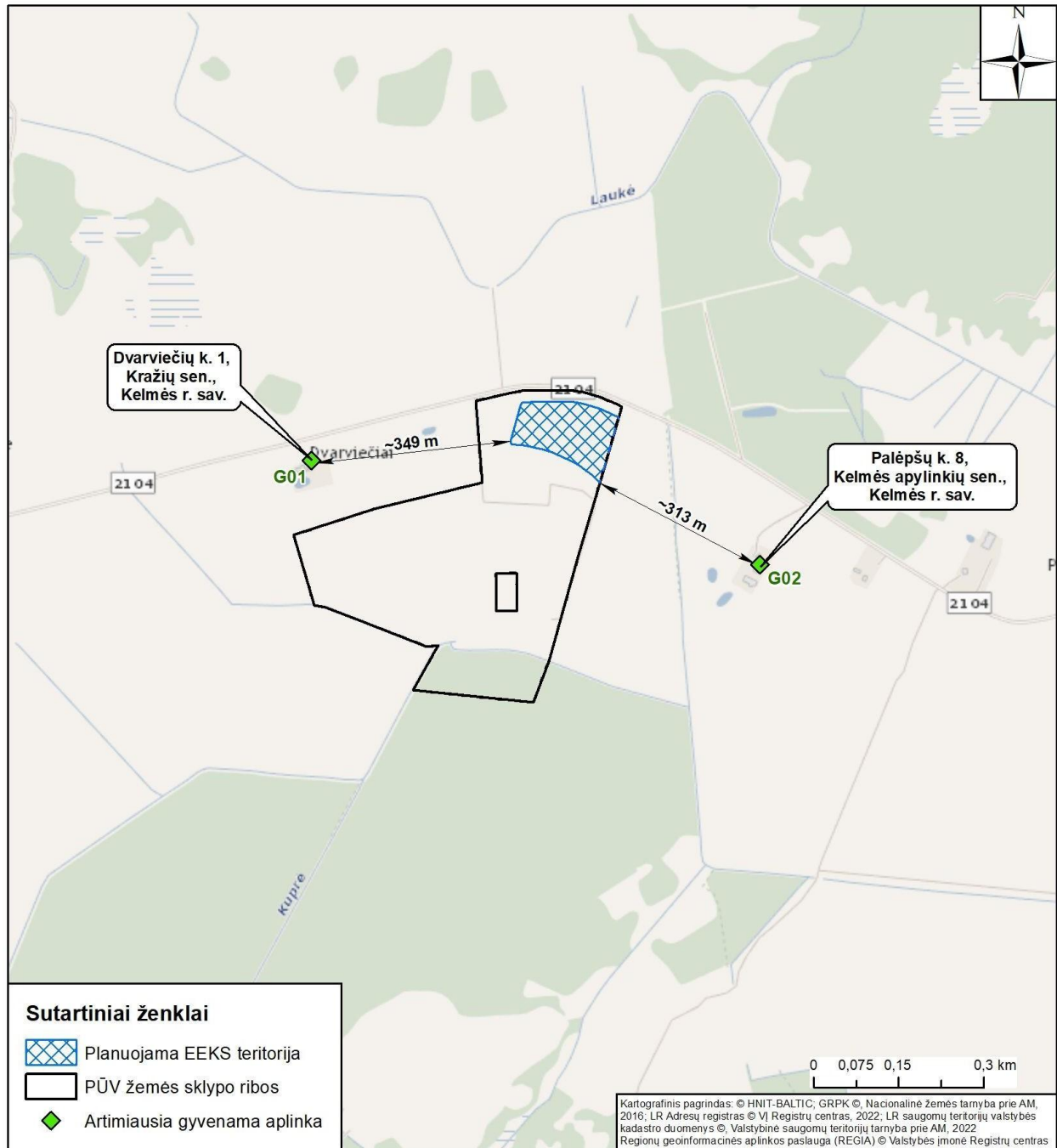
The nearest sources of pollution to the planned economic activity site, although currently inactive, are located in the Butkiškės rural area: Vehicle depot No. 9842, Oil depot No. 9843 and the Juodligė kiln (Public Institution ‘Ramybės skliautas’) No. 12473 are situated more than 2.6 km away (Fig. 3.8.1).



3.8.1 Fig. The nearest registered polluting activities in relation to the planned economic activity area.

3.9. The location of the land plot or area for the planned economic activity in relation to recreational, resort, residential, public, industrial and storage, and engineering infrastructure areas, indicating the distances from these areas and/or existing structures to the site of the planned economic activity

The nearest residential area, located at Palėpšų k. 8 (G02), is situated approximately 313 m to the south-east of the boundary of the planned economic activity area. Another residential property at Dvariečių k. 1 (G01) is situated approximately 349 m to the west (Fig. 3.9.1, Table 3.9.1).

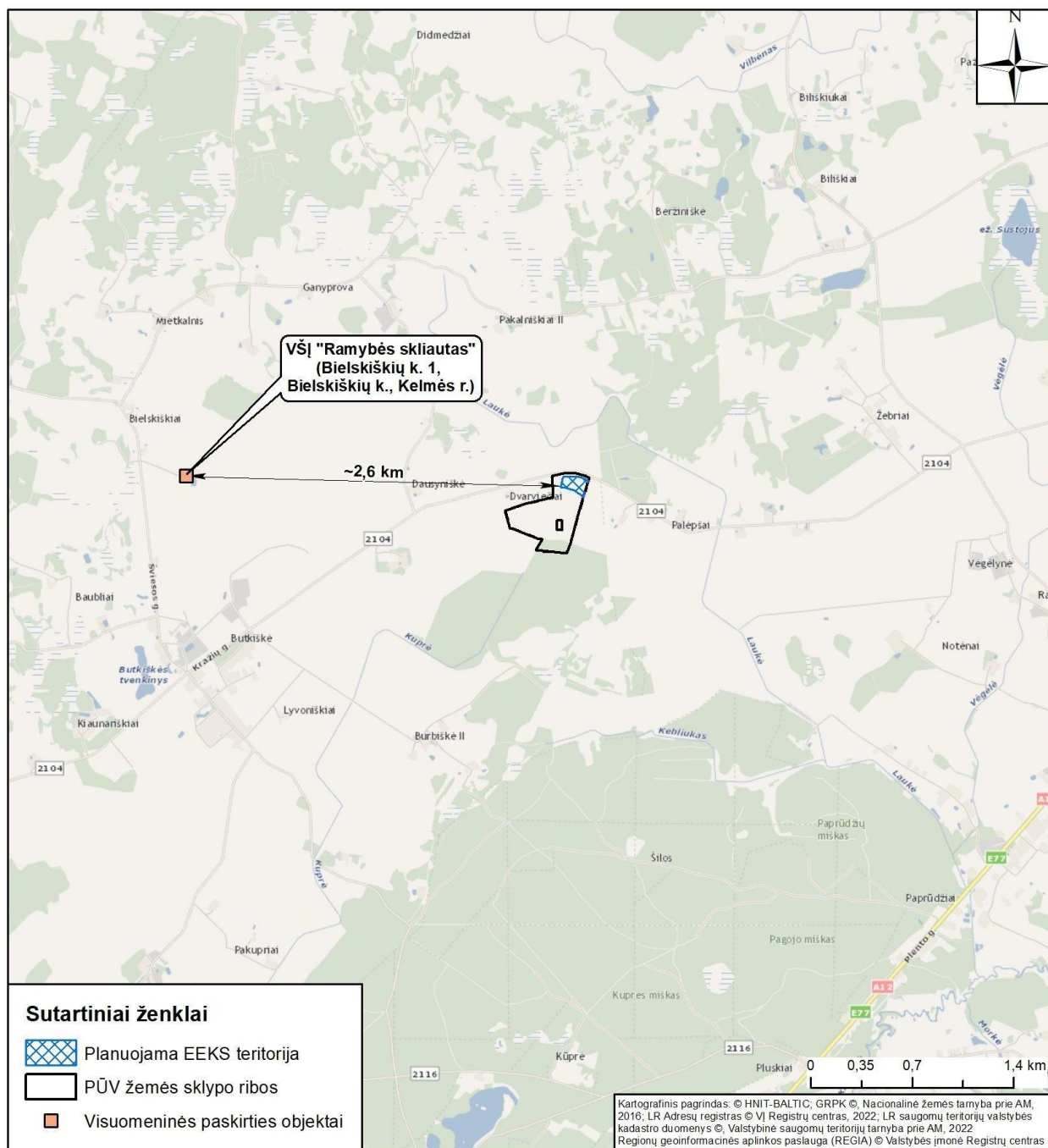


3.9.1 Fig. Residential area closest to the project area.

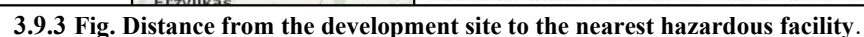
Table 3.9.1. Information on the nearest residential buildings

No.	Residential area	Distance from the boundary of the BESS site
1	2	3
G1	Dvarviečių village 1, Kražiai Eldership, Kelmė district municipality	Approx. 349 m
G2	8 Palėpšų village, Kelmė District, Kelmė District Municipality	Approx. 313 m

There are no public-use buildings in the immediate vicinity of the development site (Fig. 3.9.2). The nearest ones, belonging to the public institution 'Ramybės skliautas', are located at 1 Bielskiškių village, Bielskiškių village, Kelmė District Municipality, approximately 2.6 km away.

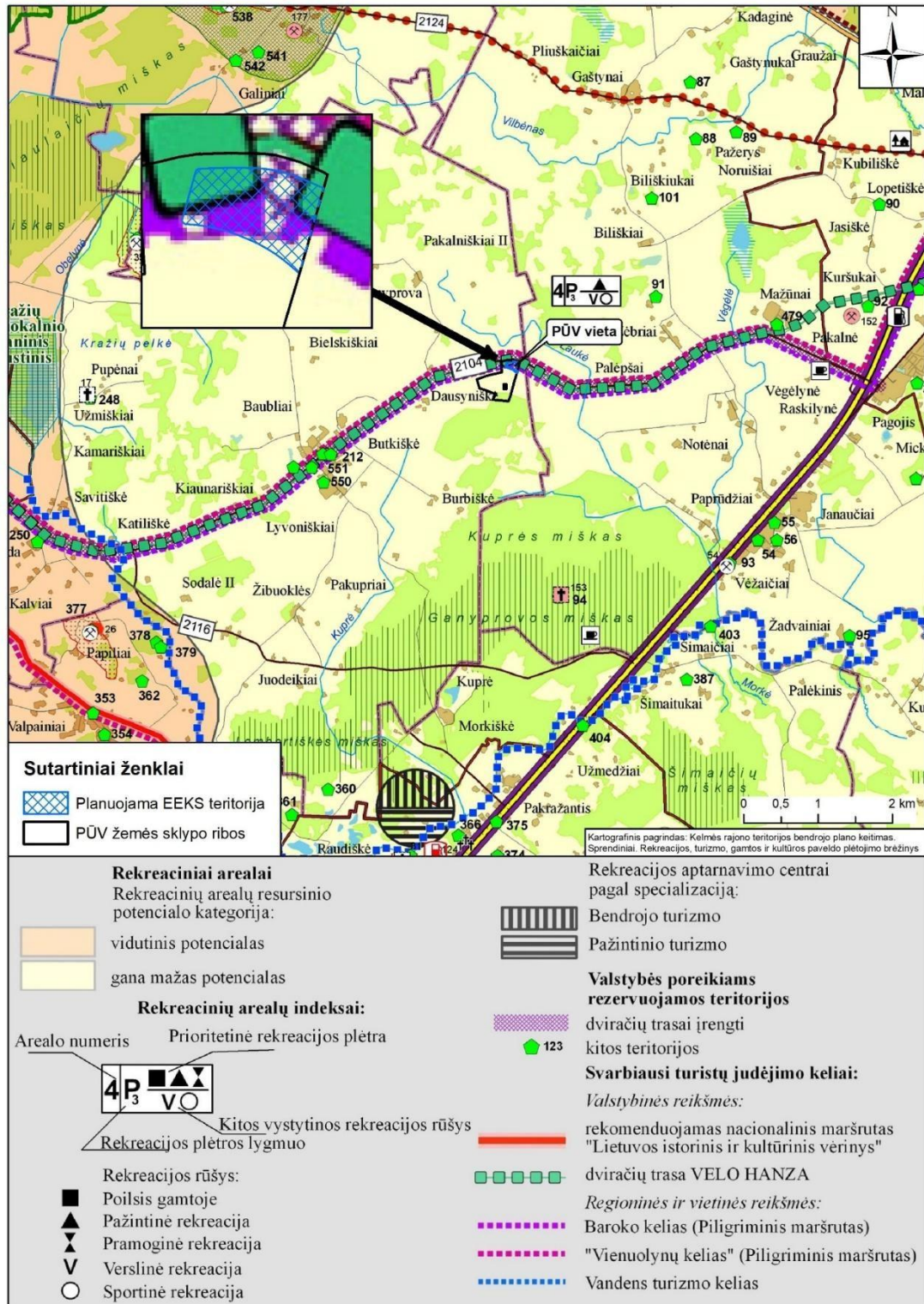


3.9.2 Fig. Distance from the development site to the nearest public-purpose facility.



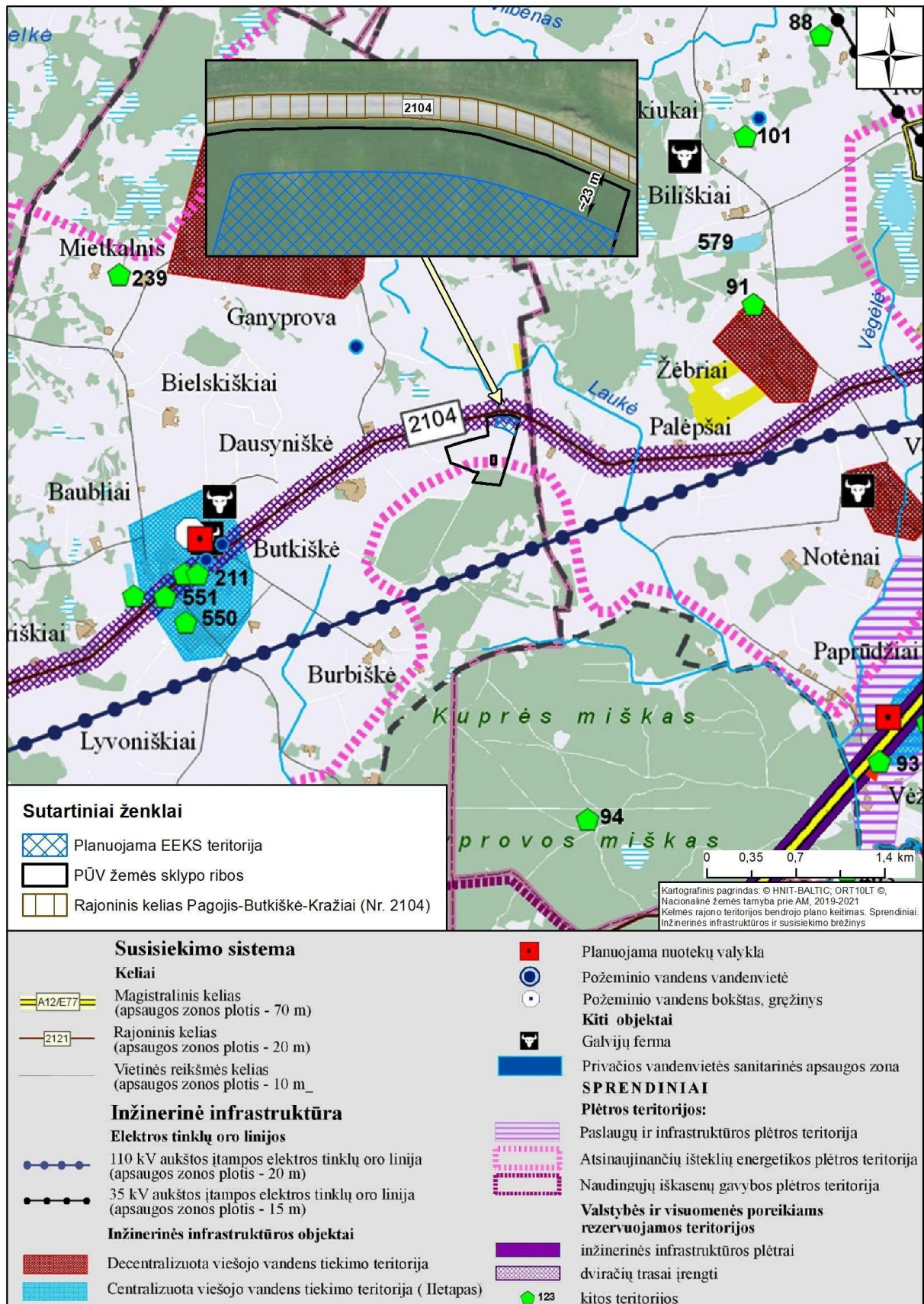
The nearest facility to the project site is approximately 21.3 km away (Fig. 3.9.3); this is the Viduklė Agricultural Complex of UAB 'Agrochema'. Registered activities: wholesale trade, warehousing and storage of agrochemical products and fertilisers. Ammonium nitrate up to 4,900 tonnes; this quantity meets the first qualifying threshold for hazardous substances.

The site of the planned 150 MW wind farm will be located in an area with relatively low recreational potential (Fig. 3.9.4).



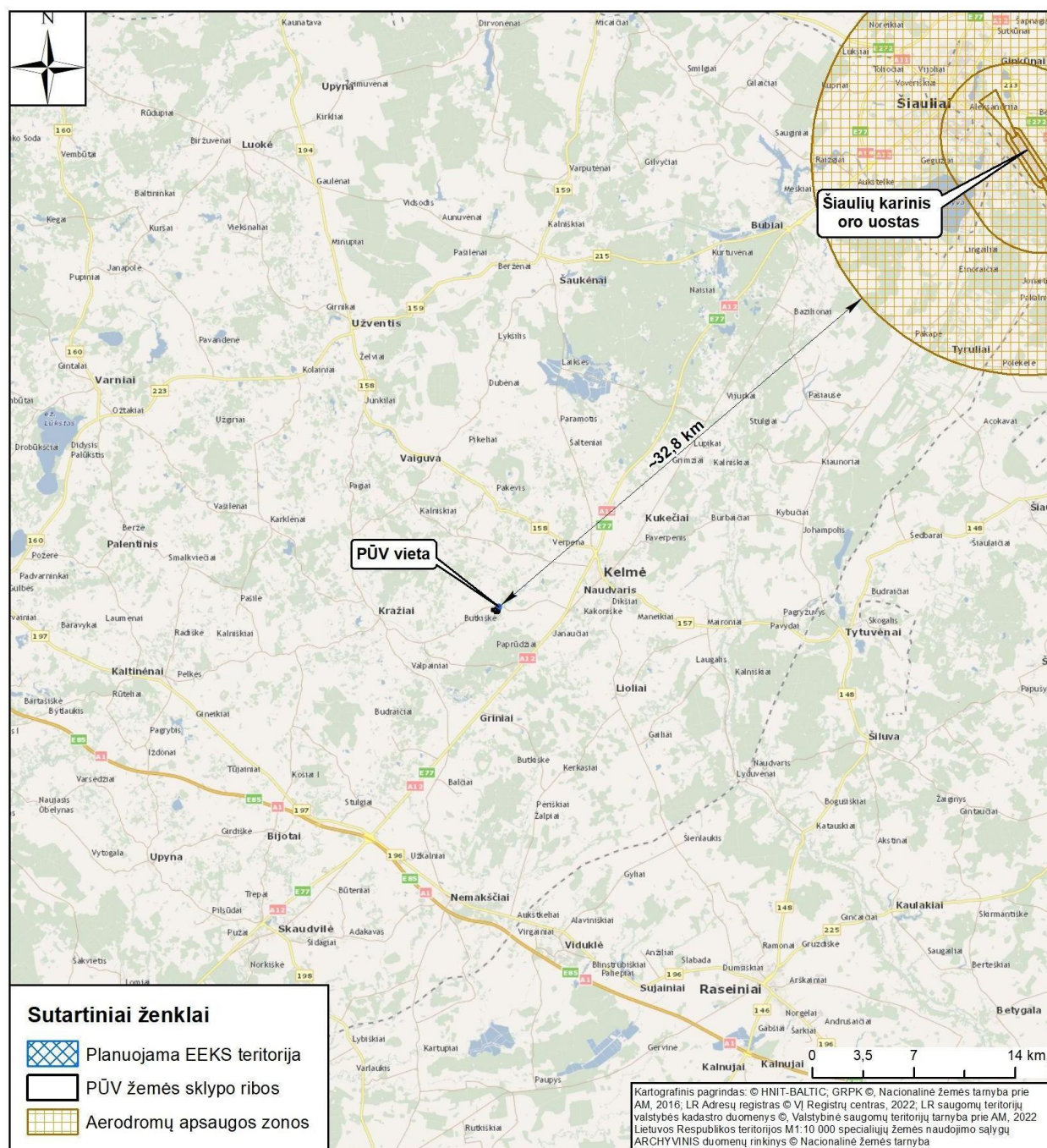
3.9.4 Fig. Nearest tourism and recreational areas to the project site (Kelmė District Municipality General Plan, 2013).

In accordance with the amendments to the Kelmė District General Plan (hereinafter 'GP'), approved by Kelmė District Municipal Council Resolution No. T-94 of 29 March 2013 'On the amendment of the Kelmė District General Plan', an area adjacent to the planned BESS has been reserved for the construction of a cycle route and pilgrimage routes. The cycle route is planned within the buffer zone of Road No. 2014 and does not border the BESS area (Fig. 3.9.5). The proposed development will have no impact on the recreational potential of this region.



3.9.5 Fig. Existing and planned engineering infrastructure in the vicinity of the project (Kelmė District Municipality, 2013).

The safety zone of the nearest aerodrome is approximately 32.8 km from the planned BESS site (Fig. 3.9.6).



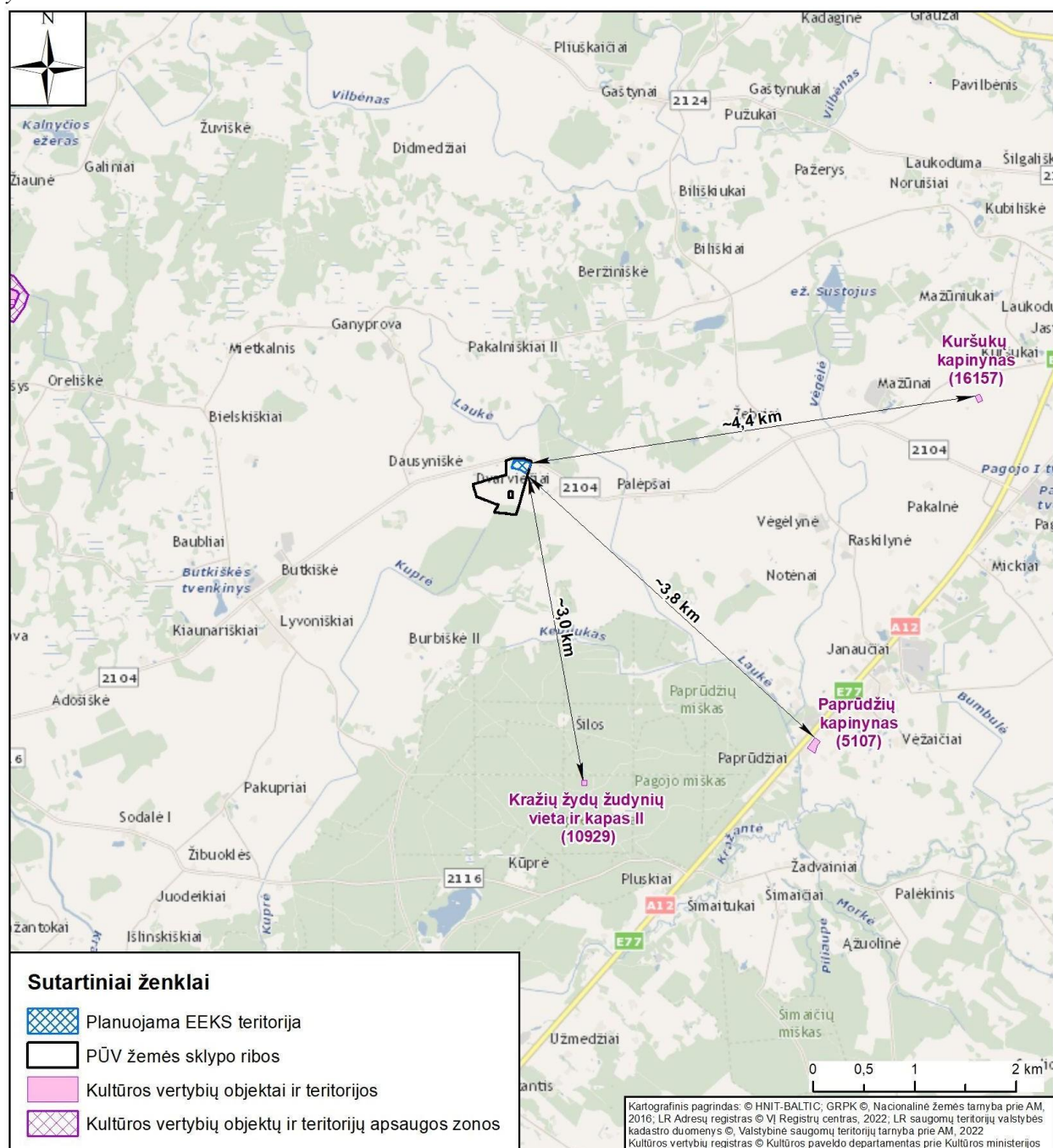
3.9.6 Fig. Distance from the project site to the nearest aerodrome protection zone.

The total height of the BESS installations will not exceed 3.5 metres (excluding lightning protection installations); therefore, the project will not affect air navigation.

The proposed development does not fall within the safety zones of other infrastructure facilities, such as motorways, railways or oil pipelines.

3.10. Information on immovable cultural heritage assets located on the land plot or within the territory of the planned economic activity

According to data from the Register of Cultural Heritage of the Republic of Lithuania, no registered cultural heritage sites or their protection zones fall within the area of the planned BESS. Information on the nearest registered cultural heritage sites is provided in Table 3.10.1 and Figure 3.10.1.



3.10.1 Fig. Nearest registered cultural heritage sites.

Table 3.10.1. Nearest registered cultural heritage sites

Unique object code	Name	Address	Status	Type	Area	Distance from the BESS of the BESS territory
1	2	3	4	5	6	7
10929	Site of the Kražiai Jewish massacre and mass grave II	Kelmė District Municipality, Kelmė Sub-district, Šilų village	Registered	Property	48.00	~ 3.0 km
5107	Paprūdžiai Cemetery	Kelmė District Municipality, Kelmė Eldership, Paprūdžiai village	State-protected	Property	9,200.00	~ 3.8 km

Unique property code	Name	Address	Status	Type	Area	Distance from the BESS of the BESS territory
1	2	3	4	5	6	7
16157	Kuršukai Cemetery	Kelmė District Municipality, Kelmė Sub-district, Kuršukai village	Registration	Real estate	3554.00	~ 4.4 km

4. TYPES AND DESCRIPTION OF POTENTIAL ENVIRONMENTAL IMPACTS

The planned economic activity (PEA) involves the installation and operation of a 150 MW electricity storage system (BESS) with ancillary facilities in Kelmė District Municipality, Kražiai Eldership, in the village of Dvarviečiai, on land plot cadastral No. 5407/0001:499, unique property No. 4400-5315-5847, with a total area of 17.1132 ha. The area of the site planned for the BESS is 1.69 ha.

The aim of the project is to store electrical energy by purchasing it from the grid and, where necessary, to transmit it via underground cable lines to the newly constructed Dvarviečiai transformer substation (TS) and onwards to the electricity transmission networks. This will contribute to the balancing of the electricity networks.

No significant adverse impact on the natural environment or public health is anticipated: the project does not involve the creation of any new stationary sources of pollution capable of significantly affecting the quality parameters of air, soil or water. There may be short-term and localised adverse effects on the natural environment during construction works due to noise, earthworks, and temporary air pollution from mobile (transport and construction machinery) and backup (e.g. diesel generator with storage tank) pollution sources. The BESS is not tall (up to approximately 3.5 m in height) and will therefore have no significant visual impact and/or impact on air navigation.

In the long term, it is anticipated that the lithium-ion batteries will be replaced with new ones, and that maintenance and replacement of parts will be carried out on the cooling and heating systems and other electrical equipment. The works mentioned may have an impact on the environment, but they are necessary for the proper and safe operation of the BESS.

Waste generated during the decommissioning of the facility will be transferred to specialised waste management/recycling companies that operate in accordance with the Waste Management Act of the Republic of Lithuania, the Waste Management Regulations, the Regulations on the Management of Electrical and Electronic Equipment and Waste Thereof, the Construction Waste Management Regulations, and other legislation, and will be managed in accordance with the requirements of the Republic of Lithuania's waste management legislation in force at that time.

4.1. Impact on residents and public health

During the project implementation, a short-term (only during construction works, during the day) negative impact on the residential environment closest to the project site due to a temporary increase in noise levels – caused by the movement of construction machinery along road No. 2104 Pajojis–Butkiškė–Kražiai and due to the works planned to be carried out within the BESS territory (for a duration of up to 9 months). The calculated noise indicators are presented in Section 2.11, Table 2.11.5.

The nearest residential area to the project site is approximately 313 m to the south-east and ~349 m to the west. The BESS facilities, located within the boundaries of the planned site, will emit noise of varying intensity during operation. The calculated noise indicators are presented in Chapter 2.11, Table 2.11.5.

The projected noise levels from the project and the combined noise levels near the nearest residential areas will not exceed the limits specified in Lithuanian Hygiene Standard *HN 33:2011 'Noise limit values in residential and public buildings and their surroundings'*.

During the implementation of the project, equipment from other suppliers may be selected; therefore, its technical and acoustic characteristics may differ from those assessed in the calculations. During the preparation of the technical design, once the layout and quantity of the equipment have been finalised (the quantity will not exceed that assessed) and acoustic characteristics, the developer will carry out repeat noise modelling calculations and ensure compliance with the maximum permissible noise limits applicable to the surroundings of residential and public buildings in accordance with HN33:2011.

During the reconstruction, a short-term impact on ambient air quality is anticipated due to increased traffic of vehicles and specialised machinery. The increase in air pollution resulting from the use of fuel-burning equipment at the worksite will be temporary and localised (see Section 2.9.1).

To prevent any significant impact, it will be ensured that the equipment used is in good working order and does not exceed the permitted emission limits set for such equipment. Mitigation measures are set out in Table 4.10.1.

Once the project has been implemented, it is not anticipated that electromagnetic field levels exceeding the permissible limits for residential areas will occur outside the BESS territory (Section 2.11.2).

4.2. Impact on biodiversity, including the potential impact on natural habitats due to their encroachment or other forms of destruction, damage or fragmentation, changes to the hydrological regime, forest fragmentation, destruction of vegetation, etc.; a possible reduction in the area of natural habitat types, the disappearance or damage to protected species, their growing sites and habitats, and a possible significant impact on the feeding, migration, breeding or wintering of animals

The PEA BESS site is located within areas used for agriculture; therefore, no natural features of importance to biodiversity have been identified at this location.

During the construction and operation of the project, no forest will be felled, nor will the habitats of protected species or the growing sites of protected vegetation be otherwise affected.

The impact on vegetation relates to damage to the grass cover caused by construction works and the storage of temporary materials and construction machinery on site. Damage to vegetation and various types of soil during construction works is unavoidable. It is planned to excavate an area of approximately 2.3 ha and store approximately 4,600 m³ of topsoil, which will subsequently be used for the formation and landscaping of the area surrounding the BESS, and for the installation of green surfaces.

The spread of non-native and invasive plant species is not anticipated.

During the project, natural habitats will not be built on or otherwise destroyed, damaged or fragmented. The area of natural habitat types will not be reduced.

According to data from the Protected Species Information System (SRIS), the white stork population is more abundant and closer to the project area. According to SRIS observations recorded in 2024, two white stork nests are located in neighbouring settlements, approximately 305–350 metres from the BESS site. Other recorded protected species in the immediate vicinity include: the common buzzard, the lesser spotted eagle, the whooper swan, the black stork, the white-tailed eagle, the middle spotted woodpecker and the lesser spotted woodpecker, whose nesting sites or feeding grounds are more than 530 m away from the BESS site (see Section 3.6.2).

No significant adverse impact is anticipated in this case.

4.3. Impact on protected areas and ‘Natura 2000’ sites

The project area does not fall within the boundaries of any protected areas or ‘Natura 2000’ sites, nor within their buffer zones. The distance to the nearest ‘Natura 2000’ site, the Pamedžiokalis Forest, is approximately 7.0 km. This distance is sufficient to ensure the protection of the protected habitats identified in the EIA.

4.4. Impact on the land (surface and subsoil) and soil

During the construction of the BESS (construction of sites, installation of underground cables and foundations), there may be a short-term impact on the soil due to earthworks. During the construction of sites, access roads, foundation pits and the laying of underground cables, the topsoil layer covering an area of approximately 2.3 ha will be piled up, stored in designated areas and, upon completion of the construction and installation works, used for landscaping the site and creating green spaces.

The works are being carried out in accordance with STR 1.06.01:2016 ‘Construction works. Supervision of building construction’ and ST 121895674.06:2009 ‘Earthworks and site preparation’.

No karst processes occur within the project area.

An underground water tank with a capacity of 90 m³ is planned for fire-fighting and cooling of equipment (this solution depends on the chosen supplier. The final decision will be made during the preparation of the technical design). No water well is planned. During the design phase, a connection to the nearby Dvarviečiai TP water supply may be planned. During operation, water from the borehole will not be used for domestic purposes.

No significant adverse impact on the soil is anticipated during operation. Light vehicles will be used for the technical maintenance of the BESS facilities, whilst specialised medium-duty vehicles will be used for firefighting and, in the long term, for replacing batteries or equipment. All vehicle movements are planned to take place exclusively via the existing access road, with a junction from regional road No. 2104 (Pagojis–Butkiškė–Kražiai), and via the service and access roads within the BESS site.

4.5. Impact on water, surface water body protection zones and/or coastal protection strips, and the marine environment

No domestic and/or industrial wastewater will be generated during the operation of the BESS.

During the construction of the BESS (delivery of equipment, installation of reinforced concrete platforms and underground cable ducts), no significant adverse impact on surface water, groundwater or sub-surface water is anticipated. To prevent the contamination of surface and groundwater, only technically sound equipment will be used. Storage areas for equipment, construction materials and waste will be arranged to occupy as small an area as possible, thereby ensuring the minimum possible impact on the soil and on surface and groundwater.

It is planned to install the BESS equipment containers, control cabinets and intermediate substation on reinforced concrete slab foundations or supports in accordance with the Rules for the Installation of Electrical Equipment in Substations and Switching Stations. The total built-up area may amount to approximately 20 per cent of the total project area (see Section 2.3).

Due to the risk of accidental oil and fuel leaks, it is planned to install liquid collection tanks or other measures beneath potentially polluting installations (transformers) to ensure that petroleum products do not reach open areas of the site and do not contaminate the soil or groundwater bodies. In the event of an emergency, any spilled petroleum products will be collected and handed over to a certified waste management operator (see Section 2.8).

During the operational period, the project site will not be contaminated; therefore, no adverse impact on surface water bodies, groundwater bodies, groundwater, etc. is anticipated.

4.6. Impact on air and climate (e.g. ambient air quality, microclimate)

Given the nature of the PEA, there may be a temporary and localised impact on ambient air quality due to the operation of internal combustion engines in vehicles and support machinery during the construction phase; however, this will be localised, short-term and will not have a significant impact on ambient air quality.

No stationary, long-term sources of pollution are anticipated during the operation of the project, and maintenance work on the BESS will be carried out in accordance with the legislation governing construction and operational activities; only technically sound equipment will be used, and therefore no impact on local meteorological conditions is anticipated.

4.7. Impact on the landscape, characterised by aesthetic, immovable cultural or other values, recreational resources, particularly the visual impact resulting from changes to landforms (e.g. lowering, raising, levelling), and the impact on the natural framework

Potential impact on the landscape

In accordance with the applicable spatial planning documents or the legislation of the Republic of Lithuania, there are no restrictions on the installation and operation of a 150 MW wind farm on the planned plot of land in terms of its impact on the landscape.

Information on the nearest vantage points for panoramic views of the landscape is provided in accordance with the Map of Vantage Points for the Country's Most Valuable Panoramic Views, approved by the Ministry of the Environment¹⁵. Given that the PEA

BESS, whose main installations will not exceed 3.5 m in height (excluding lightning conductors), do not fall within the country's landscape areas, and as the nearest vantage point for viewing the landscape – the Medžioklnis viewpoint (near the town of Kražiai) – is approximately 7.7 km away (Fig. 3.4.3), the impact of the project on the landscape is considered insignificant.

Potential impact on the natural framework

The Law on Protected Areas of the Republic of Lithuania defines the natural framework as a coherent network of natural ecological compensation areas, ensuring the ecological balance of the landscape, natural connections between protected areas, other areas or habitats of environmental importance, as well as the migration of plants and animals between them.

¹⁵ Available at: <https://vst-t.maps.arcgis.com/apps/webappviewer/index.html?id=80388c28c00845d9a9792bb01cd936df>

According to the solutions set out in the natural framework plan drawn up as part of the 2013 amendment to the Kelmė District Municipality General Plan (GP), part of the project area falls within regional and local valley and hollow migration corridors located on land designated for agricultural use. (see Section 3.4 and Figure 3.4.4).

The project area falls within an agricultural zone and the area designated in the BP for the development of renewable energy.

The planned building density of the BESS within the natural framework areas will be up to 20 per cent, and the height of the installations across the entire area will be up to 3.5 metres (excluding lightning conductors). The project area is set back from the protective buffer zones along the shores of surface water bodies and does not fall within the boundaries of these protection zones; it is situated on land used intensively for agriculture and will therefore not adversely affect natural areas. No tree felling is planned for the development of the project, and the area's natural hydrological regime will not be altered; consequently, no significant adverse impact on local biodiversity or migratory species is anticipated. The project's activities do not contravene the provisions of the Republic of Lithuania's Natural Framework No. D1-96.

The area where the BESS is planned to be built is located in a region with relatively low recreational potential. Adjacent to the BESS area, a roadside zone has been reserved for the construction of a cycle route and pilgrimage routes. The cycle route is planned within the protection zone of Road No. 2014 and does not intersect with the BESS site (Fig. 3.9.5). The project will have no impact on the recreational potential of this region.

4.8. Impact on immovable cultural heritage

The registered immovable cultural heritage sites are situated at a sufficient distance from the BESS area under consideration and from the access road for construction machinery, and will not be affected by the project (Section 3.10).

In accordance with the latest consolidated version of the Heritage Management Regulation PTR 2.13.01:2022 'Management of Archaeological Cultural Heritage' (hereinafter referred to as the Regulation), effective from 13 December 2024, Section III, point 7.8

'Archaeological investigations are mandatory where: large-scale earthworks are planned (such as the development of quarries, the excavation of ponds, the laying of transport infrastructure and utility networks, and the construction of structures necessary for their operation, etc.) that alter the relief over an area of more than 5 ha'. The planned economic activity will involve earthworks covering an area of no more than 2.3 ha; therefore, it is not mandatory to comply with the provisions of the Regulation and carry out archaeological investigations at the project preparation stage.

Should any archaeological finds be discovered by chance whilst carrying out construction works for the planned economic activity involving earthworks, this will be reported to the local authority's heritage protection department, which will in turn inform the Department of Cultural Heritage, as stipulated in Article 9(3) of the Law on the Protection of Immovable Cultural Heritage of the Republic of Lithuania.

4.9. Impact on material assets

The planned economic activity – the installation and operation of an electricity storage system – will not have any negative impact on or impose any restrictions on other economic activities.

During the construction year, the local road was damaged by heavy goods vehicles delivering materials; this road and the existing access road will be restored to a condition no worse than their original state following the completion of construction.

No adverse impact on material assets is anticipated as a result of the continued operation of the project. No real estate (land, buildings) will be expropriated for public purposes.

The area currently planned for the BESS falls within the sanitary protection zone for industrial facilities (see Section 3.2 and Figure 3.2.3). A project is being prepared for the formation and reorganisation of plot No. 5407/0001:499, with a total area of 17.1132 ha, the aim of which is to separate a part of the plot (3.1261 ha) intended for the BESS and its appurtenances, and to change the primary land use designation and/or land use type(s) of the separated part to 'Land for other purposes', specifically the 'Territory of transport and engineering infrastructure facilities'. Once the development project has been implemented and the land reorganisation project has been carried out, the sanitary protection zone will remain unchanged (it will not be extended).

4.10. Potential significant impact on the interaction of all factors under consideration

According to the analysis of the planned economic activity's impact on various environmental components, the planned economic activity will not have a significant impact on the interaction between the environmental factors under consideration.

4.11. Potential significant impact on all factors under consideration, resulting from the risk of

vulnerability of the planned economic activity to extreme events

No significant adverse impact on environmental factors is anticipated as a result of the risk of the planned economic activity being compromised by extreme events and/or emergencies.

Extreme events that may occur during the operation of the 150 MW BESS and which may affect the environment and local residents include accidents involving mechanical damage to equipment or overheating of equipment, which may result in a fire in one or more units.

During construction and operation, the BESS site will be fenced off and monitored by CCTV cameras fitted with motion sensors. Should the motion sensors be triggered during the hours of darkness, the site lighting will be switched on. In the event of a technical fault or external factors, the operator's control centre will receive a notification.

The containers housing the energy storage units (ESUs) will be fitted with an autonomous fire-suppression system equipped with sensors, capable of operating 24 hours a day in the event of a loss of the main electricity supply.

Accidents caused by natural disasters, such as icing, flooding, strong gusts of wind or lightning, are unlikely, as the impact of natural disasters is assessed during the preparation of the technical design.

During the preparation of the technical design, the execution of construction works and the operation of the BESS within the project site, the General Fire Safety Regulations, approved by order of the Director of the Fire and Rescue Department under the Ministry of the Interior, will be adhered to.

It is planned to install an underground fire-fighting and cooling water tank with a capacity of 90 m³ and a hydrant within the project area; this solution is subject to the chosen supplier. The final decision will be taken during the preparation of the technical design. Roads between 3.5 and 6 m wide, suitable for Fire and Rescue Service vehicles, are to be constructed throughout the site (see Section 2.2, Figure 2.2.1). Fire extinguishers are to be provided at the control panel container and the intermediate distribution point during the design phase.

4.12. Potential significant transboundary environmental impact

The project site is located approximately 61.9 km from the nearest state border of the Russian Federation (Figure 2.2.1.a). The planned economic activity will not have any significant transboundary environmental impact.

4.13. Measures envisaged to avoid or prevent any significant adverse environmental impact

The plot of land selected by the project developer and the adjacent plots are located within an agricultural land zone. No sensitive, protected or otherwise affected sites have been identified in the vicinity that could be affected by the planned activity. In accordance with the rules for design, works planning and operation as defined by Lithuanian standards, as well as the additional measures set out in Table 4.10.1, the environmental impact will be negligible.

4.13.1 Table. Recommended environmental protection and impact mitigation measures during the implementation of the project

Component	Proposed environmental protection and impact mitigation measures	Measures Implementation stage
1	2	3
Water, surface runoff	Temporary storage areas for materials and construction equipment will be located outside the boundaries of the protection zones along the shores of surface water bodies. Equipment containers, cupboards and buildings will be suitable for outdoor conditions and will not pollute the environment due to surface corrosion. Rainwater will run off onto the site's surface. Rainwater will not accumulate within the project site but will either be naturally absorbed into the ground in areas covered with gravel or vegetation, or will drain off via slopes formed at the edges of the BESS site. Underneath each potentially polluting installation, such as a transformer, impermeable steel or concrete tanks or pits will be installed to collect any petroleum products spilled during accidents.	Planning stage / During construction and operation

Soil	Technically sound machinery will be used for construction works to prevent chemical pollution from mobile vehicles and other equipment. At the construction site, within the temporary project area, the top layer of fertile soil will be removed and stored separately prior to any earthworks. Following the construction works, the soil stored in the vicinity of the BESS site will be redistributed and, where necessary, sown with a mixture of perennial grasses.	During the works and long-term operation
Ambient air	Only mechanically sound machinery must be used during construction. Operational facilities must be regularly inspected, maintained and tested in accordance with the manufacturers' instructions and as stipulated by the technical regulations of the Republic of Lithuania. The refrigerant for the BESU is planned to comply with EU environmental standards: it must not deplete the ozone layer, must have a low global warming potential, and must be non-flammable and non-toxic.	During works and operation
Public health	Information boards must be displayed at the entrances to the project site, detailing the nature and duration of the planned works, as well as warning, prohibition and other signs to ensure that all persons are aware of the risks to health and life. Construction works will be carried out only using mechanically sound machinery, the noise levels emitted by which will not exceed the limits set out in STR 2.01.08:2003 'Control of noise emitted into the environment by equipment used outdoors' (approved by Order No. 325 of the Minister of the Environment of the Republic of Lithuania on 30 June 2003). Work is scheduled to take place only on working days during daylight hours. There will be no permanent general lighting within the project area; lighting will be activated only by motion sensors or during maintenance work at night. During the preparation of the technical design, all equipment will be selected with such noise levels and/or noise reduction measures will be chosen so that the total noise level from the entire BESS and neighbouring facilities does not exceed the limit values set out in Lithuanian Hygiene Standard <i>HN 33:2011 'Noise limit values in residential and public buildings and their surroundings'</i>.	Before work commences, whilst work is in progress, and during operation

Component	Planned environmental protection and mitigation measures	Measures Implementation stage
1	2	3
	In the event of complaints from residents regarding the potential impact of the project, the following action will be taken: the impact will be assessed and measured, and, where necessary, additional mitigation measures will be implemented.	
Cultural heritage	During the construction works for the project involving earthworks, should any archaeological finds be discovered by chance, this will be reported to the local authority's heritage protection department, which will inform the Department of Cultural Heritage, as stipulated in Article 9(3) of the Law on the Protection of Immovable Cultural Heritage of the Republic of Lithuania.	During the works
Extreme events	<i>To prevent overheating</i> of the planned BESS electrical equipment (BESU), the manufacturer will supply battery cell containers complete with ventilation and cooling equipment, which will ensure the correct temperature during internal processes. <i>To prevent fires</i> in BESU containers, an internal fire-suppression system will be integrated at the factory. The fire-fighting equipment will be fitted with smoke and fire detectors connected to a central control system and capable of operating for up to 24 hours in the event of a loss of the centralised electricity supply. For general fire suppression across the entire BESS fleet and/or external cooling of equipment within the site boundaries, it is planned to install an underground water reservoir with a capacity of 90 m³ and a hydrant (this solution depends on the chosen supplier. The final decision will be made during the preparation of the technical design). The reservoir will have automatic water level and replenishment control. The access road and site will be designed to ensure that Fire and Rescue Service vehicles can access and manoeuvre appropriately at each facility complex.	Operation
Waste	All construction waste generated during the construction works will be sorted and stored in containers until it is removed and handed over to waste management operators. Construction waste will be managed in accordance with <i>the Rules on the Management of Construction Waste</i> (approved by Order No. D1-637 of the Ministry of the Environment of the Republic of Lithuania dated 29 December 2006). Upon completion of the construction works, the construction site must be cleared so that no waste generated during the works remains on site. Product packaging and waste generated during operation will be managed in accordance with the requirements of Order No. D1-367 of the Minister of the Environment of the Republic of Lithuania of 3 May 2011 '<i>On the Approval of the Rules for the Accounting and Reporting of Waste Generation and Management</i>'. A contract for the handover, acceptance and recycling of replaced, end-of-life <i>lithium-ion batteries</i> will be concluded with the equipment manufacturers or suppliers. If such an option is not available or ceases to exist, all waste will be handed over to certified waste management service providers in accordance with <i>the current Law on Waste Management of the Republic of Lithuania</i> (No. VIII-787). Manufacturers and importers shall be required to register and use the Unified Product Packaging and Waste Information System (GPAIS). The servicing, collection, recycling and registration of equipment containing <i>F-gases</i> will be carried out by a licensed company in accordance with Regulation (EU) 2024/573 of the European Parliament and of the Council on fluorinated greenhouse gases.	During construction, operation and decommissioning.

Component	Planned environmental protection and mitigation measures	Measures Implementation stage
1	2	3
	In the event of accidents or breakdowns, the relevant measures for remedying the consequences, providing compensation and restoring the site to its original condition, as provided for in legislation, must be applied. Upon cessation of operations and during the dismantling of all equipment, the integrated BESS units housed in containers and cabinets will not be left on the project site, but will be transported in their complete configurations (as delivered during construction) to specialised sites for further dismantling, sorting and recycling. Where possible, the equipment or its parts will be reused or sold for further operation in other business activities (secondary use).	

APPENDICES

ANNEX 1

Declaration



Coastal Research and Planning Institute

DECLARATION

3 February 2025

Klaipėda

Planned economic activity – a 150 MW electricity storage system in the Kelmė district

The Coastal Research and Planning Institute (hereinafter referred to as PTPI), the preparer of the environmental impact assessment documents, declares that it complies with the requirements set out in Article 5(3) of the Law of the Republic of Lithuania on the Environmental Impact Assessment of Planned Economic Activities.

PTPI employs specialists who hold a higher education qualification or professional qualification in a field corresponding to the specific nature of the environmental impact assessment documents or parts thereof being prepared, and who have at least one year's work experience in a field corresponding to the specific nature of the environmental impact assessment documents or parts thereof being prepared.

Director

Rosita Milerienė

ANNEX 2

**Extract from the State Enterprise
Centre of Registers' Real Estate
Register database for the land plot**

EXTRACT FROM THE REAL ESTATE REGISTER DATABASE

7 January 2025 08:58:15

1. Property registered in the Land Registry:

Register No. 44/2391268
 Register type: Plot of land
 Date of registration: 25 October 2019
 Kelmė District Municipality, **Kražiai** Eldership, **Ovarviečiai** Village

2. Real estate:

2.1.

Land plot
 Kelmė District Municipality, Kražiai Eldership, Dvarviečiai Village
 Unique property number: 4400-5315-5847
 Cadastral number of the plot of land and name of the cadastral area
 : 5407/0001:499 Butkiškės cadastral area
 Primary intended use of the property: Agricultural
 Land plot usage type: Other land plots for agricultural purposes
 Status: Formed by division of a property
 Historical origin of the property: Obtained by division of the property, unique property number 4400-5110-4635 Area of the second plot: 17.1132 ha
 Total area of agricultural land: 15.2235 ha, of
 which: area of arable land: 15.2235 ha
 Forest land area: 1.6893 ha
 Forest area registered in the State Forest Cadastre: 1.8106 ha
 Date of submission of data on the area of forest registered in the State Forest Cadastre: 2 April 2021
 Date of submission: 2 April 2021 Area of
 water bodies: 0.2004 ha
 Area of drained land: 15.4174 ha Agricultural
 land productivity score: 32.9
 Type of survey: The land parcel was formed as a result of cadastral surveys
 Indexed forest stand value: 1,310 EUR
 Value of the forest stand: 273 EUR
 Average market value: 52,210 EUR
 Date of determination of average market value: 24 November
 2020 Method of determining average market value: Mass valuation
 Date of determination of cadastral data: 2D19-OB-30

3. Accessories to the property from another register: none recorded

4. Ownership:

4.1.

Property rights
 Owner:
 Property: plot of land No. 4400-5315-5847, described in section 2.1.
 Basis for registration: 2010-0:s-24 Deed of Gift No. 221Z
 14 October 2019 Decision No. 28SK-588-(14.2B.11Q.) of the Head of the Territorial
 Division of the National Land Service
 |Effective from: 28 October 2019

5. State and municipal land held in trust: none recorded

6. Other rights in rem:

6.1.

Long-term lease (emphyteusis)
 Tenant: UAB "Ignitis Renewables Projektai 8", company registration number
 306324987 Property: plot of land No. 4400-5315-5847, described in
 section 2.1.
 |Basis for registration: 2D24-11-27 Long-term lease (emphyteusis) agreement No. 7446 16
 December 2024 Agreement No. 7939
 Area: 3.1261 ha
 |Valid from: 17 December 2024

6.2.

Right of superficies
 Holder of the superficies right: UAB "Ignitis Renewables Projektai 8", company registration
 number 306324987 Property: plot of land No. 4400-5315-5847, as
 described in section 2.1.
 Basis for registration: 27 November 2024 Long-term lease (emphyteusis) agreement No.
 7446 16 December 2024 Agreement No. 7939
 Area: 3.1261 ha
 |Valid from: 17 December 2024

6.3.

Easement – the right to lay, maintain and use underground and above-ground utilities
 (servient)
 Property: plot of land Qtr. 4400-5315-5847, described in section 2.1.
 |Basis for registration: Easement Agreement No. 606 dated 31 January
 2023 Area: 2,809.00 sq m
 |Valid from: 2 February 2023

6.4.

Other easements (servient)
 Property: plot of land No. 4400-5315-5847, described in section 2.1.
 |Basis for registration: 2D23-01-31 Easement Agreement No. 606 Area:
 394.00 sq m
 Description: Temporary building easement
 |Valid from: 2 February 2023

6.5.

Right of way – the right to drive vehicles and use the footpath
 (servient)
 Property: plot of land No. 4400-5315-5847, described in section 2.1.
 Basis for registration: 31 January 2023, Easement Agreement No. 606
 Area: 4,521.00 sq m
 Valid from: 2 February 2023

- 6.6. Easement • the right to lay, maintain and use underground and above-ground utilities (servient)
Property: plot of land No. 4400-5315-5847, described in section 2.1.
Basis for registration: 7 October 2021 Easement Agreement No. 5224
Area: 308.00 sq m
Valid from: 14 October 2021
- 6.7. Other easements (servient)
Property: plot of land No. 4400-5315-5847, described in section 2.1.
Basis for registration: 2D21-1D-07 Easement Agreement No. 5224
Area: 122.00 sq m
Description: Temporary building easement.
Validity: From 14 January 2021
7. Legal facts: none
8. Tags:
- 8.1. The area to which the easement applies is not registered in the Land Registry:
sanitary protection zones for public utilities (Chapter IV, Section 1)
Property: plot of land No. 4400-5315-5847, described in section 2.1.
Basis for registration: Law No. XIII-2166 of the Republic of Lithuania on Special Conditions for Land Use, dated 6 June 2019
Order No. 3D-711 of the Minister of Agriculture of the Republic of Lithuania dated 19 December 2019 Area: 171,132.00 sq m
Entry valid from: 1 January 2023
- 8.2. The area to which the Special Land Use Conditions apply is not registered in the Land Registry:
Sanitary protection zones for industrial facilities (Chapter IV, Section 1) Property:
plot of land No. 4400-5315-5847, described in point 2.1.
Basis for registration: Law No. XIII-2166 of the Republic of Lithuania on Special Conditions for Land Use, 6 June 2019
19 December 2019 Order No. 3D-711 of the Minister of Agriculture of the Republic of Lithuania
Area: 171,132.00 sq m
Valid from: 1 January 2023
- 8.3. The area to which the Special Conditions for Land Use apply is not registered in the Real Estate Register: electronic network protection zones (Chapter III, Section 4)
Property: plot of land No. 4400-5315-5847, described in point 2.1.
Basis for registration: Law No. XIII-2166 of the Republic of Lithuania on Special Land Use Conditions, dated 6 June 2019
Decree No. 3D-711 of the Minister of Agriculture of the Republic of Lithuania dated 19 December 2019 Area: 1,794.00 sq m
Valid from: 14 April 2023
- 8.4. The area to which the Special Land Use Conditions apply is not registered in the Real Estate Register: forest land (Chapter VI, Section 3)
Property: plot of land Qtr. 4400-5315-5847, described in section 2.1.
Basis for registration: Law No. XIII-2166 of the Republic of Lithuania on Special Conditions for Land Use, dated 6 June 2019
Order No. 3D-711 of the Minister of Agriculture of the Republic of Lithuania dated 19 December 2019 Area: 16,893.00 sq m
Valid from: 14 April 2023
- 8.5. The area to which the Special Conditions for Land Use apply is not registered in the Land Registry: protection zones for reclaimed land and land reclamation structures (Chapter VI, Section 2)
Property: plot of land No. 4400-5315-5847, described in section 2.1.
Basis for registration: Law No. XIII-2166 of the Republic of Lithuania on Special Conditions for Land Use, dated 6 June 2019
Order No. 3D-711 of the Minister of Agriculture of the Republic of Lithuania dated 19 December 2019 Area: 154,174.00 sq m
Valid from: 1 January 2023
- 8.6. The area subject to the Special Land Use Conditions is not registered in the Land Registry: several protection zones (Chapter III, Section 2) Property: plot of land No. 4400-5315-5847, described in point 2.1.
Basis for registration: 2D19-06-06 Law of the Republic of Lithuania on Special Conditions for Land Use No. XIII-2166
19 December 2019 Order No. 3D-711 of the Minister of Agriculture of the Republic of Lithuania Area: 4,301.00 sq m
Valid from: 1 January 2023
9. Areas subject to the Special Conditions for Land Use are recorded in the NTK cadastral data file on the basis of the data contained therein: no entry
10. Registration of the property and cadastral details:
- 10.1. Formed by division (property registration)
Property: plot of land No. 4400-5315-5847, described in section 2.1.
Basis for registration: 30 August 2019 Real Estate Cadastral Data File
14 October 2019 Decision No. 28SK-588-(14.28.110.) of the Head of the Territorial Division of the National Land Service
Valid from: 25 October 2019
- 10.2. Cadastral survey carried out by (cadastral reference)
Property: plot of land No. 4400-5315-5847, described in section 2.1.
Basis for registration: 2DO9-03-2D Qualification certificate No. 2M-M-894
30 August 2019 Cadastral data file for the immovable property
Valid from: 25 October 2019
11. Data on registered areas subject to special land use conditions:
- 11.1. Name of the area: Road protection zones (Chapter III, Section 2) Unique number of the area: 100650211
Basis for registration: Ministry of Transport and Communications of the Republic of Lithuania, 29 April 2024, Plan for the Establishment of Road Protection Zones of National Importance in Kelmė District Municipality, ref. no. 3-149
Date of registration: 13 May 2024
Area of the plot of land falling within the Territory: 371 sq m, from 13 May 2024

- 11.2. Name of the area: Electricity network protection zones (Chapter III, Section 4) Unique number of the area: 10Q696823
|Basis for registration: **Kelmė** District Municipality Administration; 1 July 2023 Project – Engineering networks (Electricity network) in Kelmė District Municipality, construction project No. 2022/19-11-TP-E-1
Date of registration: 2 October 2024
Area of the plot of land falling within the territory: 2,665 sq m, from 2 October 2024
- 11.3. Name of the area: Elektron power grid protection zones (Chapter III, Section 4) Unique number of the area: 100645168
|Basis for registration: AB "Energijos skirstymo operatorius"; 1 December 2023. Project No. E2N4390475
Date of registration: 11 April 2024
Area of the plot of land falling within the territory: 677 sq m, from 11 April 2024
- 11.4. Name of the area: Electricity network protection zones (Chapter III, Section 4) Unique number of the area: 100420954
|Basis for registration: AB "Energijos skirstymo operatorius"; 1 December 2023 Replacement of an overhead line with an underground cable line, Dvarviečiai village, Kražiai Eldership, Kelmė district municipality. No. E2h14390475
Date of registration: 11 December 2023
Area of the plot of land falling within the territory: 420 sq m, from 11 December 2023
- 11.6. Name of the area: Electricity network protection zones (Chapter III, Section 4) Unique number of the area: 10Q417843
|Basis for registration: Kelmė District Municipality Administration; 6 September 2021, construction project No. 2020/36-04-TP-E-1 for a 30 kV electricity cable line in Kelmė District Municipality
Date of registration: 21 November 2023
Basis for data amendment: 5 December 2024 Application
Document defining the territory: **Kelmė** District Municipality Administration; 6 September 2021 Construction project No. 2020/36-04-TP-E-1 for a 30 kV underground cable line in Kelmė District Municipality
Date of data amendment: 6 December 2024
Area of the plot of land falling within the territory: 271 sq m, from 6 December 2024
- 11.6. Name of the area: Electricity network protection zones (Chapter III, Section 4) Unique number of the area: 10Q195217
|Basis for registration: Ministry of Energy of the Republic of Lithuania; 21 December 2021 |Decision No. 1-3b7 on the approval of the Kelmė electricity network territory plan
Date of registration: 5 January 2022
Basis for data amendment: AB "Energijos skirstymo operatorius"; 1 December 2023 Reconstruction project No. E2N4390475 for the replacement of an overhead line with an underground cable line, Dvarviečiai village, Kražiai Eldership, Kelmė district municipality
Date of data amendment: 31 October 2024
Area of the plot of land falling within the territory: 115 sq m, from 15 April 2024
- 11.7. Name of the territory: Sanitary protection zones for industrial facilities (Chapter IV, Section 1) Unique number of the territory: 100402200
|Basis for registration: WINDLIT, UAB; 7 October 2021 AGREEMENT ON THE ESTABLISHMENT OF A SANITARY PROTECTION ZONE ON THE LANDOWNER'S PLOT AND NON-COMPLIANCE WITH THE CONSTRUCTION DISTANCE TO THE BOUNDARY OF THE NEIGHBOURING PLOT No. 5235
Date of registration: 10 July 2023
Area of the plot of land falling within the territory – 171,137 sq m, as of 10 July 2023
- 11.8. Name of the territory: Sanitary protection zones for industrial facilities (Chapter IV, Section 1) Unique number of the territory: 10Q355279
|Basis for registration: Environmental Protection Agency; 19 May 2022 DECISION ON THE ENVIRONMENTAL IMPACT ASSESSMENT OF UAB WINDLIT'S PLANNED **ECONOMIC** ACTIVITY: CONSTRUCTION OF A WIND FARM IN Kelmė DISTRICT ENVIRONMENTAL IMPACT ASSESSMENT No. (30.2)-A4E-5922
Date of registration: 11 July 2022
Area of the land plot falling within the Territory: 94,405 sq m, from 5 January 2025

12. Register notes and references: none

13. Other information: none

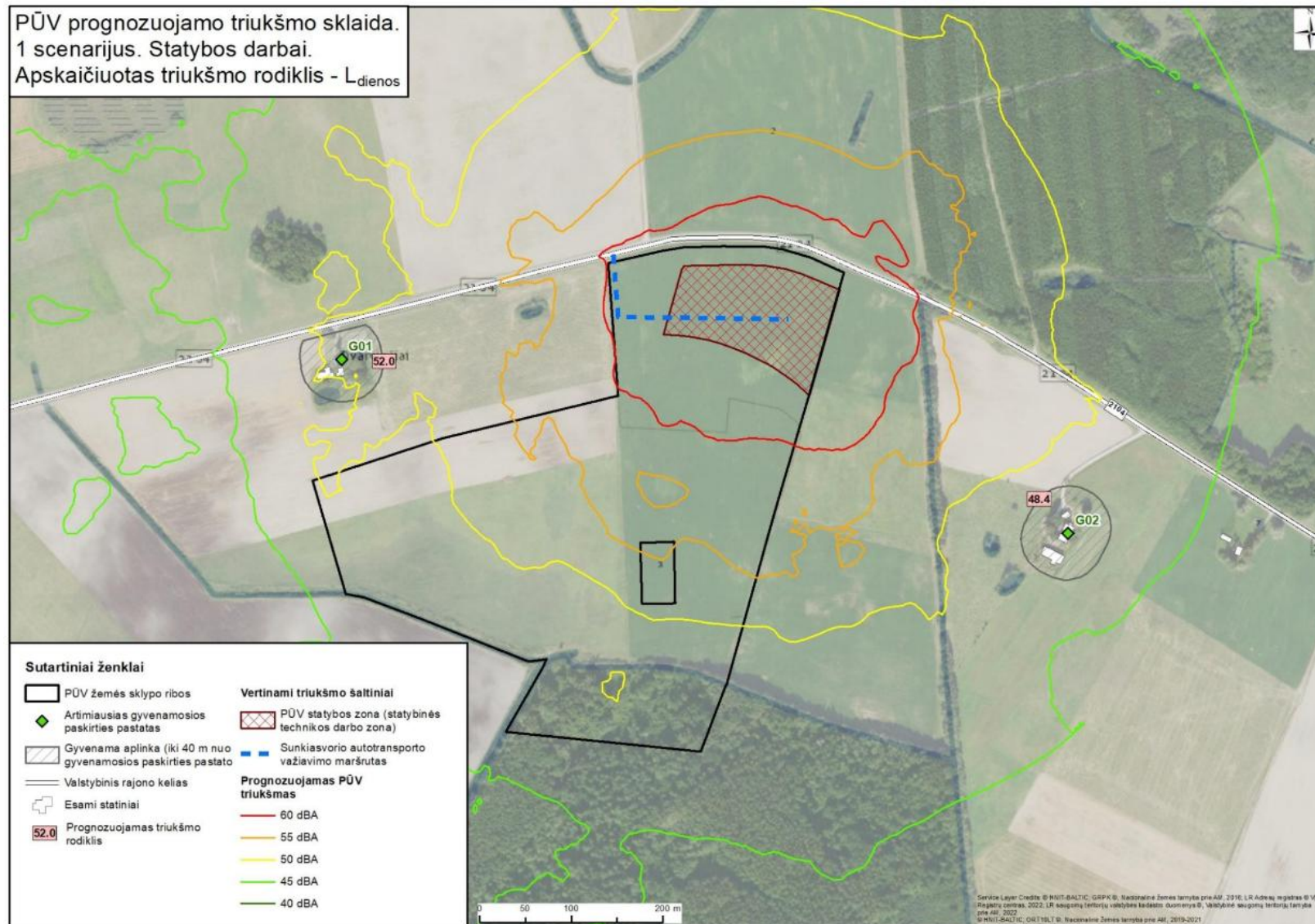
14. Information on the correction of transaction data: none

Document printed by

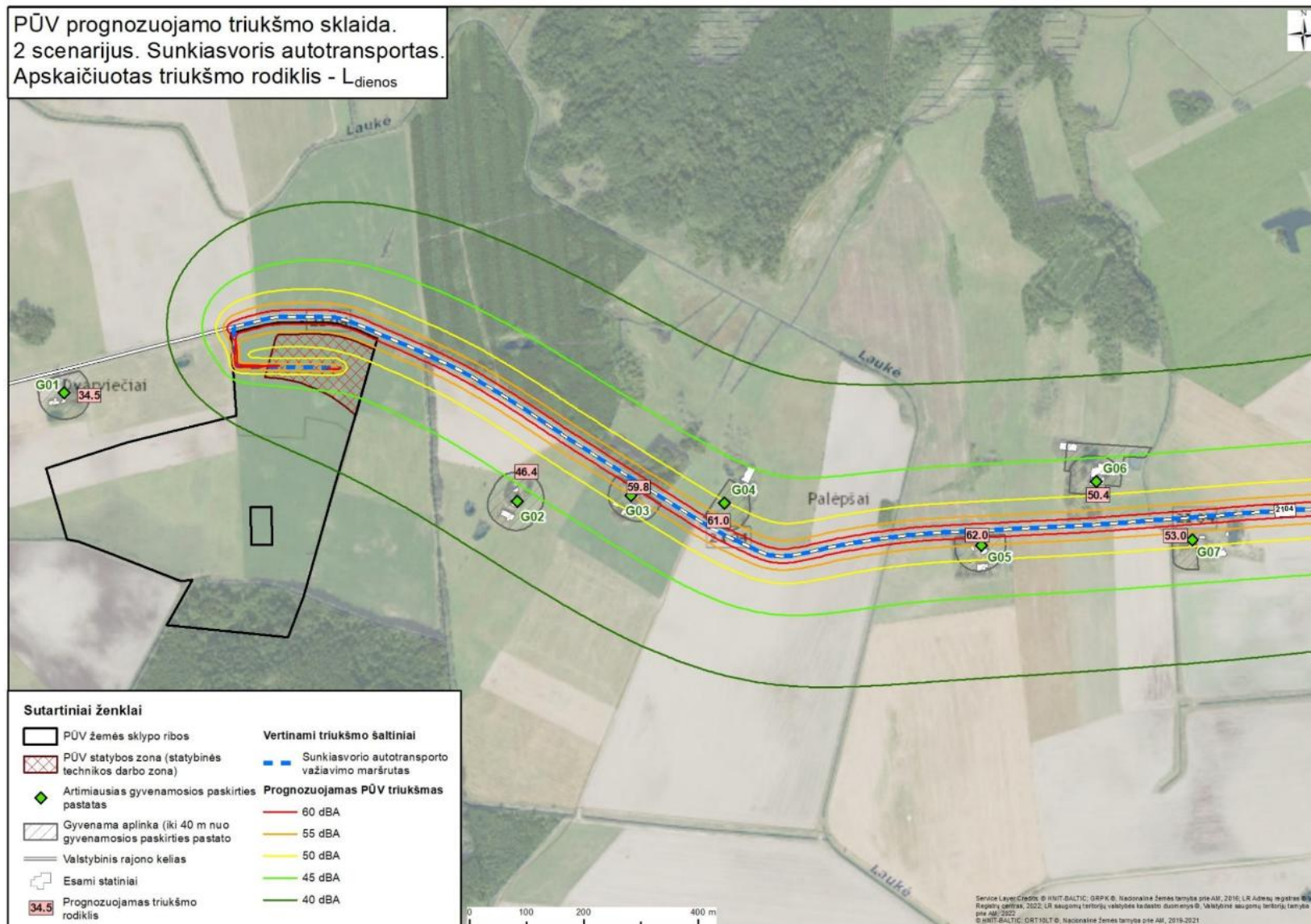
ANNEX 3

Results of noise propagation modelling

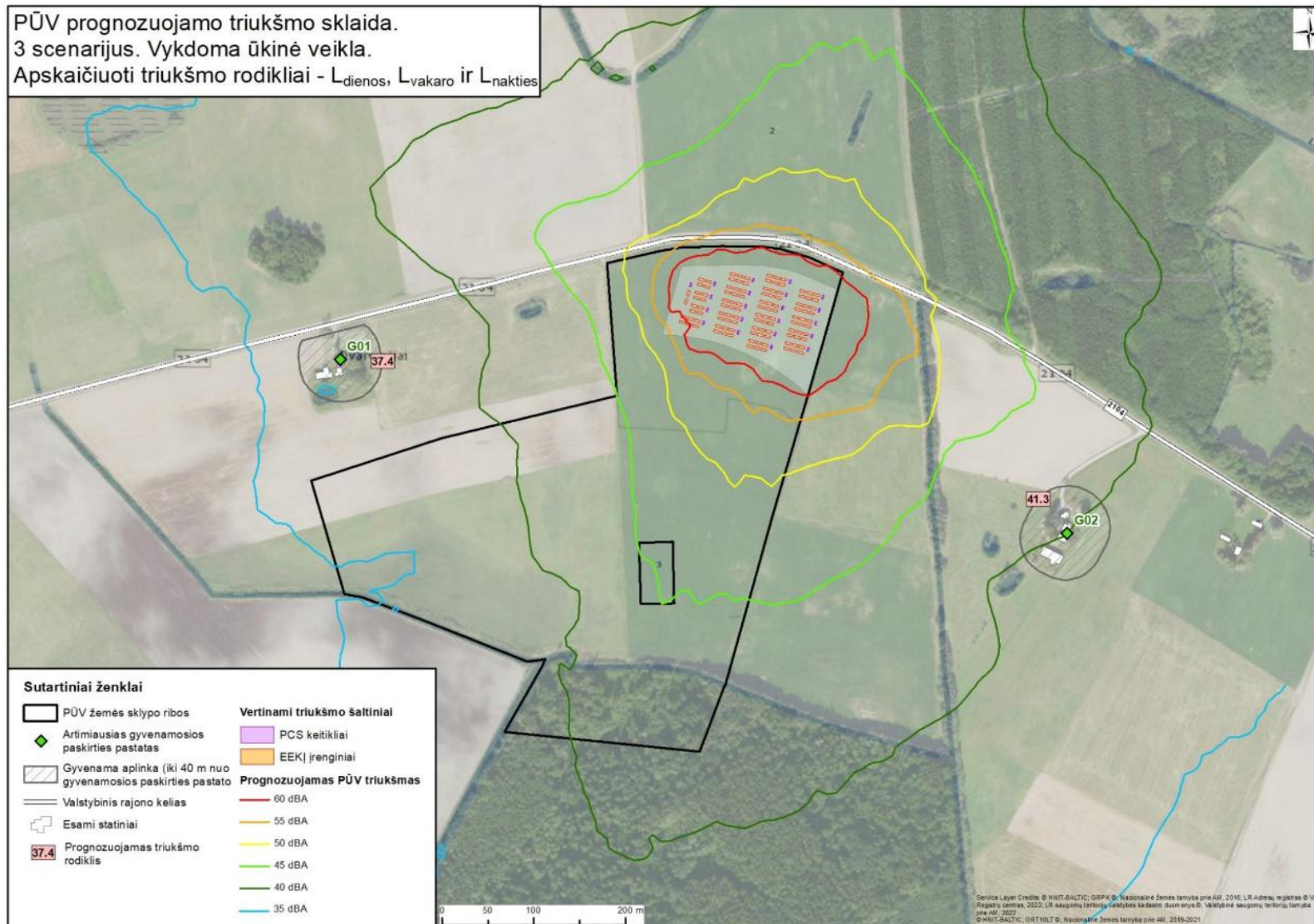
PŪV prognozuojamo triukšmo sklaida.
1 scenarijus. Statybos darbai.
Apskaičiuotas triukšmo rodiklis - L_{dienos}



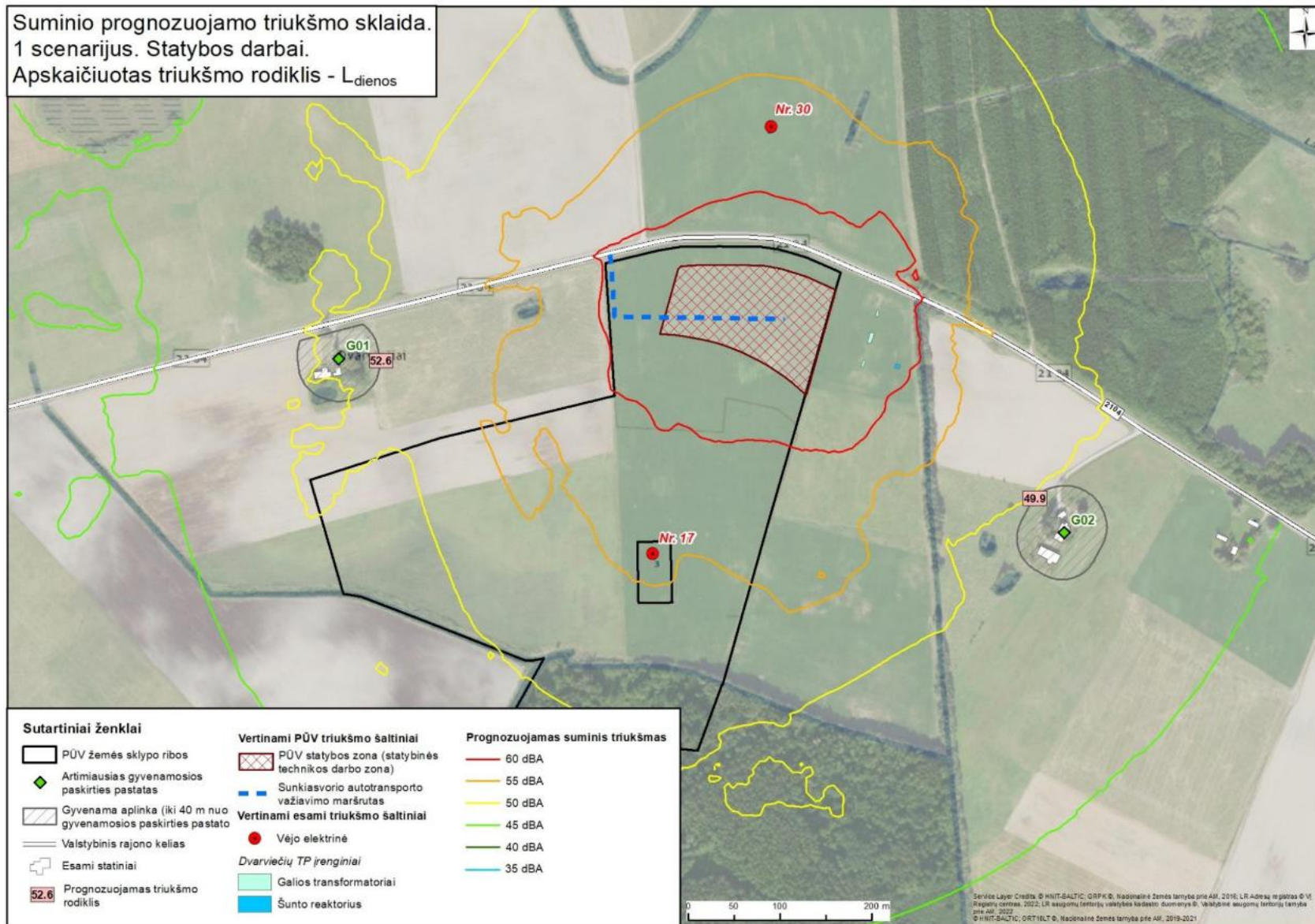
PŪV prognozuojamo triukšmo sklaida.
2 scenarijus. Sunkiasvoris autotransportas.
Apskaičiuotas triukšmo rodiklis - L_{dienos}



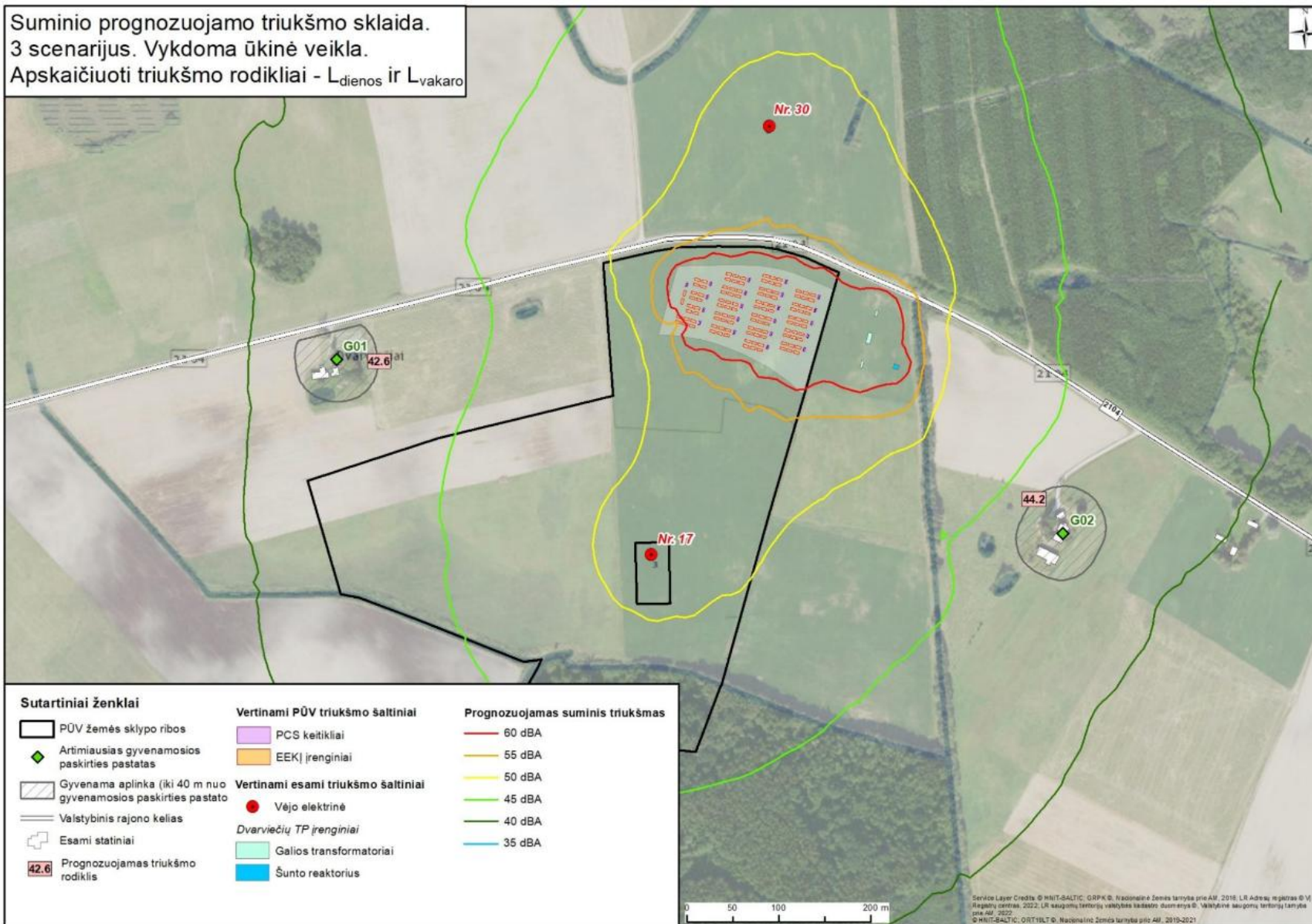
PŪV prognozuojamo triukšmo sklaida.
3 scenarijus. Vykdoma ūkinė veikla.
Apskaičiuoti triukšmo rodikliai - L_{dienos} , L_{vakaro} ir $L_{nakties}$



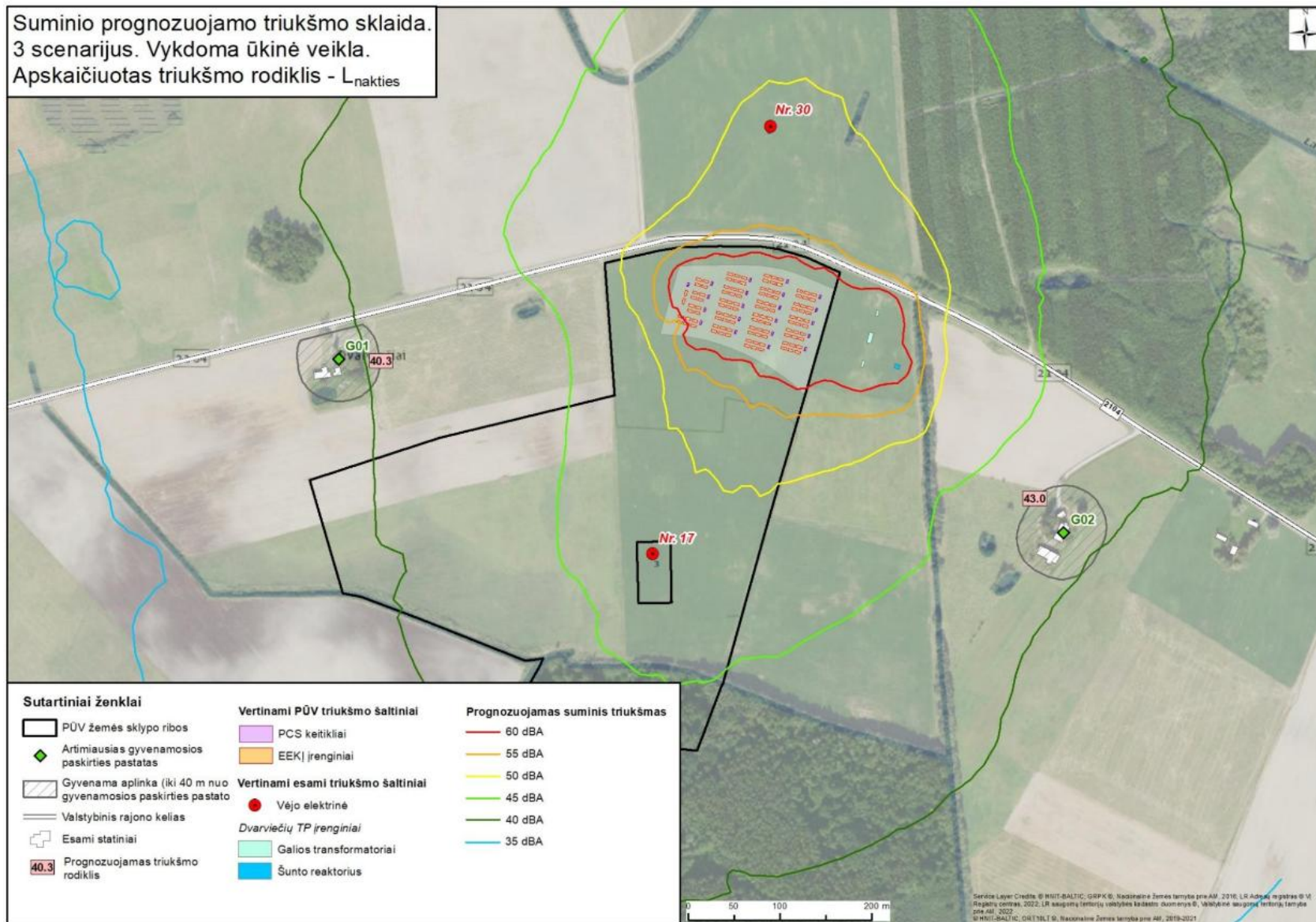
Suminio prognozuojamo triukšmo sklaida.
1 scenarijus. Statybos darbai.
Apskaičiuotas triukšmo rodiklis - L_{dienos}



Suminio prognozuojamo triukšmo sklaida.
3 scenarijus. Vykdoma ūkinė veikla.
Apskaičiuoti triukšmo rodikliai - L_{dienos} ir L_{vakaro}



Suminio prognozuojamo triukšmo sklaida.
3 scenarijus. Vykdoma ūkinė veikla.
Apskaičiuotas triukšmo rodiklis - $L_{nakties}$



ANNEX 4

Noise level values for similar installations

Noise levels of similar wind farms located in the vicinity of the PEA:

operating mode	rated power [kW]	maximum sound power level over the complete operating range of the wind turbine		available hub heights [m]				
		L _{WA} [dB(A)]	L _{WA} (STE) [dB(A)]	118	138	148	159	164
Mode 0	7000	108.6	106.6	●	●	●	●	●
Mode 1	6800	108.4	106.4	●	●	●	●	●
Mode 2	6690	108.0	106.0	●	●	●	●	●
Mode 3	6530	107.5	105.5	●	●	○	●	●
Mode 4	6370	107.0	105.0	●	—	—	●	●
Mode 5	6240	106.5	104.5	●	—	—	●	●
Mode 6	6080	106.0	104.0	●	—	—	—	●
Mode 7	5940	105.5	103.5	○	—	—	—	○
Mode 8	5820	105.0	103.0	○	—	○	—	○
Mode 9	5270	103.0	101.0	○	○	○	○	○
Mode 10	5180	102.5	100.5	○	○	○	○	○
Mode 11	4810	102.0	100.0	●	●	●	●	●
Mode 12	4520	101.5	99.5	●	●	●	●	●
Mode 13	4230	101.0	99.0	●	●	●	●	●
Mode 14	3870	100.5	98.5	●	●	●	●	●
Mode 15	3620	100.0	98.0	●	●	●	●	●
Mode 16	3380	99.5	97.5	●	●	●	●	●
Mode 17	3180	99.0	97.0	●	●	●	●	●

Noise levels of transformers in the vicinity of the project site:

29.	Noise pressure level at a distance of 0.3 m when measured in accordance with the requirements of LST EN (IEC) 60076-10 (ONAN, fully loaded)	≤ 60 dB (A) + 3 dB (A)	≤ 60 dB (A) + 3 dB (A)
30.	Noise pressure level at 2 m when measured in accordance with LST EN (IEC) 60076-10 (ONAF, fully loaded) Garso slėgio lygis, 2 m atstumu	≤ 65 dB (A) + 3 dB (A)	≤ 65 dB (A) + 3 dB (A)

Noise levels of shunt reactors in the vicinity of the PEA:

5.20.	Triukšmo lygis 2 m. atstumu, matuojant pagal IEC 60076-10/ Sound power level at distance of 2 m. when measuring according to IEC 60076-10, (L _{WA}), dB(A) ⁷⁾	≤ 90 ^{c)} Garso galia - 90 dB	330 kV operation: 90 dB sound power level 72 dB sound pressure level at 2 m
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TECHNICAL PROPOSAL

Kelme Battery Energy Storage System Ignitis Renewables

4 February 2025

www.mtu-solutions.com



This measure shall be discussed technically with CATL and a decision taken at the design stage as to whether it is necessary and can be implemented.

Table 5 Noise Emission Table

	Sound pressure Sound pressure level	With noise mitigation measures
Nidec Next1500-4k0W PCS converters	80 dB(A) @ 1 metre	Silencer kit (optional)
CATL EnerS/TnerS battery container EKKJ equipment	75 dB(A) measured at 1 metre	Fan speed control (solution needs to be assessed)

6.6 Arc flash

An arc flash is a safety-critical incident relevant to service personnel working on battery containers. In accordance with NFPA 70E requirements, it is essential that the risks of arc flash incidents are assessed and appropriate safety measures are defined for service personnel working on site. Depending on the required service distance, the arc incident energy is calculated based on the container's short-circuit current, and this value is used to determine the appropriate personal protective equipment (PPE) for on-site personnel working on the equipment. As part of the solution proposed in the project, a holistic approach is taken to assess the arc flash risk of the unit system in this project. The project proposes a unit battery system comprising three EnerS/TnerS containers with two power conversion systems. Consequently, the project considers the worst-case scenario for an arc flash incident involving all three EnerS/TnerS containers operating in parallel. According to the risk assessment and the subsequent calculation of arc flash incident energy, it has been found that Category 2 PPE is sufficient for a single EnerS/TnerS container. However, when dealing with three EnerS/TnerS containers in parallel, depending on the service distance (46 cm or 30 cm), Category 3 or 4 PPE is recommended. Therefore, the arc flash risk is assessed, and a suitable mitigation measure is implemented to ensure on-site safety.