Development of the Offshore Wind Farm in Lithuania

Environmental Impact Assessment Programme

August 2024

Developer:

UAB “Ignitis renewables”

EIA prepared by:

Public Institution

Coastal Research and Planning Institute

Development of the Offshore Wind Farm in the Lithuania's Marine Territory

Environmental Impact Assessment Programme

Proposed economic activity	Development of the Offshore Wind Farm in Lithuania. The proposed economic activity is classified as in the public interest and is considered important for public security.
Site for the proposed economic activity	The Baltic Sea area approved by the Resolution of the Government of the Republic of Lithuania No. 171 of 15 March 2023 "On the Identification of the Priority Parts of Lithuania's Territorial Sea and/or the Lithuanian Exclusive Economic Zone in the Baltic Sea Where a Tender (Tenders) without Applying Incentives for the Development and Operation of Power Plants Using Renewable Energy Sources is (are) Expedient and on the Measurement of the Maximum Permitted Generating Capacity and Minimum Installed Capacities of Such Power Plants".
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Organiser (Developer) of the proposed economic activity	UAB "Ignitis renewables"
Prepared by	Public Institution Coastal Research and Planning Institute

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CONTENTS

Annex 1	The engineering infrastructure development plan of the project of special national importance "The Preparation of the Territories Necessary for the Connection of the Power Plants that Use Renewable Energy Sources, which are Proposed for the Development in Part (Parts) of Marine Territories of Lithuania's Territorial Sea and/or the Exclusive Economic Zone of the Republic of Lithuania in the Baltic Sea, to the Electricity Transmission Grids for the Engineering Infrastructure Development". Concept drawing with the connection alternatives (offshore and onshore)
Annex 2	Applicable international environmental and social standards
Annex 3	Copies of conclusions of the EIA subjects, documents of correspondence with state or other authorities
Annex 4	Documents of public information and participation in the EIA procedure
Annex 5	Documents of transboundary consultations

ABBREVIATIONS

Abbreviation	Explanation
AC	Alternating Current
CCRA	Climate Change Risk Assessment
COD	Commercial Operations Date
CPTRL	Comprehensive Plan of the Territory of the Republic of Lithuania
DNSH	Do No Significant Harm
EC	The European Commission
EEZ	Exclusive Economic Zone
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMF	Electromagnetic field
EP 4	Equator Principles
EPFI	Equator Principles Financial Institutions
EPA	Environmental Protection Agency under the Ministry of Environment
EPAP	Equator Principles Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
E&S	Environmental and social
EU	The European Union
GES	Good Environmental Status
GBF	Gravity based foundations
GHG	Greenhouse gas
GNS	Gillnet
HDD	Horizontal directional drilling
HELCOM	The Baltic Marine Environment Protection Commission (Helsinki Commission)
HRI	Human Rights Impacts
HSSE	Health, Safety, Security and Environment
HVAC	High Voltage Alternating Current
IAC	Inter-array cables
ICES	The International Council for the Exploration of the Sea
IFC	International Finance Corporation
MP	Monopile
MSFD	Marine Strategy Framework Directive
MW	Megawatt
NEIS	National Energy Independence Strategy
NERC	National Energy Regulatory Council
OSP	Offshore substations platform
OTB	Bottom otter trawl
OTM	Midwater otter trawl

Abbreviation	Explanation
OWF	Offshore wind farm
PA	Protected area
PEA	Proposed economic activity
PS	Performance Standards
RBD	River Basin District
RES	Renewable energy sources
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation
SEIA	Strategic environmental impact assessment
SPA	Special Protected Area
SPM	Single point mooring
TCFD	Task Force on Climate-Related Financial Disclosure
TP	Transition piece
TS	Transformer substation
TSC	Technical screening criteria
TSO	Transmission system operator
UXO	Unexploded Ordnance
WBG	The World Bank Group
WFD	Water Frame Directive
WTG	Wind turbine generator

1. INTRODUCTION

1.1. Proposed economic activity

On October 12, 2023, UAB "Ignitis renewables", together with its partner OW OFFSHORE S.L., were declared as the winners of the tender for the use of marine site for the development and operation of a wind power park, organised in accordance with the Law of the Republic of Lithuania on Energy from Renewable Sources, by the resolution of the National Energy Regulatory Council (hereinafter – NERC). To the Developer, NERC issued a permit to use a part (or parts) of the marine site for the development and operation of an offshore wind farm (hereinafter – OWF), which grants the right to use the marine site established in the Resolution No. 171 of 15 March 2023 "On the Identification of the Priority Parts of Lithuania's Territorial Sea and/or the Lithuanian Exclusive Economic Zone in the Baltic Sea Where a Tender (Tenders) without Applying Incentives for the Development and Operation of Power Plants Using Renewable Energy Sources is (are) Expedient and on the Measurement of the Maximum Permitted Generating Capacity and Minimum Installed Capacities of Such Power Plants" (hereinafter – Resolution No. 171) for the development, construction and operation of power plants using renewable resources for 41 years.

The Developer of the OWF has just started the environmental impact assessment (hereinafter – EIA) process, dedicated to assessing the impacts on marine ecosystems and different components of ecosystems (biodiversity, waste management, habitats, hydrology and other), and suggesting impact mitigation measures. The EIA also covers social impact assessment.

The EIA will be carried out taking into account the requirements established in national legal acts, the obligations established in the Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive; hereinafter – MSFD), the recommendations of the Baltic Marine Environment Protection Commission (Helsinki Commission; hereinafter – HELCOM) and the best international practices. The EIA will also take into account the provisions established in the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (hereinafter - the Habitats Directive) and in the Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

UAB "Ignitis renewables" is planning to construct an OWF with a maximum of 55 wind turbine generators (hereinafter – WTG) in the northern part of the Lithuania's Exclusive Economic Zone in the Baltic Sea (hereinafter – EEZ), approximately 36.8 km from the shore, and a transmission system until connected to the general electricity system (transmission network).

Table 1.1.1. Category of the activity according to the Classification of Economic Activities[1]:

Section	Division	Group	Class	Activity
D	**35**	**35.1**	**35.11**	**Production of electricity**

The proposed economic activity (hereinafter – PEA) meets the type of activity specified in Article 3.10.1 of Annex 1 to the Law of the Republic of Lithuania on Environmental Impact Assessment of Proposed Economic Activities No. XIII-529 of 27 June 2017 (hereinafter – the EIA Law): 3.10.1. In Lithuania's Territorial Sea and/or the Exclusive Economic Zone of the Republic of Lithuania in the Baltic Sea.

The installation of the OWF in the Baltic Sea meets the objects and projects envisaged in the National Energy Independence Strategy[2] (hereinafter – NEIS), which are aimed at increasing the production of local electricity from renewable energy sources (hereinafter – RES) and reducing dependence on electricity imports. Paragraph 25.1.3 of the NEIS stipulates that energy production from wind energy in the Baltic Sea after 2020 is to be conducted taking into consideration, *inter alia*, research carried out and other actions which are required for the adoption of decisions regarding sites, which are appropriate for organisation of tenders and for identification of the installed capacity of power plants.

[1] Oder No. DĮ-226 of 31 October 2007 of the Director General of the Department of Statistics of the Government of the Republic of Lithuania "On the Approval of the Classification of Economic Activities."

[2] Approved by Resolution of the Parliament of the Republic of Lithuania No. XI-2133 of 26 June 2012 "On Approval of the National Energy Independence Strategy."

The Government of the Republic of Lithuania has adopted the Resolution No. 171, whereby it defines the coordinates of the part of Lithuania's EEZ in the Baltic Sea where a tender, without applying incentives for the development and operation of power plants using RES, is expedient. This resolution also defines the capacity of the wind power plants to be developed in the designated area.

The EIA is to be conducted for the designated area dedicated for the installation of the OWF, as specified in Resolution No. 171, and its connection to the onshore grid. The considered area is a part of the area covered by the Engineering Infrastructure Development Plan for the Area of Lithuania's Territorial Sea and/or Exclusive Economic Zone in the Baltic Sea, Designed for the Development of Renewable Energy, officially endorsed through Order No. 1-377 on November 18, 2022, by the Minister of Energy of the Republic of Lithuania.

The electricity generated by the OWF is planned to be transmitted to the onshore electricity transmission network. The transmission connection falls within the scope of the project of special national importance; "The Preparation of the Territories Necessary for the Connection of the Power Plants that Use Renewable Energy Sources, which are Proposed for the Development in Part (Parts) of Marine Territories of Lithuania's Territorial Sea and/or the Exclusive Economic Zone of the Republic of Lithuania in the Baltic Sea, to the Electricity Transmission Grids for the Engineering Infrastructure Development". The concepts of the Engineering Infrastructure Development Plan and the strategic environmental impact assessment report[3] (hereinafter – SEIA) for this project were prepared and published in November 2023 for the above project.

The project will undertake an Environmental and Social Impact Assessment (hereinafter – ESIA), following national and international requirements and standards:

- Lithuanian environmental and social legislation, including but not limited to environmental legislation, health, safety, security and environment (hereinafter – HSSE) legislation, social performance legislation.
- International environmental and social standards:
  - Equator Principles (hereinafter – EP 4);
  - International Finance Corporation Performance Standards (hereinafter – IFC PSs) on Environmental and Social Sustainability;
  - The World Bank Group Environmental, Health and Safety (hereinafter – WBG EHS) Guidelines;
  - The EU Taxonomy for Sustainable Activities (hereinafter – EU Taxonomy).

1.2. Lithuanian environmental legislation

Pursuant to the EIA Law, the objectives of the EIA are as follows:

- To determine, describe, and assess the potential direct and indirect effects of the PEA, i. e., the installation and operation of the OWF in the marine area approved by the Resolution No. 171 and its associated offshore and onshore facilities, on the following elements of the environment: land surface and geology, air, water, climate, landscape and biodiversity (focusing in particular on species and natural habitats of the European Community interest, also on other species protected by the Law of the Republic of Lithuania on the Protected Species of Fauna, Flora and Fungi), material assets, immovable cultural properties and the interrelationship between these elements;
- To identify, describe and assess the potential direct and indirect effects of biological, chemical and physical factors caused by the PEA on public health, also on the interrelationship between elements of the environment and public health;
- To determine the potential impact of the PEA on the elements of the environment and on public health by virtue of the risk of vulnerability of the PEA due to emergency events and/or potential emergencies;
- To determine the measures to be taken in order to prevent envisaged significant adverse impact on the environment and public health, to reduce it or, if possible, to offset it;
- To determine whether the PEA, having assessed its nature, location and/or effect on the environment, meets the requirements of environmental protection, public health, immovable cultural heritage protection, fire and civil protection legislation, whether or not it has no significant adverse effect on the elements of the environment and on public health and on the interrelationship between them.

Participants of the EIA process according to the EIA Law are as follows:

[3] Territorial planning documents preparation and territorial planning process state supervision information system (TPDRIS) of the Republic of Lithuania at: www.tpdris.lt, TPD No. S-NC-00-22-585.

- Organiser (Developer) of the PEA;
- Drafter of the EIA documents;
- The public concerned (concerned members of the public);
- Entities of the EIA. Pursuant to Article 5 of the EIA Law, entities of the EIA are as follows:
    - The executive institution of the municipality in the site in which the PEA is to be carried out,
    - The institutions authorised by the Minister of Health,
    - The institutions authorised by the Minister of the Interior responsible for fire and civil protection,
    - The institutions authorised by the Minister of Culture responsible for the protection of cultural properties;
    - The institutions of protected areas authorities authorised by the Minister of Environment, where the implementation of the proposed economic activity is likely to have an impact on national protected areas, including the European Ecological Natura 2000 sites.

Pursuant to Clause 10.1 of Chapter III of the Procedure for Environmental Impact Assessment of Proposed Economic Activities[4] (hereinafter – the Procedure), where the economic activity is proposed in Lithuania's Territorial Sea and/or the Lithuanian EEZ in the Baltic Sea, the information of the EIA programme should be submitted to the administrations of municipalities bordering the Baltic Sea.

The EIA Programme is submitted for approval to the following entities of the EIA responsible for the administration of coastal zone areas closest to the PEA site:

- Palanga Municipality Administration;
- Klaipėda District Municipality Administration;
- Klaipėda City Municipality Administration;
- Neringa Municipality Administration;
- Kretinga District Municipality Administration;
- Klaipėda Department of National Public Health Centre under The Ministry of Health;
- Fire and Rescue Service of Klaipėda County;
- Klaipėda Branch of the Department of Cultural Heritage under the Ministry of Culture;
- The State Service for Protected Areas.

The Competent Authority is the Environmental Protection Agency under the Ministry of Environment (hereinafter – EPA).

The EIA Programme is prepared following the Procedure with an aim to providing information on the PEA, its location, nature, capacity, and potential impact on the elements of the environment. Consequently, it defines the content of the EIA Report, the assessment's scope, the study methodology, and the issues to be investigated.

The information about the prepared EIA programme (and subsequently, at various stages throughout the EIA process) will be announced publicly in respect of the Order No. D1-370 of the Minister of Environment of the Republic of Lithuania of 15 July 2005 "On the Approval of the Procedure for Provision of Information to the Public and Participation in the Process of Environmental Impact Assessment of the Proposed Economic Activity." Throughout the EIA process, the concerned members of the public have the right to obtain the information about the potential environmental impact of PEA from other participants of the EIA process, as outlined in the legislative procedure. Throughout the EIA process of the PEA, the concerned members of the public also have the right to submit proposals, questions, comments, information, analysis, and opinion on the PEA and its EIA to EPA, the Drafter of EIA documents, Developer of the PEA, and EIA entities abiding by the Procedure.

1.3. Applicable international environmental and social standards

For this EIA process, the Developer has committed to undertaking the OWF development project to international environmental and social standards and Lithuanian legislation. This is to ensure that, should the project require financial support from international lenders, the project will be compliant with any requirements. Therefore, this document will include additional requirements to meet international standards.

[4] Approved by Order of the Minister of Environment of the Republic of Lithuania No. D1-157 of 23 May 2023 "On the amendment of Order of the Minister of Environment of the Republic of Lithuania No. D1-885 of 31 October 2017 "On Approval of the Procedure for Environmental Impact Assessment of Proposed Economic Activities."

The EP 4[5] (Equator Principles, 2020) serve as a common baseline and risk management framework for financial institutions to identify, assess and manage environmental and social risks when financing projects. They have been adopted by some of the world's largest financial institutions (the Equator Principles Financial Institutions; hereinafter – EPFIs), including many of the major banks in Europe, to provide a minimum standard for due diligence to support responsible decision making. Guidance for this report has also been obtained from Equator Principles (2022).

The IFC is an international financial institution that offers investment, advisory, and asset management services to encourage private sector developments. To support its clients in the management of performance risk, the IFC has developed a set of eight PSs[6] to manage social and environmental (hereinafter – E&S) risks associated with new developments (IFC, 2012). Additionally, the WBG EHS Guidelines[7] provide more specific standards to be met during construction, operation and decommissioning, with applicable sector standards for Wind Energy[8], and Electric Power Transmission and Distribution[9].

EP 4 and IFC PSs require commitment to the latest published best practice, and so additional best practices associated with the development of offshore wind may also be considered in the EIA.

[5] The Equator Principles. A financial industry benchmark for determining, assessing and managing environmental and social risk in projects.
[6] IFC's Performance Standards on Environmental and Social Sustainability.
[7] Environmental, Health, and Safety General Guidelines.
[8] Environmental, health, and safety guidelines for wind energy.
[9] Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution.

2. INFORMATION ON THE PROPOSED ECONOMIC ACTIVITY

The PEA is the installation and operation of the OWF and the related infrastructure in the marine area of the Baltic Sea as approved by the Resolution No. 171, including transmission of the generated electricity and integration into transmission system operator's (hereinafter – TSO) grid.

The Engineering Infrastructure Development Plan of the project of special national importance "The Preparation of the Territories Necessary for the Connection of the Power Plants that Use Renewable Energy Sources, Which are Proposed for the Development in Part (Parts) of Marine Territories of Lithuania's Territorial Sea and/or the Exclusive Economic Zone of the Republic of Lithuania in the Baltic Sea, to the Electricity Transmission Grids for the Engineering Infrastructure Development" (hereinafter – the Engineering Infrastructure Development Plan) is in the process of development for the transmission of electricity generated by OWF to the onshore electricity grids. The Concepts of the Engineering Infrastructure Development Plan, which was prepared and published in November 2023, provide offshore and onshore corridor alternatives for the OWF connection under consideration (Fig. 2.1.1.). The OWF will be connected to the existing onshore electricity transmission grid, in connection site of the 330 kV Darbėnai Switchyard, Kretinga district municipality, Darbėnai township, Žyneliai village 9.

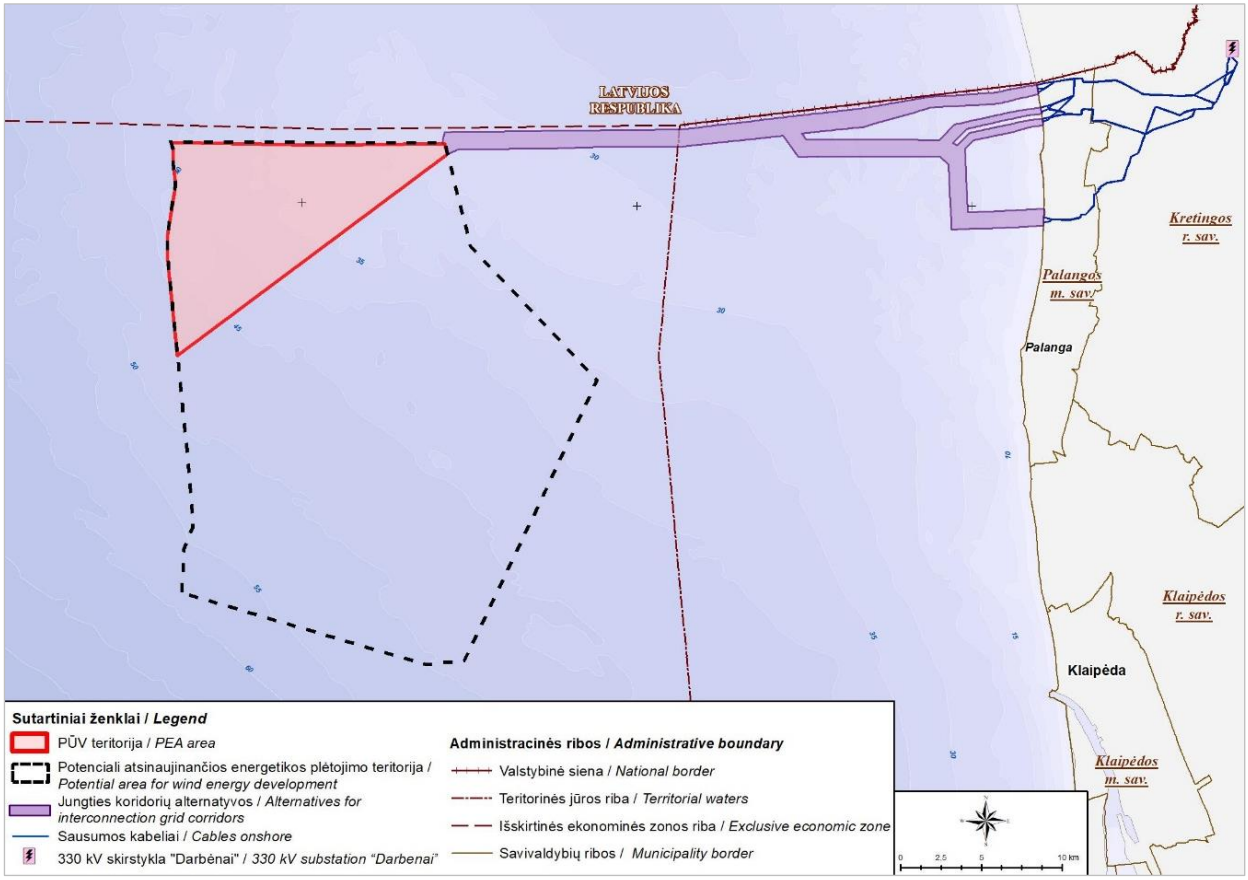


Fig. 2.1.1. The location of the PEA within the boundaries of the Lithuanian territorial sea and/or the EEZ, where tenders are expedient up to 2030 (according to Annex 2 of Resolution No. 171), without applying incentives for the development and operation of power plants using renewable energy sources, and the alternatives of connection corridors.

Schemes used in the EIA Programme present all proposed alternatives of the infrastructure corridors designed for the export cable installation as per Concept of the Engineering Infrastructure Development Plan for "The preparation of areas needed for engineering infrastructure development for connecting electric power plants utilizing renewable energy resources in the territorial sea and/or exclusive economic zone of the Republic of Lithuania in the Baltic Sea region to the transmission grids".

The EIA Report will cover the assessment of the spatial solutions approved by the Engineering Infrastructure Development Plan.

2.1. Physical and technical characteristics of the PEA

The capacities of the OWF expedient for the development in the site under consideration approved by Resolution No. 171 are as follows:

- Maximum permitted generating capacity – 700 MW;
- Minimum installed capacity – 580 MW.

The Developer is planning an OWF with a maximum of 55 WTGs. A specific WTG model or manufacturer has not yet been selected and is not described in the EIA programme. Due to the continuous and rapid development of WTG technology, more powerful WTG models, potentially up to 20 MW, may be available at the time of construction. The height of an offshore WTG depends on factors such as the capacity and rotor diameter of the model selected, the wind class at the site, and the environmental conditions. The limits of the technical and physical characteristics of offshore WTGs to be assessed during the EIA are shown in the table 2.1.1.

Table 2.1.1. Physical and technical characteristics of WTGs to be assessed during the EIA.

Parameter	Value
Rated power per each WTG	Up to 20 MW (to be specified in the EIA Report)
Hub height	Up to 170 m
Maximum tip height	Up to 350 m
Rotor diameter	Up to 300 m
Minimum clearance of lowest blade tip to MSL (Mean Sea Level)	23 m
Distance between WTGs	Min. 3 x rotor diameter
Number of WTG blades	3
Number of WTGs	Up to 55

During the technical design phase, on the basis of the Developer's data and the specified wind speed parameters, the most suitable physical and technical parameters of the WTGs, including their capacity, will be selected.

All offshore WTGs will be connected by inter-array cables (hereinafter – IAC) to the offshore substations, and from there export cables will connect the OWF to the existing onshore substation and finally to the connection site of the 330 kV Darbėnai Switchyard, Kretinga district municipality, Darbėnai township, Žyneliai village 9.

2.1.1 Wind turbine generator (WTG)

A WTG is a device which converts wind energy into electricity. This is done by the wind causing the blades to rotate, which subsequently turns the rotor and main shaft. Depending on the type of the WTG, these revolutions are increased by the gearbox which is connected to the generator, and the wind energy is hereby converted into electrical power by the generator (Fig. 2.1.2).

The WTG consists of the following main components:

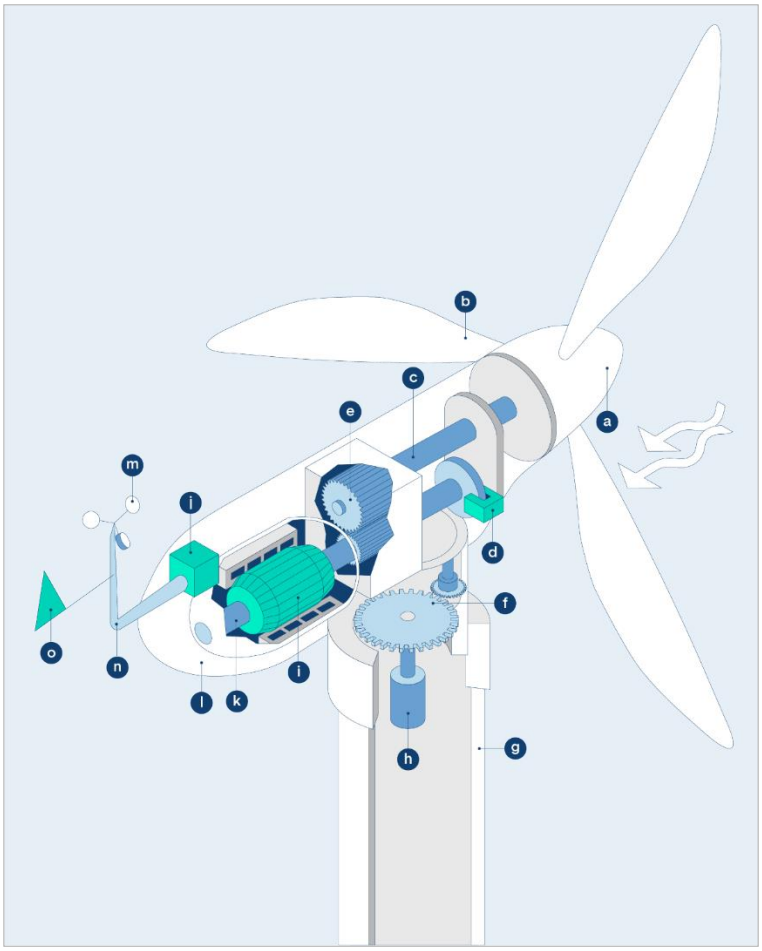


Fig. 2.1.2. Main components of the WTG nacelle: (a) rotor, (b) blades, (c) low speed shaft, (d) brake, (e) gearbox, (f) yaw drive, (g) tower, (h) yaw motor, (i) generator, (j) controller, (k) high speed shaft, (l) nacelle, (o) wind vane, (m) anemometer.

- **Foundation.** The foundation is a structure embedded into the soil/seabed and on which the WTG tower is installed and the IAC pulled into the structure and connected to a switchgear.
- **Tower.** The tower is a tubular steel construction which mainly consists of a switchgear, a service lift, and a cable ladder on which the 66 kV cables running from the transformer in the nacelle to the switchgear located at the bottom of the tower are attached. Furthermore, different working platforms are installed for the tower assembly and service work. The tower will have a door at the bottom which allows the technicians access into the WTG for service and repair work.
- **Nacelle.** The nacelle, which is installed on top of the tower, consists of the following main components: main shaft or gearbox (type depending), generator, transformer, blade pitch system and control cabinets.
- **Rotor.** The rotor consists of a hub onto which the 3 blades are mounted; the rotor will be attached to the gearbox or main shaft in the nacelle which runs the generator and transforms the rotor's rotation energy into electric power.

2.1.2 WTG foundation structures

The selection of a particular type of WTG foundation depends on a number of parameters, primarily WTG size, soil conditions, water depth and hydrodynamic conditions of the proposed location.

Monopile foundations (Monopiles; hereinafter – MP), suitable for water depths up to 50 m, are driven into the seabed until the required embedment depth is reached. The embedment depth depends on the WTG size, diameter of the pile and the geotechnical conditions. While this foundation minimally impacts the seabed area, the pile-driving process generates noise. Although the noise is short-termed, its intensity and frequent occurrence during installation can affect marine organisms relying on hearing for communication. This type of structure often requires scour protection, which likely transforms the seabed around the pile into an artificial reef for marine organisms.

Tripods are used in intermediate depth (20–60 m), comprising three 'legs' connected to a centre column pile which supports the WTG foundation. Each leg is connected to the seabed using a separate pile. The relatively wider structure results in less penetration of the foundation into the seabed. The impact on the seabed is a combination, resembling the effects of both MP and gravity-based structures.

Jacket foundations are lattice structures with either three or four corner piles. This hydrodynamic transparent structure type is well-suited for depths ranging from 30 to 80 meters. Jacket structures are significantly stiffer than MP, making them highly reliable, although expensive. Due to their widespread use on offshore platforms, jacket foundations can also be used to install offshore substation platforms (hereinafter – OSP).

Gravity based foundations (hereinafter – GBF) are a support structure held in place by gravity, which may be deployed if the upper seabed layers are sufficiently strong. GBF are normally constructed with reinforced concrete and vary in geometry, size and weight depending on specifics of the site. Most recent GBFs have been constructed as hollow concrete shells for ease of transport and installation. The design includes a central shaft (steel or concrete) for

transition to the WTG tower. Once in position the structure is ballasted with concrete, sand, rock, iron-ore and/or other material to increase the supporting weight. GBF require significant seabed preparation, but installation noise is reduced compared to foundations with piling activities.

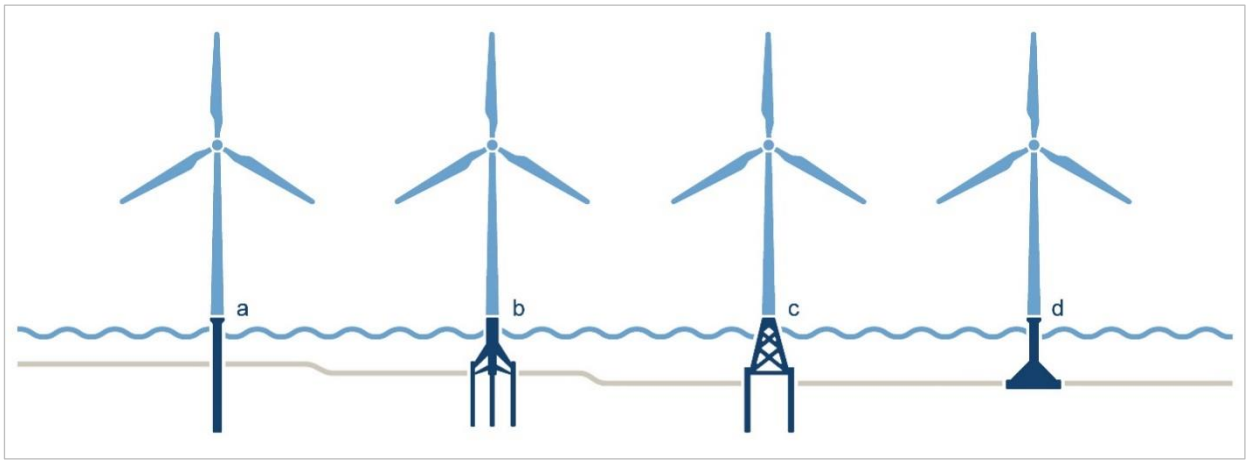


Fig. 2.1.3. Conventional offshore WTG foundations: (a) MP; (b) tripod, (c) jacket), and (d) GBF.

The Developer will determine the type of offshore WTG foundations through geo-mechanical studies conducted during the preparation of the technical design for the OWF.

The chosen foundation type influences the extent of impact on the natural substrate during construction and the alteration of hydrodynamic conditions at the proposed location. Details regarding the characteristics of the types of offshore WTG foundations considered in the EIA are presented in Table 2.1.2.

Table 2.1.2. The characteristics of the types of offshore WTG foundations to be considered during EIA.

Parameter	Value
MP	
Foundation dimensions	MP lower diameter: 9–11 m MP upper diameter: 8–9 m MP length: 70–105 m MP weight: max. 2,000 t
Installation methods, including pile-driving program and other activities (duration of foundation pile-driving, etc.).	Pile-driving and/or drilling Expected pile-driving duration: 2–3 hours uninterrupted
Boulder clearing methods (if applicable)	If required after micro-siting, boulders along cable routes and at foundation sites will be cleared primarily using a pre-lay plough. Individual large boulders will be removed using either a vessel-operated gripping device or a utility remotely operated vehicle (hereinafter – ROV) gripping device.
Scour protection	Possible methods: rip-rap (stone layers), geotextile sand bags. Expected diameter up to 33 metres.
Tripod	
Foundation dimensions	Footprint (distance between the foundation piles): up to 30 m Foundation pile diameter: up to 4 m Centre column diameter: up to 10 m
Installation methods, including pile-driving program other activities (duration of foundation pile-driving, etc.).	Pile-driving and/or drilling Expected pile-driving duration: 2–3 hours uninterrupted

Parameter	Value
Boulder clearing methods (if applicable)	If required after micro-siting, boulders along cable routes and at foundation sites will be cleared primarily using a pre-lay plough. Individual large boulders will be removed using either a vessel operated gripping device or a utility ROV gripping device.
Scour protection	Possible methods: rip-rap (stone layers), geotextile sand bags.
Jacket	
Foundation dimensions	Footprint (distance between the foundation piles): up to 31 m Foundation pile diameter: up to 4 m
Installation methods, including pile-driving program other activities (duration of foundation pile-driving, etc.).	Pile-driving and/or drilling Expected pile-driving duration: 2–3 hours uninterrupted
Boulder clearing methods (if applicable)	If required after micro-siting, boulders along cable routes and at foundation sites will be cleared primarily using a pre-lay plough. Individual large boulders will be removed using either a vessel operated gripping device or a utility ROV gripping device.
Scour protection	Possible methods: rip-rap (stone layers), geotextile sand bags.
GBF	
Foundation dimensions	Bottom diameter: up to 40 m Top shaft diameter: 7.5–12 m
Installation methods, including pile-driving program other activities (duration of foundation pile-driving, etc.).	No driving. Lifting of GBF from heavy lift vessel onto prepared seabed or floating out and submerging by ballasting.
Boulder clearing methods (if applicable)	If required after micro-siting, boulders along cable routes and at foundation sites will be cleared primarily using a pre-lay plough. Individual large boulders will be removed using either a vessel operated gripping device or a utility ROV gripping device.
Scour protection	Possible methods: rip-rap (stone layers), geotextile sand bags.

2.1.3 Electricity transmission solutions

A chain of medium and high voltage cables and power lines, step-up transformers and substations is required to transform and transmit the generated electricity to the grid managed by the electricity TSO – LITGRID AB.

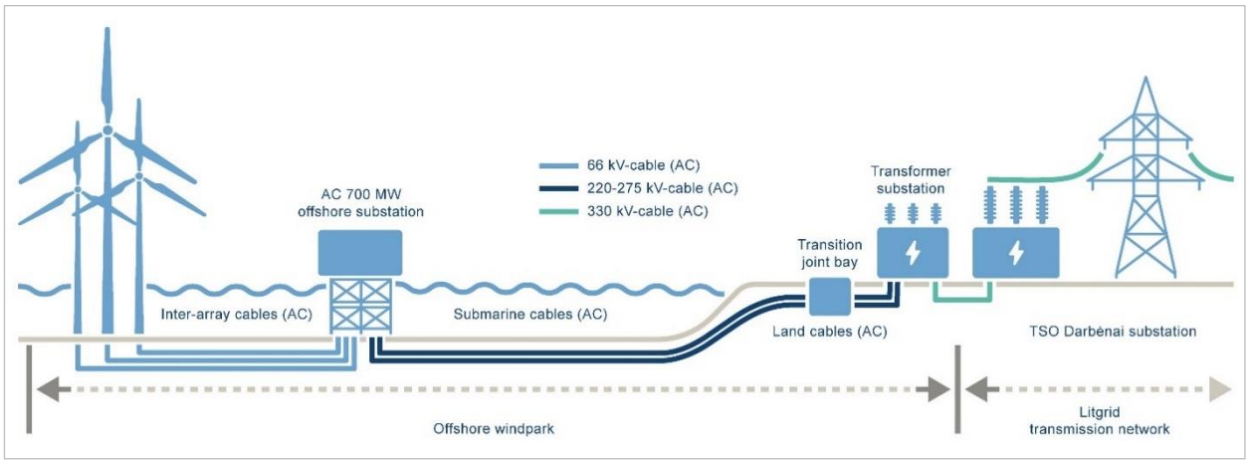


Fig. 2.1.4. Schematic presentation of the OWF-generated electricity transmission to the land-based grids.

In seas and oceans (offshore), energy is transmitted, and communication is maintained via submarine cables.

Table 2.1.3. OWF electricity transmission cables.

Parameter	Value
IAC: type, voltage, length, other specifications	High-voltage 66 kV three-core cable with fibre optic; array cables arranged in individual strings or loops to connect all WTGs with offshore substations; the length will be confirmed after design of WTGs layout and OSP number and locations.
Export cable: type, voltage, length, other specifications	Export cable connects the offshore and onshore substations. High Voltage Alternating Current (hereinafter – HVAC) offshore export of 220 kV or 275 kV or other voltage three-core cables with fibre optic. Onshore export cables planned to be single-core. The number of circuits (2 or 3) will be confirmed after performing electrical system concept design. Preliminary route length from OSP to landfall – approximately 40 km. From the shore to the provided connection point route, length is approximately 18 km. Final length of the route depends on the selected engineering infrastructure corridor by Ministry of Energy, to be confirmed at later stage.
Possible cabling methods	To be defined during later phases of the project development according to the seabed conditions and limitations identified by the EIA. Land cables in the agricultural land will be installed using open trench method; at identified locations, trenchless method will be applied.

2.1.4 Offshore cable installation technology

The process of offshore cable installation involves key activities: cable laying, burial, protection (when needed), pull-in and electrical testing.

The cables linking the WTGs to each other and to the OSP are typically buried at an average depth of 1–3 m beneath the seabed. Detailed design, informed by seabed investigation data, will determine additional protection requirements. Common cable protection methods at WTG and OSP entry points include the use of J-tubes. Additional protection methods for IAC include steel cable stiffeners to weigh down the exposed cables effectively, and cable mats typically made from concrete or polyurethane.

Export cables connecting offshore and onshore substations are typically buried at depths of 1–4 m beneath the seabed to ensure long term integrity and prevent damage. The required burial depth is defined in a cable burial risk assessment. A preferred method for cable installation is using a cable plough, when pre-trenching, cable laying, and burial is performed simultaneously. Alternatively, in post-lay burial, the vessel moves along the laid cable, using a trenching ROV, vertical injector, or jetting sled to fluidise sediment and burry the cable. Export cable installation starts with the shore pull-in, followed by the vessel laying the cable as it progresses towards the OSP.

2.1.5 Offshore substation platforms

An OSP is used to reduce electrical losses before export of power to shore. It is achieved by increasing voltage (using step up transformers) from the level of one used in IAC to the required export cable. Generally, the OSP contains equipment to manage the reactive power consumption of the electrical system. The size and design of the OSP will be determined by various factors, including specifications from the TSO for grid connection. The OSP consists of a topside and a foundation. A typical HVAC platform has an area of 800 m^2.

The installation of the OSP involves three main steps: installation of a foundation, transporting the platform (topside) from its onshore fabrication site, and installation of the topside onto the foundation. This operation requires vessels equipped with substantial crane capacity due to the heavy lifting involved. As these vessels typically lack sufficient deck space to accommodate the OSP topside, it is transported separately to the OWF site and then lifted onto the foundation using the heavy lift vessel.

The main components of the OSP include power transformers, switchgear, backup generator, staff rooms, water tanks, power cables, control / surveillance system, etc. These substations are usually built on foundations similar to those of WTGs, it could be MP or jacket, depending on the OSP size and water depth.

However, for enhanced electricity transmission efficiency, multiple substations may be installed within a single OWF.

Fig. 2.1.5. Sheringham Shoal OSP[10].

Table 2.1.4. Information on the considered OSP.

Parameter	Value
Substation details: potential site, capacity (MW)	Number of offshore substations (either one or two) will be determined following an electrical system design analysis aimed at identifying the most optimal components for the OWF. Additionally, the location of installation will be specified once the WTGs layout plan is prepared and export route corridor is confirmed. The capacity of the OSP is expected to fall within the range of 700–740 MW based on the letter of intent signed with the TSO.
Possible type of foundations	The OSP foundation type will be either a jacket or a MP depending on the size and weight of the OSP and the water depth. This will be defined at a later stage.

2.2. The installation and activities of the OWF

2.2.1. The main planned works for the installation of the OWF

OWF construction is scheduled to commence in Q4 2026. Commissioning is planned for Q2 2029, with commercial operations date (hereinafter – COD) in Q4 2029.

During the construction phase, components of WTGs are transported on an installation vessel from the marshalling port to the OWF site and assembled. Typically, the WTG tower is pre-assembled onshore to reduce offshore activities and transported with the nacelle and blades for final assembly offshore.

The primary activities for the offshore WTG installation (provided in detail in Table 2.2.1):

- Foundation installation;
- Tower erection;
- Nacelle installation;

[10] Source: The Crown estate. Offshore operational report 2020. https://www.thecrownestate.co.uk/media/3792/offshore-wind-operational-report-1.pdf

- Blade mounting;
- IAC laying within the OWF;
- Installation of OSP;
- Installation of export cables (offshore, at the landfall, on land);
- Construction of onshore substation.

Table 2.2.1. Main works for OWF installation

Work stage	Works to be performed
Foundation installation	WTG foundation structures are loaded at the marshalling harbour (storage location) onto installation vessels and transported to the OWF site. On-site installation process varies depending on the chosen foundation type, involving pile-driving, drilling, or dredging for GBF installation. Following this, the foundation structures are delivered to the OWF site. Piled foundations may be installed from a jack-up vessel or a floating vessel. GBF are usually too heavy to lift in place with the usual vessel cranes. Hence, they are towed out to site while floating using their buoyancy and then lowered to the seabed by ballasting. After the foundation is in place at its location, it is connected to the power transmission cables and anchoring the foundation..
Preparation and installation of WTG	**WTG preparation at the marshalling port.** The individual WTG components such as nacelle and hub, towers and blades are typically produced at different manufacturing locations. After manufacturing completion, the components are transported to a marshalling port where the components will be prepared, pre-assembled and tested before loadout onto the installation vessel. Full tower pre-assembly: due to the size and weight of the tower, the tower is delivered to the marshalling port in 'smaller' sections. All individual 'small' tower sections, which can be 3 to 5 sections, are transported horizontally and upended and stacked on top of each other into one complete tower section. Full towers are then equipped with a personnel / service lift, medium voltage cables, controllers etc. Following this, the full tower will be located next to the quay side at the marshalling port for loadout onto the installation vessel. The complete tower is subsequently lifted on to the installation vessel by the vessel crane for installation as one unit. Following final preparation and testing of the nacelle, the nacelle will be equipped with (if not standard) a turning device for horizontal single blade installation and transported to the quay side for load out onto the installation vessel. Upon arrival at the pre-assembly site, blades are inspected for transport damage. The transport frames are removed, and stud bolts and blade collars will be mounted before the blades are lifted onto the installation vessel. **WTG offshore installation and mechanical completion.** The installation of the WTGs is carried out by a jack-up installation vessel which will be able to jack out of the water to avoid movement caused by the sea (waves and swell) during lifting operations. Prior to installation of the WTG onto the foundation including transition piece (hereinafter – TP), the TP flange is cleaned and inspected for damage. The full tower is then lifted on to the TP and bolted to the top flange. The nacelle, including hub, is lifted and placed on top of the tower and bolted onto the tower top flange. One blade at a time is lifted horizontally and mounted onto the hub. Once the blade bolts have been tensioned, a turning device rotates the hub 120° to the horizontal installation position of the next blade. Internal medium voltage cables and the control cables are routed and terminated from the nacelle or the transformer to the switchgear placed in the bottom of the tower or the transition piece. Following the cable terminations, the turbine is connected to the electrical grid via internal swich gear and various tests and adjustments are performed before the turbine is put into operation.

Installation of OSP	OSP installation involves transferring platform (top side) from fabrication side and installation onto the foundation. The substation foundation is installed prior to the topside. Topside installed in one piece by heavy lift operation.
Cabling	Offshore WTGs are linked and electricity is transmitted through dedicated submarine cables. These cables, depending on the site geological conditions, are laid in a trench excavated in the seabed or directly on the sea bed with proper protection applied. Cable laying is executed using a specialised vessel; techniques for laying cable include pre-lay plough, plough, trenching, or jetting. If the trenching is applied the cable is usually buried using the same soil. In Lithuania's coastal area, the connection between the sea (from an isobath depth of 7 m) and the onshore area is proposed to be enabled using trenchless installation such as Horizontal Directional Drilling (hereinafter – HDD) or other similar technology. This technology entails drilling an underground bore of the necessary diameter to fit a pipe with cable inside. Most common onshore cabling is performed by excavating open trenches; HDD or similar technology may be used for intersections with natural objects or infrastructure facilities. Onshore cables will have joints every 500–1000 metres.
Installation of onshore TS	Onshore transformer substation (hereinafter – TS) installation consists of construction of the infrastructure (civil works) and electrical equipment. Voltage of AC electricity transmitted from OWF to the onshore TS through export cables needs to be increased to 330 kV. This increase is necessary for the subsequent connection to the 330 kV switchyard in the electricity transmission grid. Preliminary estimates show that the onshore TS will occupy an area of approximately 6–8 ha.

2.2.2. Operational phase

The operational phase involves the generation and transmission of electricity to the grid and the maintenance, repair and inspection of WTGs and transmission equipment. At this stage, the safety of inspection or repair personnel arriving at the WTG is crucial. It is therefore important to select safe equipment and procedures for accessing the WTGs.

Maintenance of OWF may engage small ships that can easily approach and moor next to the WTG. The service staff on these ships can then safely access to the WTG service platform. If major repairs, such as the replacement of blades or the entire offshore WTG, need to be carried out, heavy lifting vessels might be used.

In addition to WTG maintenance, the operational phase covers the maintenance and, if necessary, repair of the TS and electricity transmission lines offshore as well as onshore.

2.2.3. Decommissioning phase

Decommissioning phase involves removal of offshore infrastructure at the end of its active lifetime, plus disposal of equipment. The primary components to be removed during the dismantling of the OWF include the WTGs, foundations and transition elements, submarine cables (both offshore and onshore), OSP, and the associated infrastructure onshore (Topham & McMillan, 2017).

All parts of the WTG are shipped onshore and delivered for reuse, recycling, or recovery.

The existing legal framework stipulates that in the event of the expiry of the permit to produce electricity, the Government will determine the procedure and timelines for the demolition or dismantling of power plants, as well as the procedure for the removal of electricity grids and other infrastructure necessary for the power plant connection.

Currently, no clear criteria, scope or procedures has been outlined. Therefore, the EIA Report will also consider potential alternatives that are not currently under consideration but might be feasible in the future. This includes options such as life extension and repowering of specific components or power plants.

2.3 Materials to be used and waste generation

For the implementation of the OWF and its associated infrastructure offshore and onshore, only certified products complying with the European Union (hereinafter – EU) requirements will be used. At the installation sites, only the assembly of the equipment, the necessary preparatory work and the operation of the OWF with the associated equipment will be carried out.

The EIA Report will provide information on waste generation and management, including different alternatives during the OWF development phases.

2.4 Extent of use of natural resources

In the operational phase of the OWF, wind energy will be used for electricity generation, in accordance with the Law of the Republic of Lithuania on Energy from Renewable Sources, which defines wind energy as the utilisation of air movement energy to generate power.

On land, the installation of OWF associated infrastructure, such as TS and connection cables, will involve soil-moving activities. During the construction of the access roads and equipment storage areas, the topsoil will be stockpiled, stored and, once the construction and installation works have been completed, will be used for shaping the site.

The report of SEIA and concepts of the Engineering Infrastructure Development Plan provide that deforestation may be necessary for the construction of connection cables onshore, and the route may cross swamp and peatland areas. The extent of works will depend on the connection corridor approved by the concretised solutions of the Engineering Infrastructure Development Plan. Potential impacts on various environmental components will be assessed in the EIA Report.

3. INFORMATION ON THE SITE OF THE PROPOSED ECONOMIC ACTIVITY

3.1 Geographical and administrative situation of the site of the proposed economic activity

The WTGs are proposed to be installed in the marine area of the Baltic Sea approved by the Resolution No. 171 where a tender (tenders) without applying incentives for the development and operation of power plants using renewable energy sources is expedient by 2030.

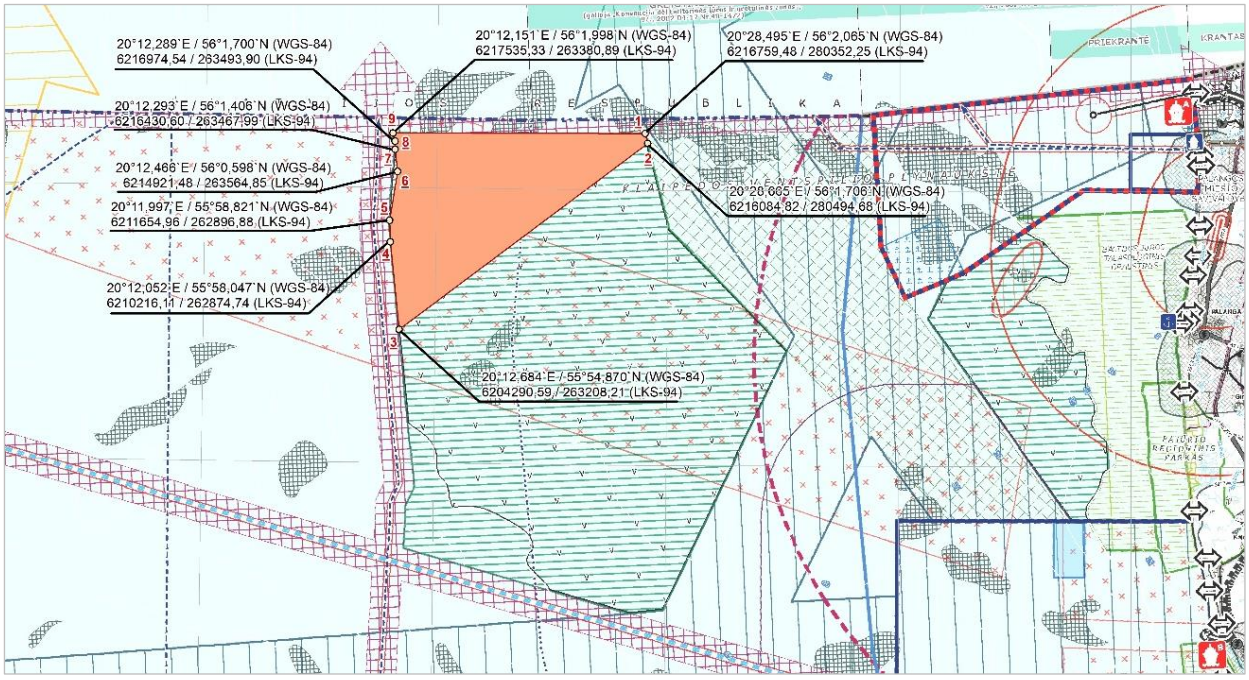


Fig. 3.1.1. The PEA site in the Baltic Sea approved by the Resolution No. 171 (extract from Resolution No 171[11]).

Table 3.1.1. Coordinates of the Site approved by the Resolution No. 171.

Site point No. (see Fig. 3.1.1)	Coordinates	
	according to the World Geodetic System 1984 (WGS–84)	according to the Lithuanian Coordinate System 1994 (LKS–94)
1	20°28,495`E 56°2,065`N	X-6216759,48; Y-280352,25
2	20°28,665`E 56°1,706`N	X-6216084,82; Y-280494,68
3	20°12,684`E 55°54,870`N	X-6204290,59; Y-263208,21
4	20°12,052`E 55°58,047`N	X-6210216,11; Y-262874,74
5	20°11,997`E 55°58,821`N	X-6211654,96; Y-262896,88
6	20°12,466`E 56°0,598`N	X-6214921,48; Y-263564,85
7	20°12,293`E 56°1,406`N	X-6216430,60; Y-263467,99
8	20°12,289`E 56°1,700`N	X-6216974,54; Y-263493,90
9	20°12,151`E 56°1,998`N	X-6217535,33; Y-263380,89

[11] https://www.e-tar.lt/portal/lt/legalAct/39556540c6ed11ed9978886e85107ab2

The main characteristics of the site:

- Area: 119.5 km^2;
- Average depth: 35 m;
- Distance to the shoreline: 36.8 km;
- Distance from Klaipėda Seaport: 50.3 km;
- Average wind speed at a height of 200 m: approx. 8.6 m/s (based on the wind speed measurements in the area adjacent to the proposed OWF).

The PEA site is located in the Lithuanian EEZ in the Baltic Sea, at depths between 30–45 m isobaths and is far from the coastline and the municipalities of Klaipėda city, Klaipėda district, and Palanga city. The minimum distance from the PEA site to the city of Palanga is approximately 36.8 km. The distance from the OWF site to the Latvian EEZ is approx. 0.9 km, to the Swedish EEZ – approx. 69 km, and to the Russian EEZ – approx. 35.8 km.

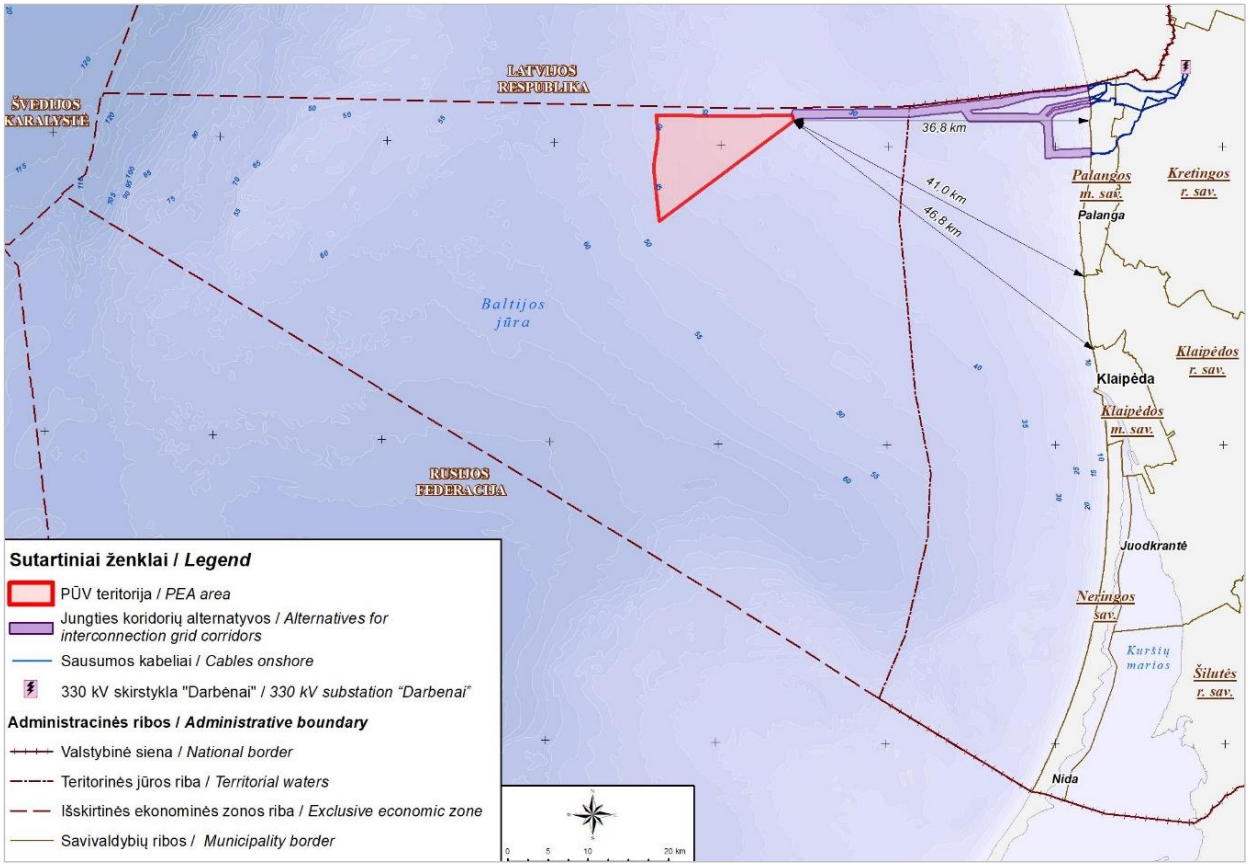


Fig. 3.1.2. Geographical and administrative situation on the PEA site.

The Engineering Infrastructure Development Plan is in the process of the selection of the connection corridor site. The Concepts of the Engineering Infrastructure Development Plan analyse the potential connection site (including alternative sites) within the borders of Palanga city municipality and Kretinga district municipality, considering the planned exit points to the shore (alternatives) and the site of the connection to the Darbėnai 330 kV switchyard (Fig. 3.1.2). It is important to note that Klaipėda district municipality does not fall into the area crossed by the planned connection.

The SEIA Report and concepts were prepared for the Engineering Infrastructure Development Plan at the stage of developing the EIA Programme. The concept drawing with alternatives of the connection line, both offshore and onshore, are provided in Annex 1 to the EIA Programme.

The environmental impact of installation of the approved (according to the final spatial solutions of the Engineering Infrastructure Development Plan) export cable corridor will be assessed in the EIA Report.

3.2 Current use of the site

Lithuania's EEZ and territorial sea is currently used for various purposes, including shipping and commercial fishing, various engineering communication routes, other economic activities such as dredging, soil dumping, and development of renewable energy. Military operations are also carried out or planned. The Lithuanian seaside is popular as a recreational area and has a great potential for nautical tourism. A significant part of the marine area is dedicated to protected and European Natura 2000 areas that are being expanded (refer to point 5.4.1), including areas such as Curonian Spit National Park, Pajūris Regional Park, Baltic Sea Thalassological Reserve among others.

In the onshore part of the PEA site, considering the planned exit points of the connection cable to the shore and the geographical location of the Darbėnai switchyard, alternative corridors are planned within Palanga City Municipality and Kretinga District Municipality (refer to point 3.2.8).

3.2.1 Shipping

The PEA site is outside the established international shipping routes, roadstead or anchorage sites. The distance from the eastern border of the OWF to the nearest international shipping corridor is approx. 340 metres. The alternatives for the planned export cable corridors cross shipping routes.

The most relevant for the connection landing are the anchorage sites of Būtingė Oil Terminal and the marked anchorage at the Šventoji Port. However, the export cable corridor has been routed to avoid this anchorage area.

A cartographic comparison of the PEA site with the defined areas of Klaipėda State Seaport, Šventoji Port, and Būtingė Oil Terminal anchorage sites and shipping corridors is presented in Figure 3.2.1 below.

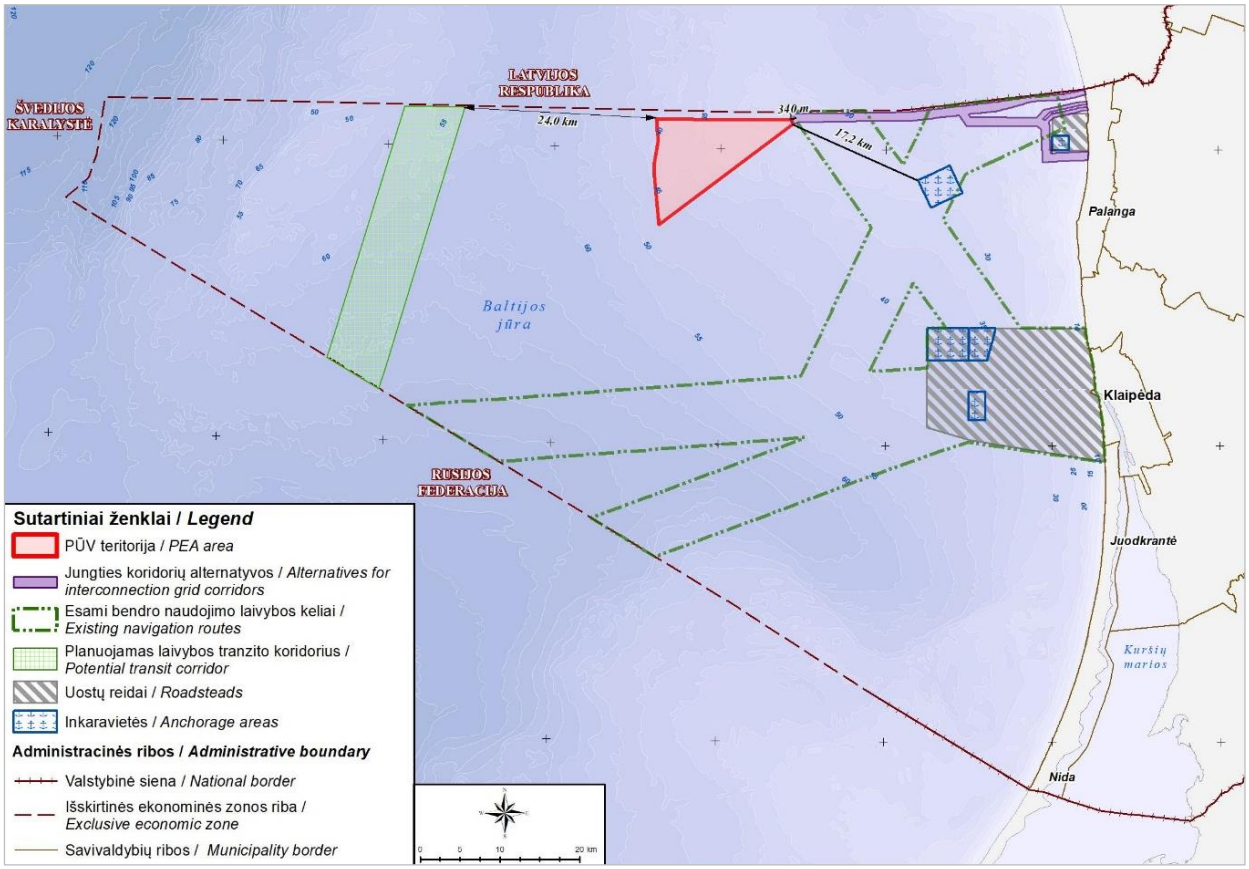


Fig. 3.2.1. Location of the proposed site in respect of shipping routes, roadstead or anchorage sites (GIS data: Baltic sea – Central Baltic sea – Southeastern Baltic Lithuanian coast and EEZ nautical chart. Lithuanian transport safety administration (2022).

3.2.2 Commercial Fishing

Based on the classification by the International Council for the Exploration of the Sea (hereinafter – ICES), Lithuania's marine territory falls within statistical rectangles 40H10, 40G9 and 39H10 of subdivision 26 of the fishing area where fish is caught with trawls and trap nets (Fig. 3.2.2).

The data for 2013–2018 demonstrates active fishing in the PEA site using bottom otter trawls (hereinafter – OTB) as well as low-density fishing using midwater otter trawls (hereinafter – OTM) and set gillnets (hereinafter – GNS).

However, after the European Commission (hereinafter – EC) banned commercial fisheries for cod in the Baltic Sea (ICES sub-rectangles 24–26) from 23 July 2019, the density of fishing in the PEA site has changed drastically and fishing with bottom trawls here has stopped. In 2021, only pelagic species – Baltic herring and Atlantic sprat – prevailed in the catch in the PEA site.

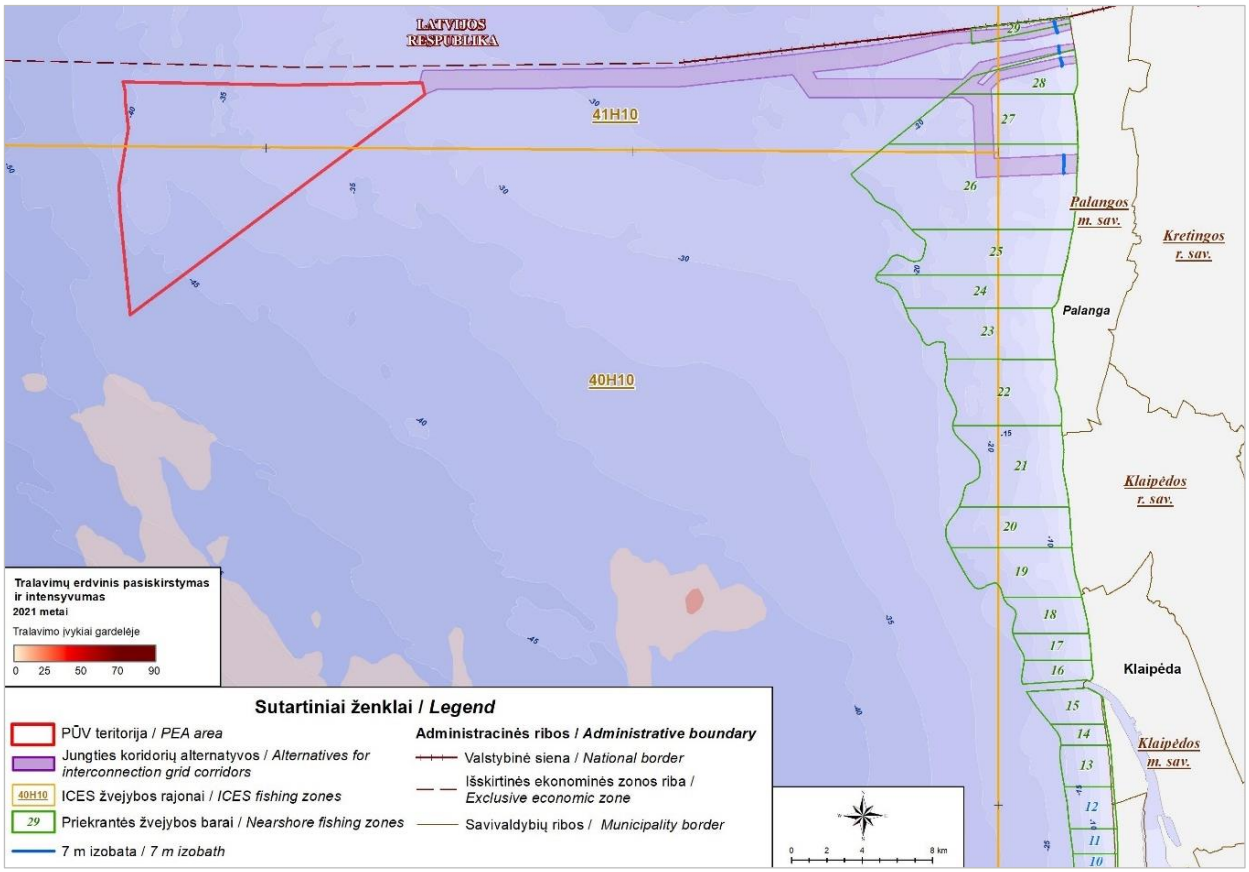


Fig. 3.2.2. Fishing areas and coastal waters fishing bars.

The boundary of the nearshore fishing area is determined at 20 m isobath and is the site of coastal waters of quite an uneven width, with up to 7 nautical miles wide to the north of Klaipėda.

Lithuania's nearshore is divided into 29 fishing bars that are allocated to fishing companies. The use of trawls, double drag nets and other trawling fishing gear at the depth of 20 m and less is prohibited. Nets, different traps (for Baltic herring, smelt and goby) are used for fishing.

The alternatives of the connection concept analysed in the Engineering Infrastructure Development Plan may intersect 26th, 27th, 28th and 29th fishing bars, depending on the selected sea-shore connection site.

3.2.3 Soil dumping at sea

There are a several offshore dumping sites, identified and assessed during the EIA carried out in 2014[12], where the soil, dredged in the Klaipėda port waters, is dumped. A deep-water dumping site, with an area of 4 square nautical miles (i.e., approx. 13.87 km^2), is 11 nautical miles (i.e., approx. 20.37 km) away S-W from the port gate at a depth of 43–48 metres. The dumping site was put into use in 1987. All the types of soil dumped in this area, i.e., sand, silt, moraine.

[12] Environmental impact assessment report on new offshore damping sites. 2014. Prepared by the Baltic Coastal Research and Planning Institute of Marine Sciences and Technology Centre of Klaipėda University. Client: Klaipėda State Seaport Authority.

Another site for dumping of sandy soils (fine sand and silty sand) is 6 nautical miles (i.e., approx. 11.11 km) away N-W from the port gate at a depth of 25–30 metres.

In 2001, a coastline nourishment with sand began in a coastline section between coordinates 55°47'00'' to 55°45'20''. Sand is poured at a depth of approx. 5 metres. In total, about 400.000 m³ of sand was poured out in this section of the coastline.

The existing offshore soil dumping sites are more than 38 km away from the PEA site (Fig. 3.2.3).

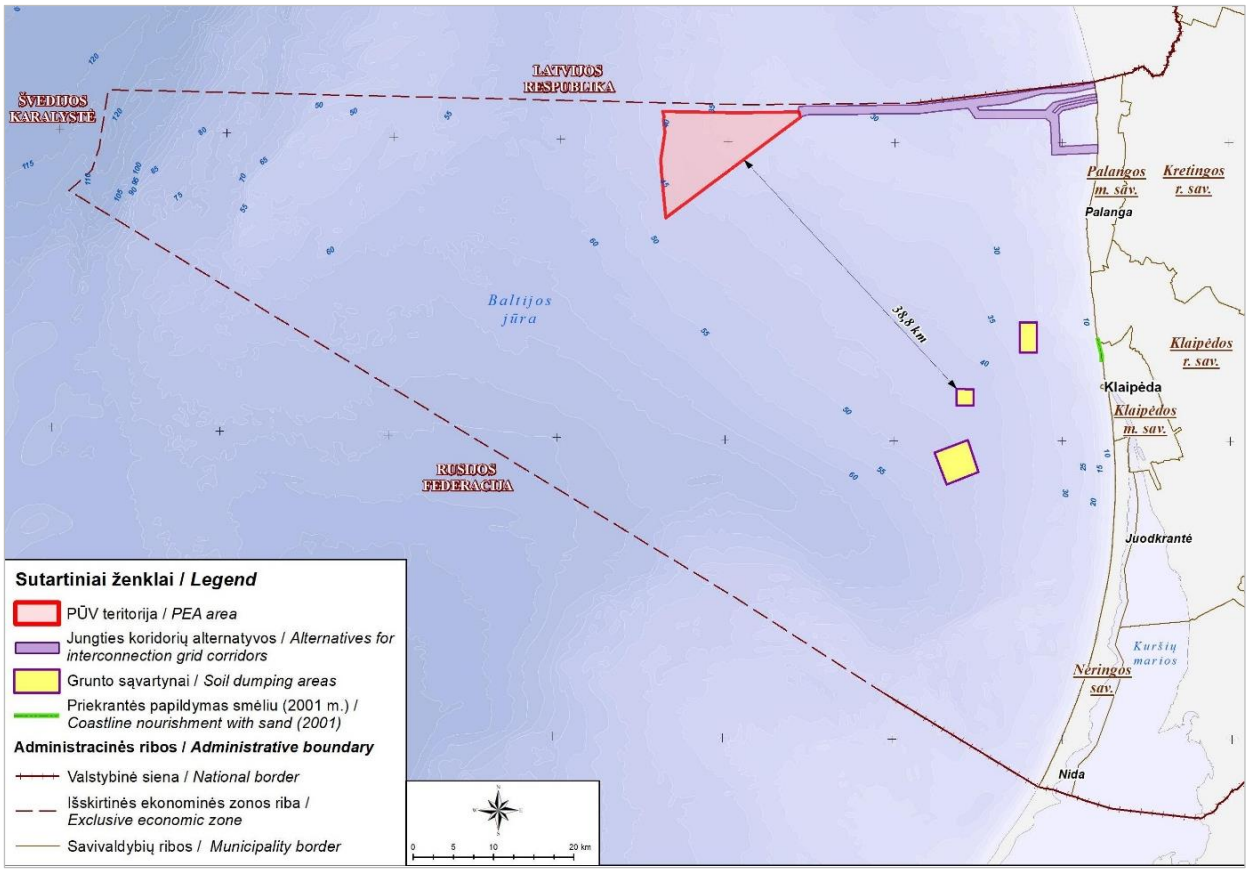


Fig. 3.2.3. Existing offshore soil dumping sites.

3.2.4. Recreational Resources

The Lithuanian coastline in this part of the Baltic Sea is fringed by sandy beaches. Swimming zones of the Šventoji settlement and Palanga city beaches are legalised by Order of Director of Palanga Municipality Administration No. A1-559 of 22 July 2010 "Regarding the establishment of swimming zones at the Palanga Beaches."

The distance from the OWF to the nearest recreational areas and beaches of Palanga City Municipality is approx. 36.8 km (Fig. 3.2.4).

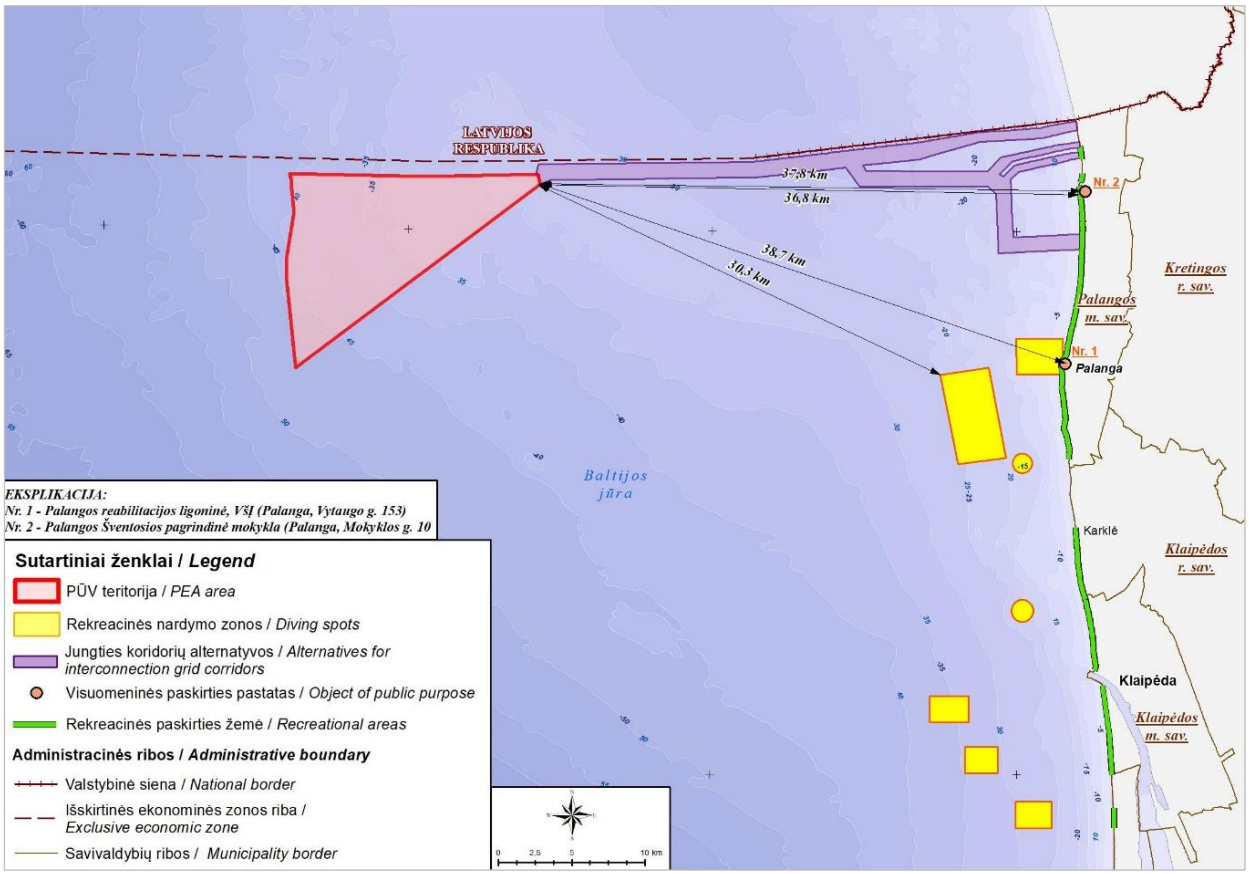


Fig. 3.2.4. Residential and recreational areas in the coastal municipalities (according to Solutions of the special plan for the management of the onshore part of the coastal strip [13])

The beginnings of the nautical tourism services can be observed on the Lithuanian seaside. Nautical tourism is defined as an independent boat trip organisation service provided for tourists for a fee, which requires a certain infrastructure, i.e., adapted embankments, roads, pedestrian (bicycle) paths, a specially designed area for tourists, buildings, parts thereof, facilities, and other objects of similar purpose, to meet the needs of inbound, outbound, and local tourism in Lithuania's territorial waters and their surrounding areas. Based on this definition, the following most frequent nautical tourism services are identified in the Lithuanian seaside: cruise shipping, inland tourist shipping, recreational fishing, and diving services in the sea.

There are several diving clubs in Klaipėda region which offer recreational diving services in the Baltic Sea. The best diving destinations in the Baltic Sea are wreck dives and tours to expressive elevations at the seabed (moraine ridges). According to the diving club OCTOPUS, diving usually takes place in coastal waters. The most popular diving spots are more than 20 km away from the PEA site (Fig. 3.2.4).

The Engineering Infrastructure Development Plan anticipates a trenchless cabling technology (HDD) to be applied for the exit of connection cable to the shore from the depth of about 7 metres. Therefore, swimming areas, beaches and dunes are not damaged by open trench digging.

3.2.5 Engineering infrastructure

In Lithuania's marine territory of the Baltic Sea, there have been two types of engineering infrastructure identified: a pipeline complex, including the Single Point Mooring (hereinafter – SPM) buoy at the Būtingė Oil Terminal, and submarine cables.

The 7.3 km long pipeline at the Būtingė Oil Terminal connects an underground onshore pipeline with a tanker mooring buoy and is used for oil product handling operations at AB Orlen Lietuva. Coordinates of location and safety area of

[13] Key points of the explanatory note of the special plan for the management of the mainland part of the coastal strip. Approved by Order No D1-601 of the Ministry of the Environment of the Republic of Lithuania of 28 July 2011.

the Būtingė Oil Terminal's pipeline and SPM buoy are provided in the Būtingė Oil Terminal Shipping Rules. The terminal has a water area allocated thereto, within a radius of 1,000 m around the SPM buoy, and a safety area of 300 m on each side of the oil pipeline. [14]

The EEZ is intersected by the following four submarine cable lines: 2 telecommunications cable routes, with the starting point in Šventoji, Lithuania, owned/operated by AB TeliaSonera (according to: International Cable Protection Committee); that is:

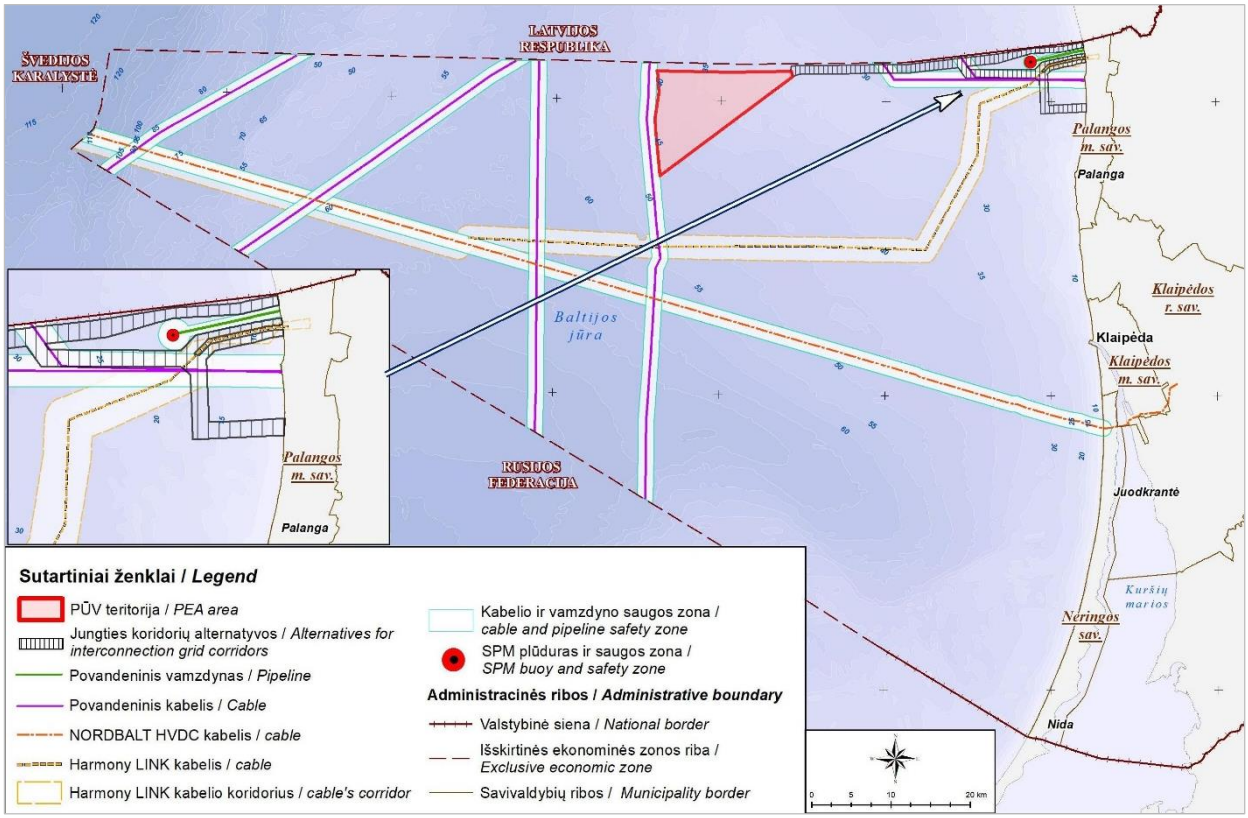
- The 218 km long BCS East-West interlink route (ready for service since 1997) connecting Šventoji with Katthammarsvik, Sweden;
- The 97.8 km long BCS East (ready for service since 1995) connecting Šventoji with Liepaja, Latvia.

An origin of the other two cable routes (not relevant for this project) crossing the Lithuanian EEZ South to North and South-West to North-East, marked on navigation maps, is unknown.

In the central part of the Lithuanian marine area, the NORDBALT connection – a 450 km long, 700 MW high-voltage DC submarine and underground cable – has been constructed from Klaipėda through the Curonian Spit and further towards the Swedish EEZ.

On 21 December 2018, CEOs of Lithuanian and Polish TSOs signed an agreement on commencement of the project of construction of a new Polish-Lithuanian submarine HVDC cable "HARMONY Link." The engineering infrastructure development plan for the special state importance energy system synchronisation project "Construction of Harmony Link Connection and 330 kV Darbėnai Switchyard", specifying the route for the HARMONY Link connection, was approved by the Government of the Republic of Lithuania by the Resolution No. 720 of 1 September 2021[15].

The export cable alternatives cross the pipeline complex at the Būtingė terminal SPM and the existing and planned submarine cable routes.



[14] The Shipping Rules have been approved by Order of the Minister of Transport and Communications of the Republic of Lithuania No. 3-248 of 18 September 2000 "On Approval of the Būtingė Oil Terminal Shipping Rules."

[15] Resolution of the Government of the Republic of Lithuania No. 720 of 1 September 2021 "On Approval of the Engineering Infrastructure Development Plan for the Special State Importance Energy System Synchronisation Project "Construction of Harmony Link Connection and 330 kV Darbėnai Switchyard."

Fig. 3.2.5. Existing and proposed engineering facilities in the marine area.

3.2.6 Restricted-use areas and danger zones at sea

Part of the PEA site is within the danger zone at sea, i.e., former minefields (Fig. 3.2.6).

In Lithuania's territorial sea and the EEZ, there are several restricted-use areas (military exercise grounds), an area with wrecks of World War II munitions, and former mine fields of quite a large area. It is possible to carry out economic activities in these areas; however, a prerequisite is to conduct seabed surveys in search of hazardous objects such as unexploded ordnances (hereinafter – UXO) and, if necessary, to remove hazardous objects before the implementation of technical design solutions.

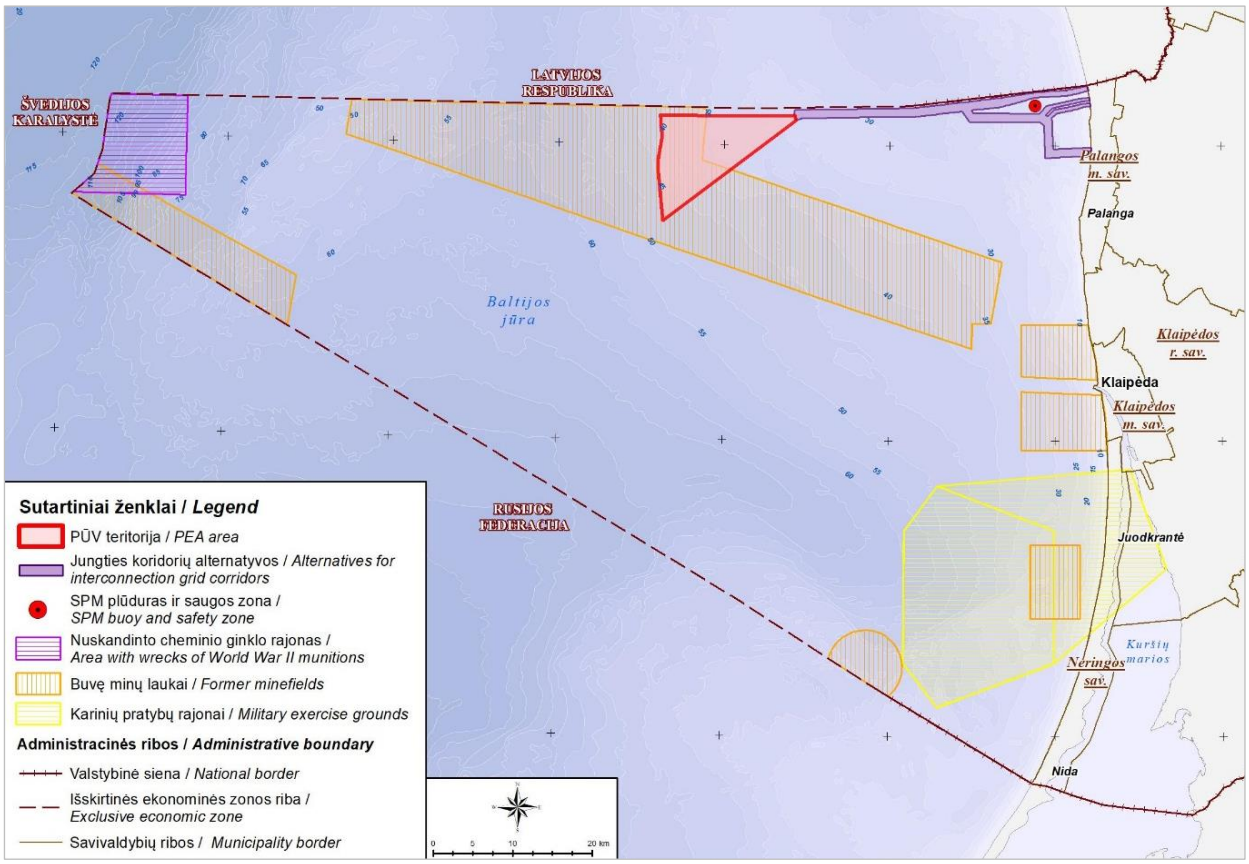


Fig. 3.2.6. Restricted-use areas and danger zones (According to Baltic sea – Central Baltic sea – South eastern Baltic Lithuanian coast and EEZ nautical chart. Lithuanian transport safety administration (2022).

3.2.7 Areas of national security importance

A map (Fig. 3.2.7) of the territories of the Republic of Lithuania, where design and construction of wind power plants (high-rise infrastructure) may be a subject to restrictions, has been developed and approved[16] in accordance with the methodology for mapping the territories of the Republic of Lithuania, where restrictions on the design and construction of wind power plants may be applied in relation to national security[17].

[16] Approved by Order of the Commander of the Lithuanian Armed Forces No. V-217 of 15 February 2016 "On Approval of the Map of the Republic of Lithuania territories where Wind Power Plant (High-Rise Buildings) Design and Construction Works May Be Subject to Restrictions."

[17] Approved by Order of the Minister of National Defence of the Republic of Lithuania No. V-921 of 22 August 2012 "On Approval of Methodology for Mapping of Territories of the Republic of Lithuania Where Design and Construction of Wind Power Plants May Be Subject to Restrictions in Relation to National Security."

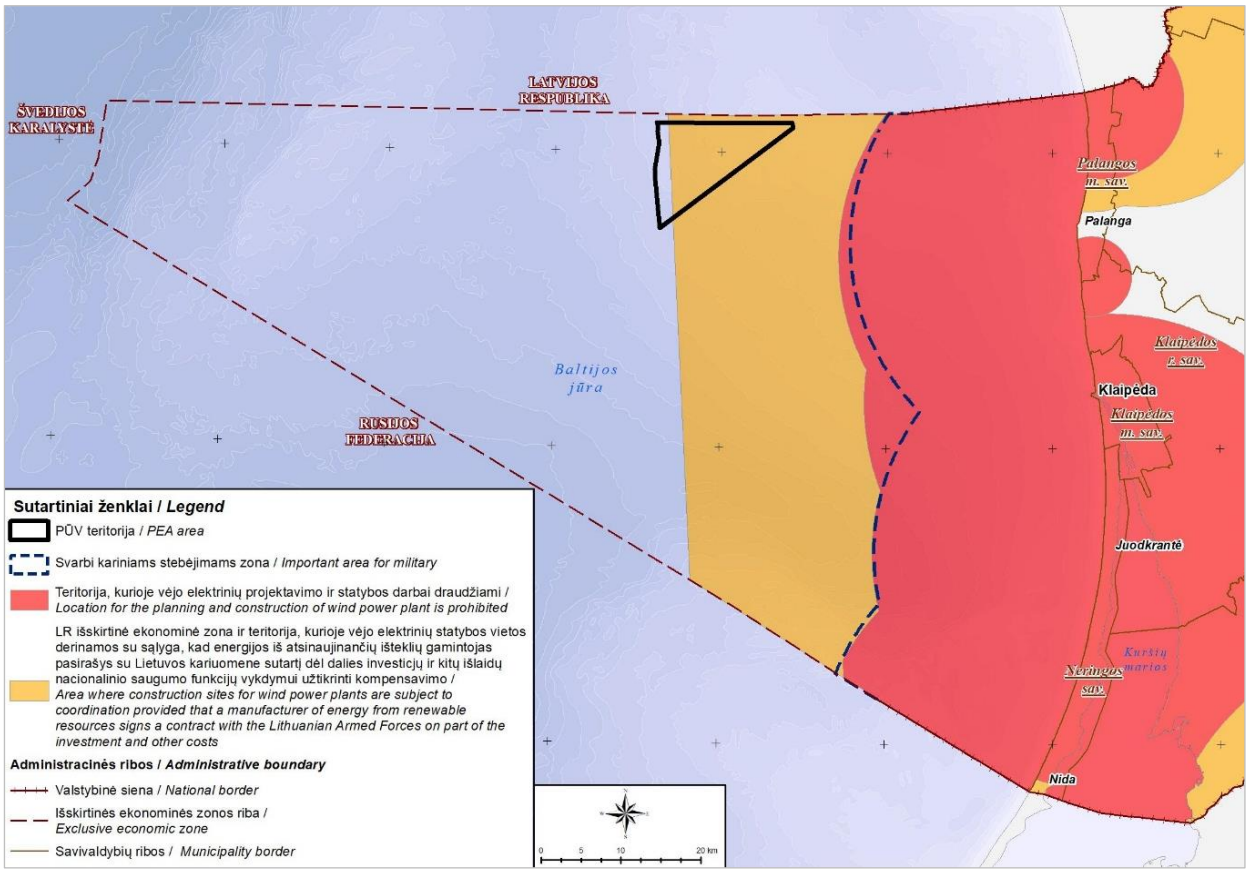


Fig. 3.2.7. Location of the PEA site in relation to the areas subject to national security requirements (basis: the Map of the territories of the Republic of Lithuania, where wind farm (high-rise infrastructure) design and construction works may be a subject to restrictions, approved by Order of the Commander of the Lithuanian Armed Forces No. V-217 of 15 February 2016).

The latest edition (2024-01-01) of the Law of the Republic of Lithuania on Energy from Renewable Sources [18] (article 49, part 19) states that wind farm construction sites in areas where, taking into account national security issues, the special land use conditions are applied, project development is to be coordinated with the commander of the Lithuanian Armed Forces and other institutions in accordance with the procedure established by laws and other legal acts. If it is determined that the interference caused by the planned construction of wind power plants can be avoided by using additional measures, the construction sites are to be coordinated with the condition that the person planning to install the wind farm shall submit an approved construction project to the authority specified in the conclusion of the coordination. This must be submitted before the issuance of the document authorizing the construction, and a contract must be signed for compensation for part of the investments and other expenses necessary to ensure the performance of national security functions; a guarantee of the fulfilment of this obligation must also be provided.

The OWF sites may be coordinated without applying the requirement to sign a contract for compensation for part of the investment and other costs necessary to ensure the performance of national security functions. So long as the Developer provides additional arrangements in accordance with the procedure established by the Government with the Lithuanian Army and (or) the installation of technical measures (radar, electro-optical devices, communication and data transmission (information systems) equipment), the agreement for compensation is not necessary.

In November 2022, an order was issued by the commander of the Lithuanian Armed Forces regarding the approval of maps delineating areas where construction restrictions are imposed, in accordance with national security and military radar protection zones (as of February 19, 2024, this order has not yet been approved). These maps are anticipated to define areas subject to construction limitations based on national security needs and the protection zones of military radar systems. The OWF site does not fall within the military radars' protection zone provided on the maps (Fig. 3.2.8), but it falls within the designated areas where construction restrictions are applied, taking into account the requirements of national security (Fig. 3.2.9).

[18] https://www.e-tar.lt/portal/lt/legalAct/7a58f650a62711eea5a28c81c82193a8

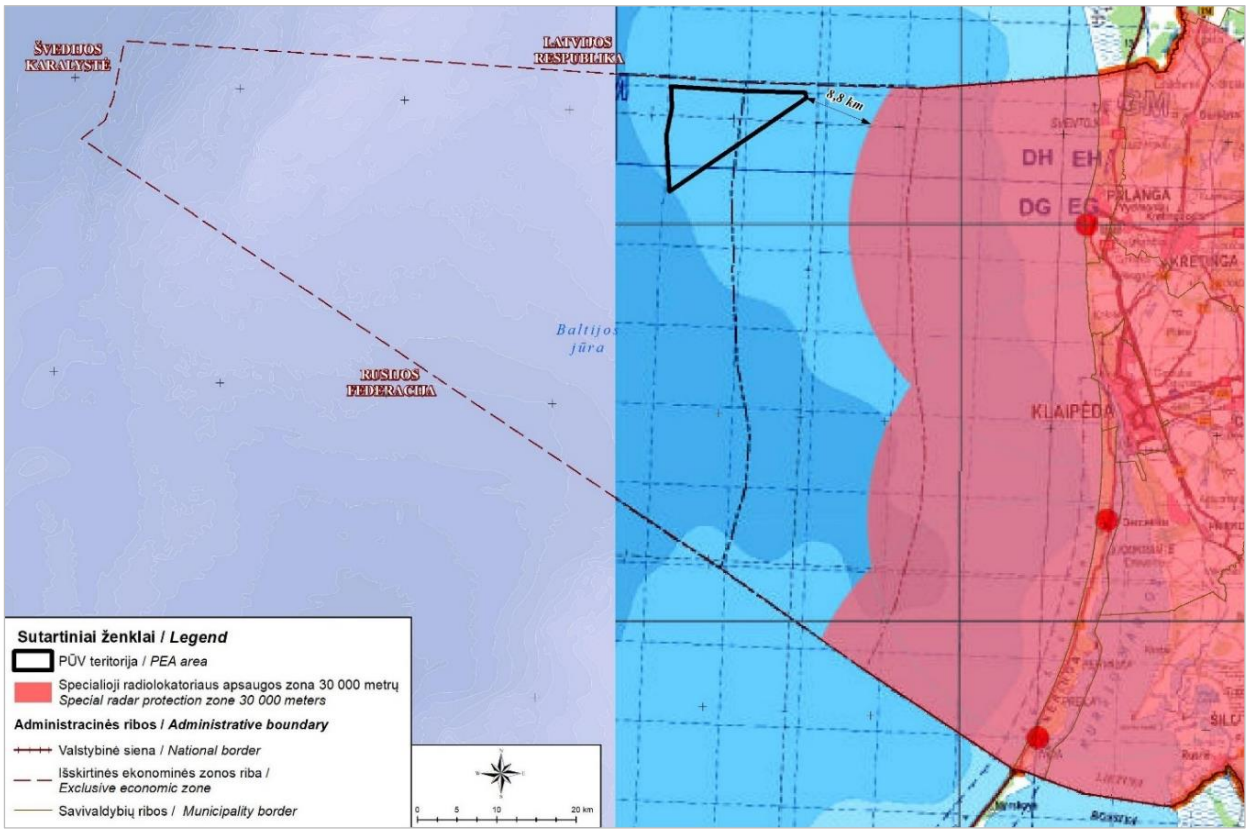


Fig. 3.2.8. Location of the OWF in relation to the proposed radar protection zones (basis: Map of radar protection zones (not approved)).

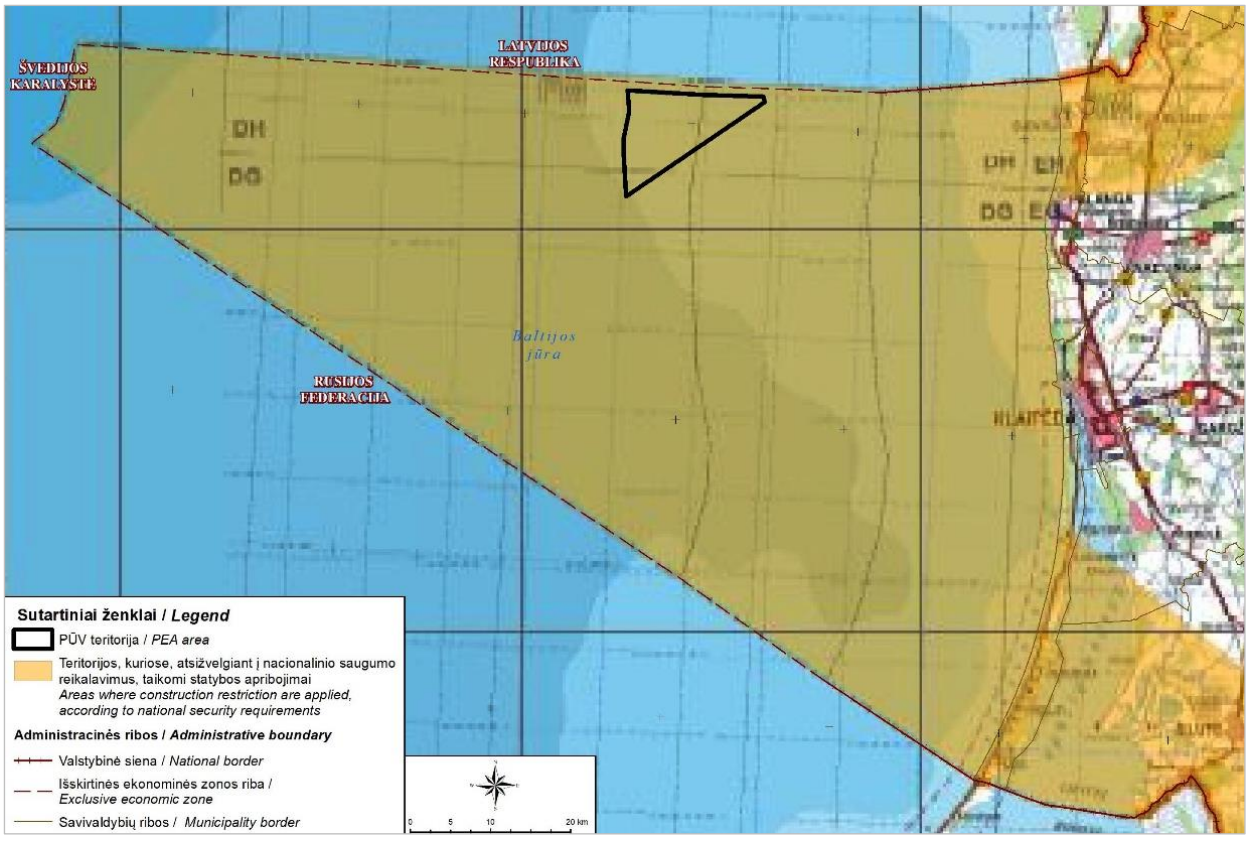


Fig. 3.2.9. Location of the OWF in relation to the proposed areas where construction restrictions are applied taking into account national security requirements (basis: map of areas where construction restrictions are applied taking into account national security requirements (not approved)).

3.2.8. Current use of the onshore site

Onshore, the installation of the TS required for the OWF and the construction of an export cable to the Darbėnai 330 kV switchyard are planned. The selection of the export cable route is the subject of an Engineering Infrastructure Development Plan, the concept of which includes a number of alternative cable corridors. Concept drawings for the marine and terrestrial areas are provided in Annex 1 of the EIA Programme. The following is a brief discussion of the existing use of the land crossed by the route corridor alternatives.

Engineering infrastructure

The urban transport system in Palanga City Municipality (Fig. 3.2.10) is primarily composed of national and local road networks. There are no existing railways within the municipality's territory, but a new railway is planned in Būtingė, aiming to connect to a future deep-water port. Palanga intersects with three national-level auto tourism routes, and the city features bicycle paths. Palanga International Airport is located in the central part of the territory of the Palanga municipality near the settlements of Kunigiškiai and Užkanavė. At the northern part, near the mouth of the Šventoji river on the Baltic Sea, the Šventoji state seaport is situated. Throughout the city of Palanga, comprehensive systems are established for public water supply and centralised domestic wastewater management, electricity supply, and a natural gas distribution pipeline network. In the northern area, near the border with the Republic of Latvia, there are oil terminal pipelines connecting the marine pipeline with the Būtingė Oil Terminal. In addition, in the northeastern part of this territory, a segment of the main oil pipeline leads to the Mažeikai oil products processing plant.

The transportation infrastructure within the Kretinga District Municipality comprises national, main, regional and district roads. The entire territory of Kretinga District Municipality has a well-developed electricity supply system, which ensures reliable and high-quality electricity supply to consumers (Fig. 3.2.11). Kretinga District Municipality is crossed by two broad-gauge railway sections, and the Kartena airfield is equipped for air traffic. Kretinga district has a centralised water supply and domestic wastewater management systems, an electricity supply system, developed communication infrastructure, and main gas pipeline networks.

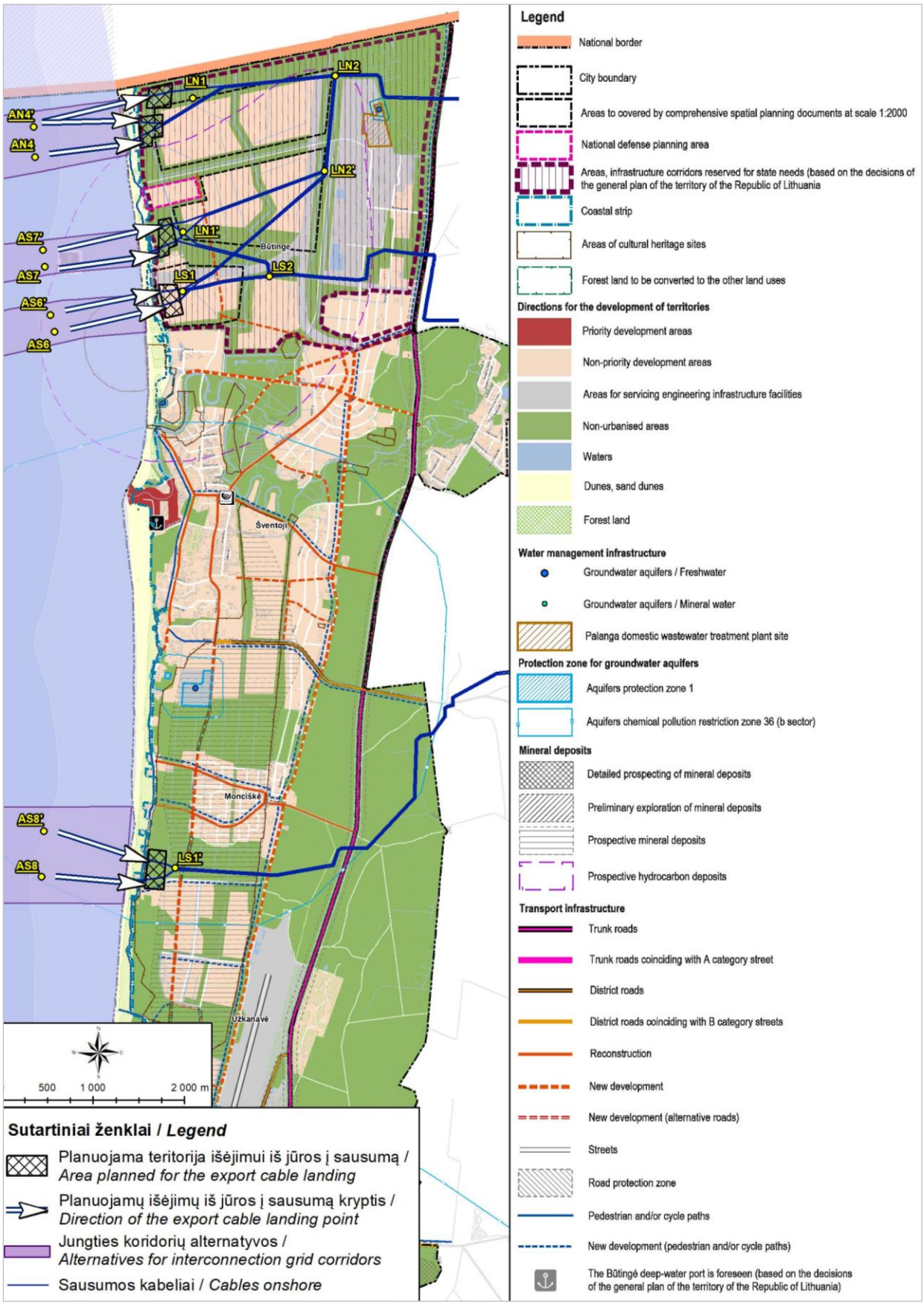


Fig. 3.2.10. Layout of connection alternatives in relation to the solutions of the drawing amending the Palanga General Plan to define the priority territories of municipal infrastructure development (source: Strategic EIA Report of the Engineering Infrastructure. Development Plan; Map base prepared using Drawing of the solutions for the adjustment of the Palanga City Master Plan, defining priority development areas for municipal infrastructure).

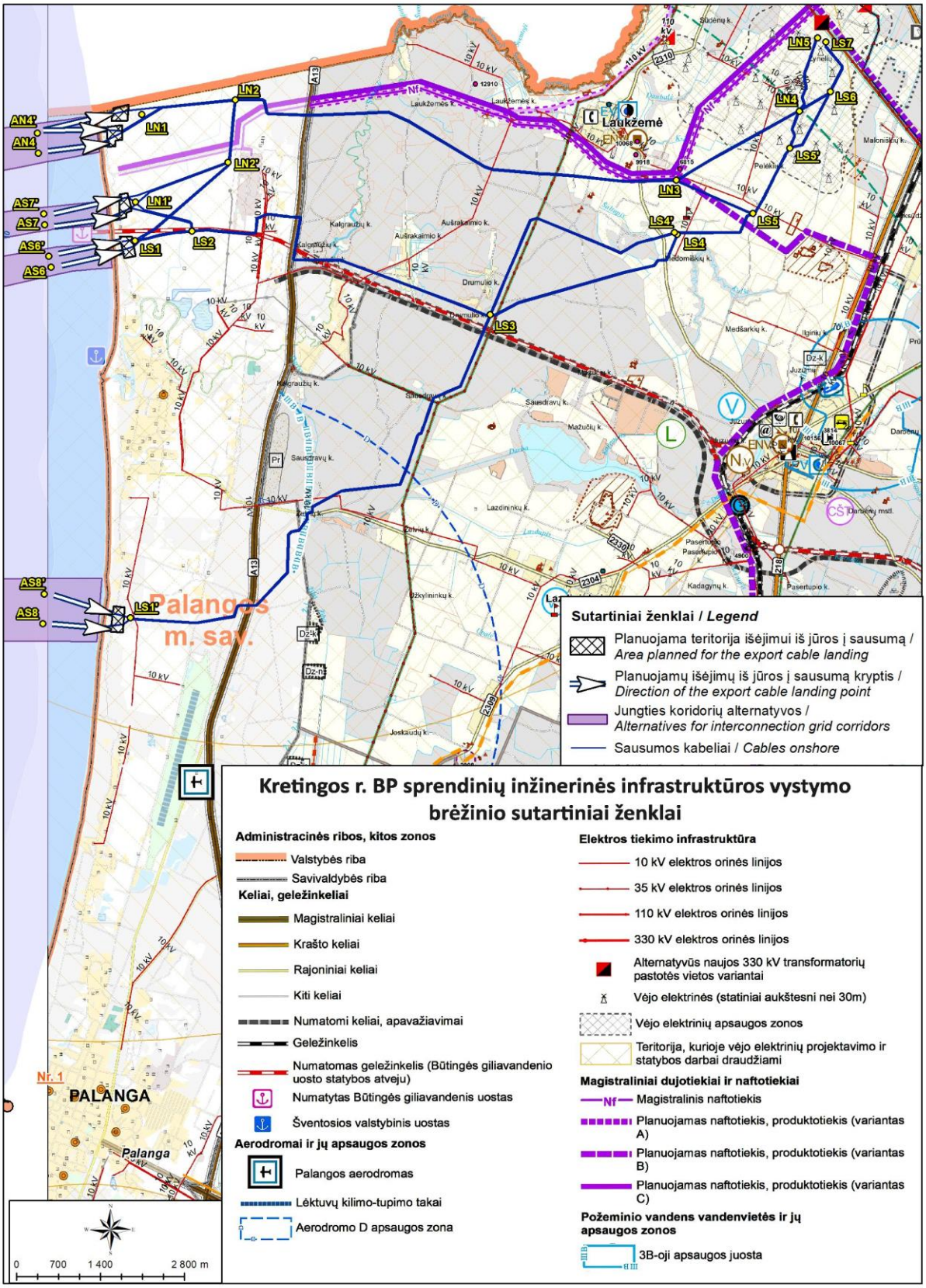


Fig. 3.2.11. Excerpt from the general plan of Kretinga district and city of Kretinga – Engineering infrastructure development drawing (Source www.tpdr.lt).

Protected areas

European ecological network Natura 2000 and national protected areas (hereinafter – PA) are designated within the site under investigations. In the Palanga City Municipality there are PAs for the importance of both habitats and birds – Baltic Sea coast, Baltic Šventoji River, as well as Būtingė geomorphological reserve, and Būtingė bird marsh ornithological reserve (see Fig. 5.4.1).

In the area of the Kretinga District Municipality, the PEA site includes areas important for the protection of habitats – Baltic Šventoji River and Sudėnai meadows, and Sudėnai botanical-zoological reserve.

Forests

Forests and forest land make up about 41% of the territory of the Palanga City Municipality and about 90% of all PAs. All forests are of state importance and belong to special purpose forests (group II).

The area of forest land occupies 35% of the Kretinga District Municipality's territory; commercial forests (group IV) prevail, some of which are state-owned, some of which are privately owned.

The export cable route alternatives onshore cross special purpose (Group II), protective (Group III) and commercial (farm) (Group IV) forests.

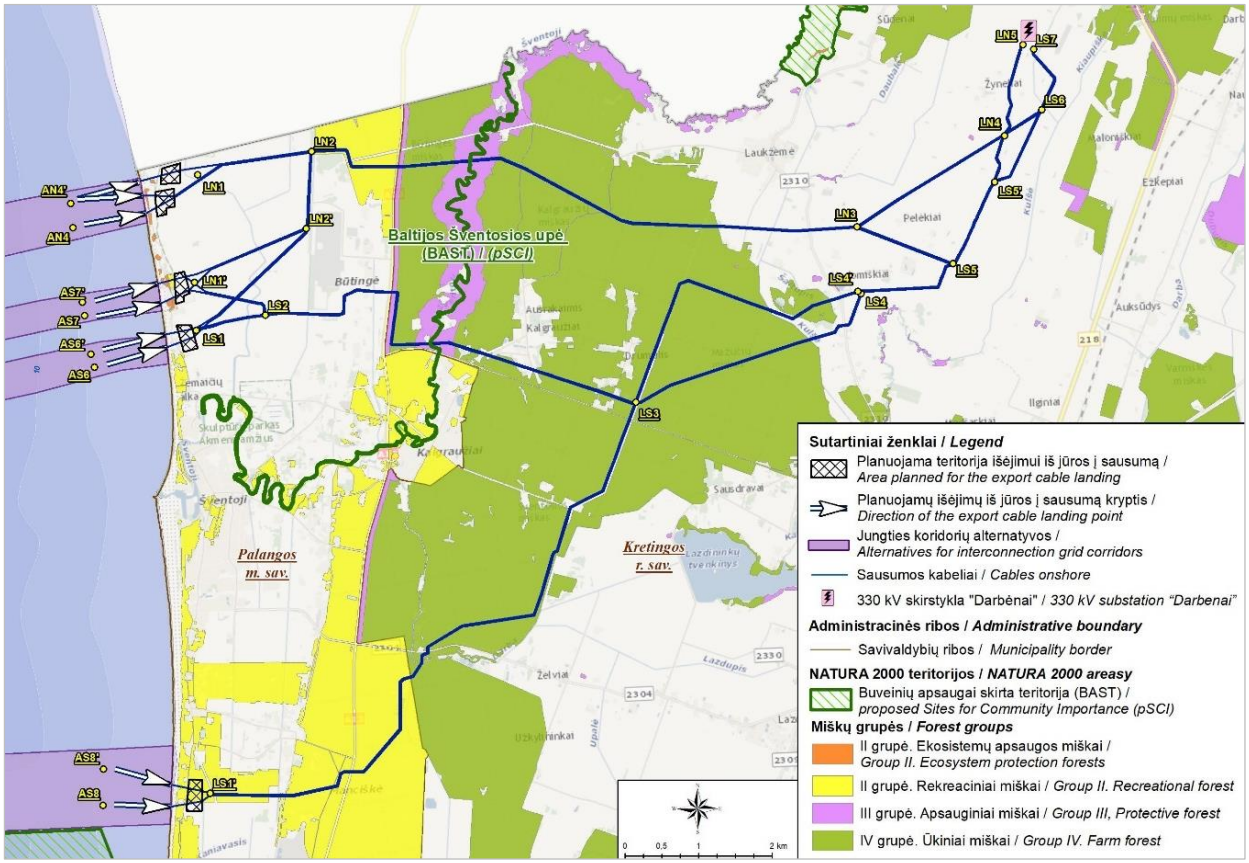


Fig. 3.2.12. Forests in the areas of Palanga city and Kretinga region district.

Mineral deposits

The ground conditions of the Palanga City and Kretinga District municipalities are dominated by sand, gravel, peat and oil deposits.

Export cable alternatives onshore fall within the limits of the predicted mineral resource areas of oil (Šventoji) and peat Vanagupė (Pajūris).

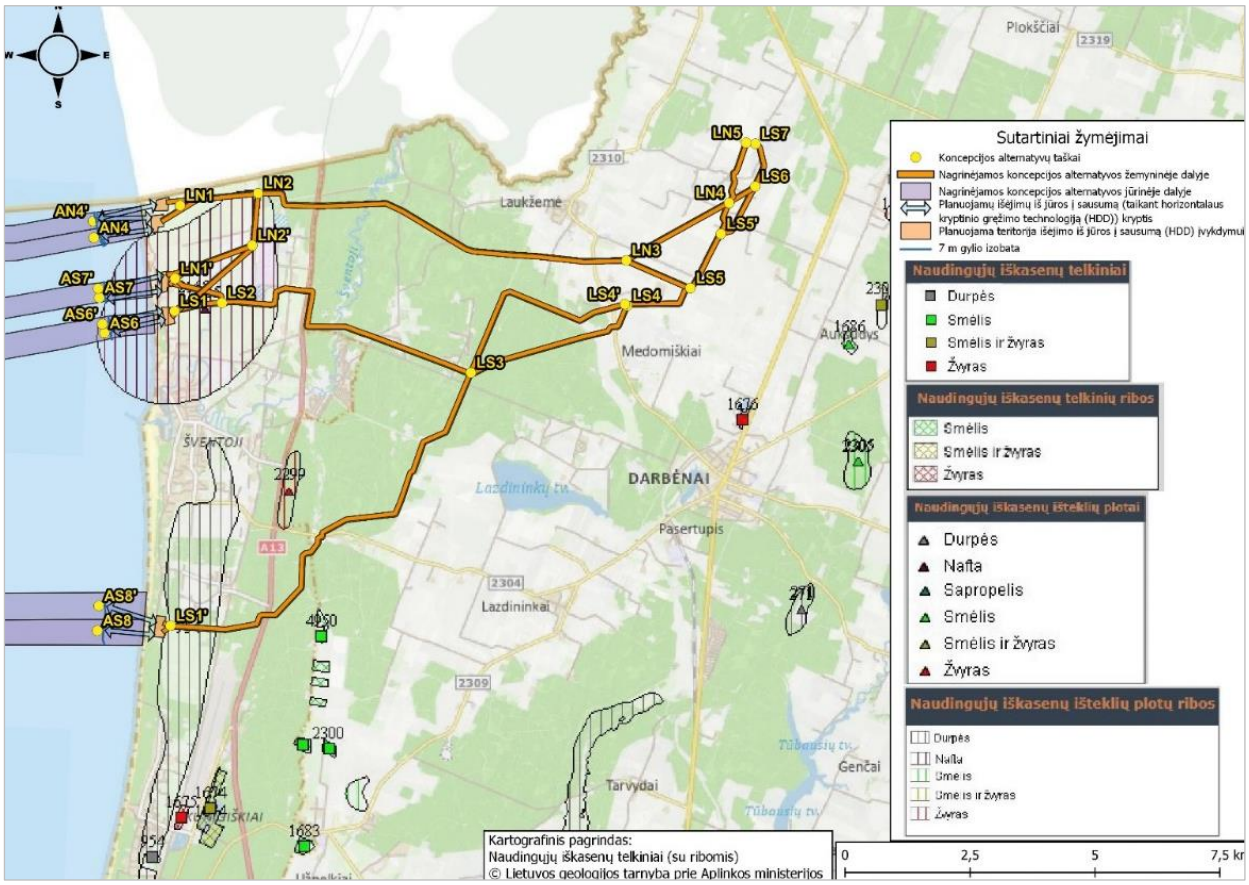


Fig. 3.2.13. Mineral resources (Source: www.lgt.lt)

Cultural heritage

Among the objects of cultural heritage, the former estates and mounds holds particular importance in shaping the cultural landscape. The Kretinga manor homestead complex is a site of exceptional significance.

The Kretinga area is rich in archaeological heritage, featuring numerous wells and boulders. Additionally, there are several locations of historical significance, including old cemeteries and small architectural elements such as chapels.

Within the boundaries of the municipality of Palanga city, the southernmost planned alternative of the export cable route crosses the boundaries of the registered cultural heritage site of the Šventoji Ancient Settlement (code 1813).

Recreation, tourism

Palanga is one of the most important resorts in Lithuania, which is classified as a national recreation service centre.

In the Kretinga District Municipality, due to its geography, two main recreational functions are considered of importance. Firstly, the exploration of the onshore part of the district municipality and the use of its recreational resources, and secondly, the utilisation of the coastal area for the creation of a resort-like environment.

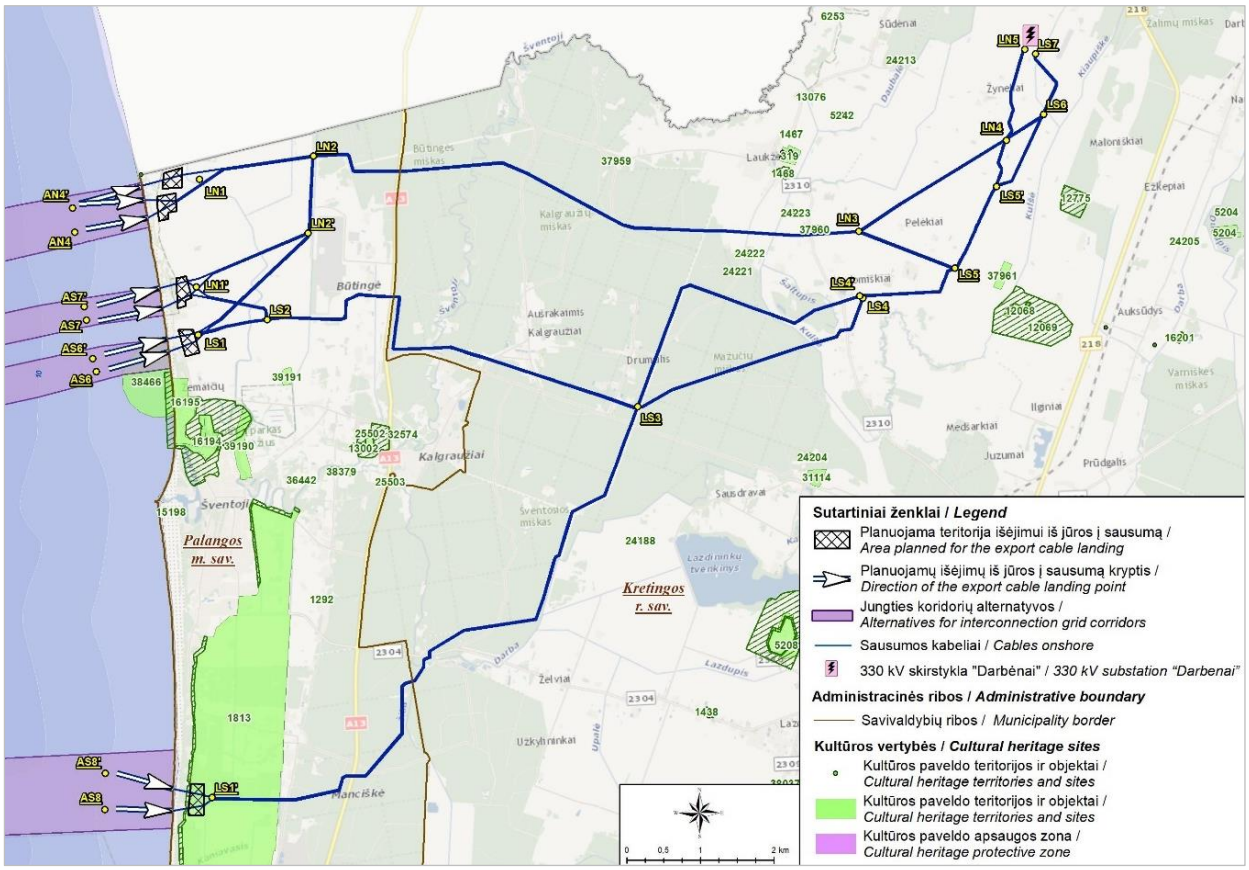


Fig. 3.2.14. Registered cultural heritage (Source: https://kvr.kpd.lt).

3.3 References to valid territorial planning documents, strategic plans and programmes

Pursuant to point 6 of Appendix 1 of the Procedure, during the preparation of the EIA, an analysis of the situation of the land plot or territory of the planned economic activity is carried out according to the approved territorial planning documents and indicates the main development direction of the territory, the functional zones and types of use of the territory; whether the planned economic activity corresponds to the content of the types of use of the territory according to the approved territorial planning document, whether the purpose and method of land use will need to be changed, and an extract of the drawing of the current state from the approved territorial planning document with the location of the planned economic activity and the boundaries of the land plot or territory is attached. Information about the territorial planning documents valid in the analyzed territory, as well as a graphic analysis of the EIA solutions by showing them on the drawings of the valid territorial planning document solutions is provided below in the text of the section

3.3.1 Comprehensive Plan of the Territory of the Republic of Lithuania[19]

The Comprehensive Plan of the Territory of the Republic of Lithuania (hereinafter – CPTRL) is complemented by the marine spatial solutions adopted on 11 June 2015 by the Resolution of the Parliament of the Republic of Lithuania No. XII-1781. It provides that „given the growth rates of the rapidly developing offshore wind energy sector in Europe as a whole and at the same time in the Baltic Sea, sites for the installation of offshore wind farms, as well as corridors for linking such farms to onshore grids, must be envisaged. It is appropriate to initiate the development of an integral wind farm network in the Baltic Region and, thus, to enable the connection of the proposed power plants in the marine territories of Lithuania and other Baltic states to the EU funded wind farm network of Denmark, Poland, Sweden, and Germany.” The graphical part of CPTRL, complemented with the marine solutions, highlights the potential areas most suitable for the development of offshore renewable energy projects, including wind energy.

[19] Approved by the Resolution of the Government of the Republic of Lithuania no. 789 of 29 September 2021 "On Approval of the Comprehensive Plan of the Territory of the Republic of Lithuania.“

These plans were also made a part of the solutions of the valid CPTRL (Clause 310), which provide for the following importance of the development of offshore energetics: “To develop the installation of offshore wind farm and the electricity transmission network to connect the OWF to the onshore grid.”

Section 3 of the CPTRL solutions “Responsible Use of the Sea and the Coastline” provides that for Lithuania to develop the competitive blue economy, the development of marine and sea-related activities is of special importance.

Clause 551 of the CPTRL provides that the development of new offshore activities creates new experience and, thus, provides an advantage in the Baltic Sea Region and an opportunity for its realization on an international scale. The installation and operation of the OWF, the development of aquaculture, the use of the mineral resources, and the application of innovative inventions in the marine activities, create new economic avenues. It is therefore necessary to support cohesive development of activities and consistent and stable growth of marine activities, by defining the strategic directions of blue economy, creating legal and administrative preconditions for the formation and installation of on-site facilities (ports, small ports, wharves), resource operating equipment, facilities and territories on the Lithuanian coast and in marine territories.

Clause 583 of the CPTRL provides that there are three priority sites proposed for the construction and installation of renewable energy facilities, i.e. in the territorial sea beside Palanga between the Baltic Sea Thalassological Reserve and the shipping route where the installation of OWF is subject to strict restrictions, in the 20–50 m depths zone north to Klaipėda (Klaipėda–Ventspils Plateau) and further westwards in the Bank of Klaipėda where there are no restrictions for the installation of OWF. The priority of the first marine area is the development of RES which do not violate the restrictions imposed on the site (waves, loads, sun, etc.). All facilities in the sites specified must correspond with national security and environmental requirements. To reduce the visual impact of the OWF on the marine landscape, construction of WTGs is possible outside the borders of the territorial sea (approx. 30 km from the shoreline).

The PEA site is within the RES priority zone highlighted in the solutions of the CPTRL (Fig. 3.3.1).

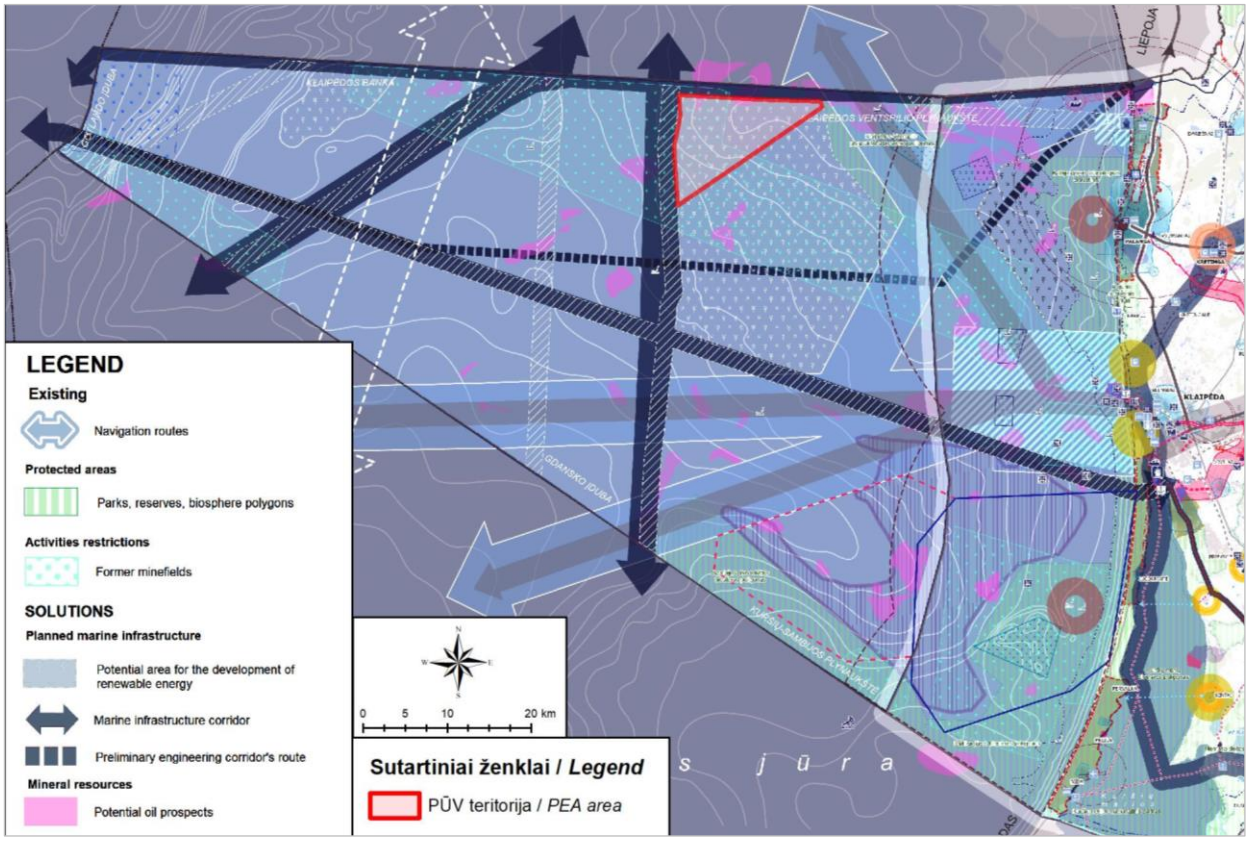


Fig. 3.3.1. Location of the PEA site in relation to the scheme in the CPTRL “Responsible Use of the Sea and the Coast”.

3.3.2 Engineering Infrastructure Development Plan for Marine Areas of Lithuania’s Territorial Sea and/or the Exclusive Economic Zone of the Republic of Lithuania in the Baltic Sea, Designed for the Development of Renewable Energy

Pursuant to the Order of the Minister of Energy of the Republic of Lithuania No. 1-253 of 17 August 2020 “On Commencing the Preparation of the Engineering Infrastructure Development Plan for Marine Territories of Lithuania’s

Territorial Sea and/or the Exclusive Economic Zone of the Republic of Lithuania in the Baltic Sea, Designed for the Development of Renewable Energy, and on the Setting of the Planning Objectives" and in view of the objectives to create conditions for energy production from wind power in the Baltic Sea and, thus, to increase a share of RES in Lithuania's domestic energy production and total final energy consumption, the Engineering Infrastructure Development Plan for Marine Areas of Lithuania's Territorial Sea and/or the Exclusive Economic Zone of the Republic of Lithuania in the Baltic Sea, Designed for the Development of Renewable Energy (hereinafter – the Development Plan) was prepared and approved by the Order of the Minister of Energy of the Republic of Lithuania no. 1-377 of 18 November 2022.

The site proposed in the concretised solutions of the Development Plan[20], which is defined in the CPTRL as a priority marine area for the development of renewable energy, is divided into separate areas where the development of the RES facilities will be carried out in stages. The PEA site is marked in the Development Plan as "Area A" (Fig. 3.3.2.).

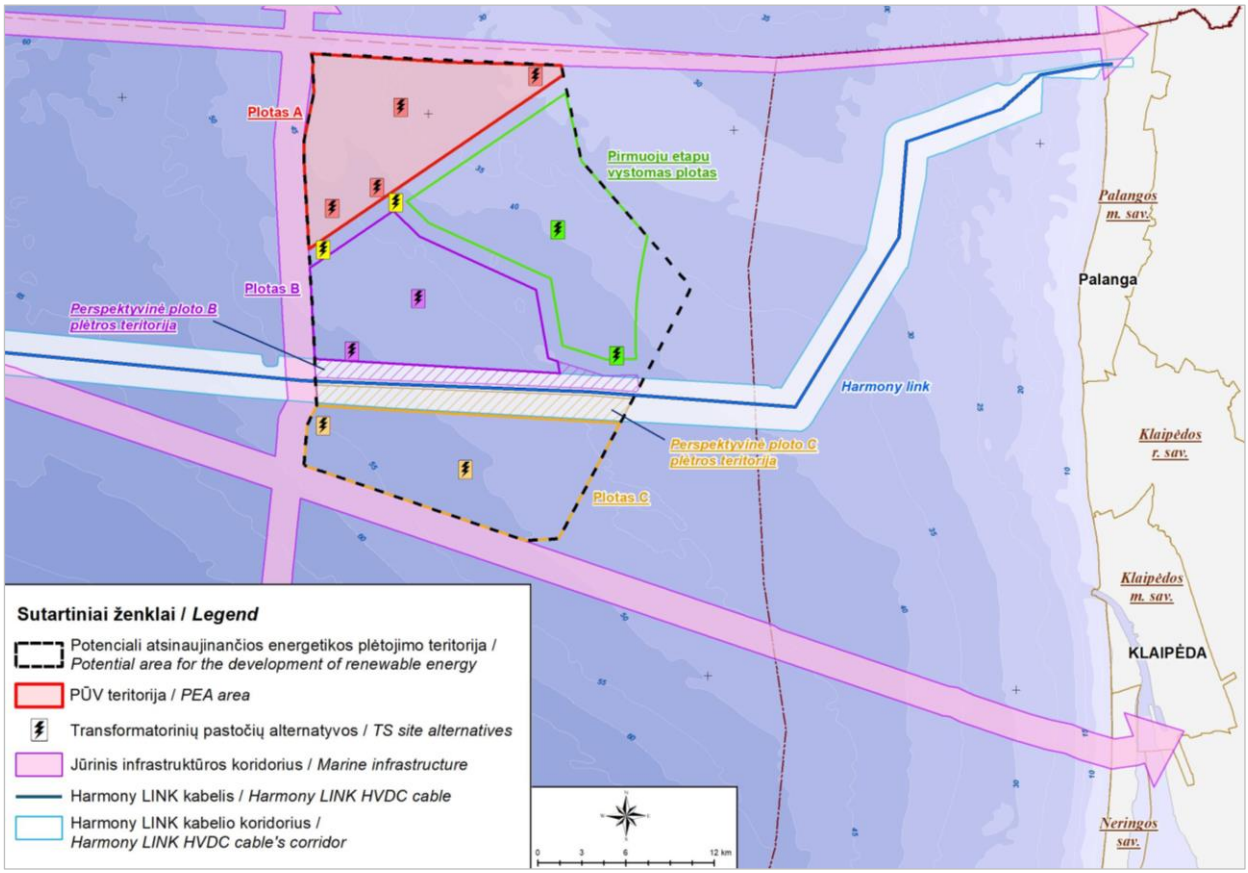


Fig. 3.3.2. Areas of the EEZ of the Republic of Lithuania in the Baltic Sea, designed for the development of renewable energy.

3.3.3 Strategic plans and programmes

National Strategy for Sustainable Development[21]

The National Strategy for Sustainable Development aims to enhance the efficient use of natural resources. One of the key principles guiding this Strategy's implementation is substitution, emphasizing the replacement of hazardous substances and non-renewable resources with non-hazardous substances and renewable resources. The wider use of RES (wind, etc.) in energy and transport sector will contribute to decreasing reliance on organic fossil fuel, subsequently reducing air pollution, and mitigating greenhouse gas (hereinafter – GHG) emissions.

[20] The concretized solutions of the Engineering Infrastructure Development Plan for Marine Areas of Lithuania's Territorial Sea and/or the Exclusive Economic Zone of the Republic of Lithuania in the Baltic sea, Designed for the Development of Renewable Energy. August 2022. Developed by: Ardynas, UAB. 2021-03-VP-KS.AR

[21] Approved by Resolution of the Government of the Republic of Lithuania no. No. 1160 of 11 September 2003 "On Approval and Implementation of the National Strategy for Sustainable Development."

National Environmental Protection Strategy[22]

One of the main focuses within the National Environmental Protection Strategy is the sustainable use of natural resources, identified as one of the four priority areas in Lithuania's environmental protection policy. As per the Lithuanian environmental vision outlined in this Strategy, by the year 2050, Lithuania aims to integrate energy resources across all sectors of the national economy, including energy, industry, transport, agriculture, and others.

National Energy Independence Strategy[23]

NEIS states that in 2016, power produced by RES accounted for approx. 25.5 % of the final energy consumption in Lithuania. It is envisaged that the implementation of the strategic goal of RES will aim to increase the share of RES compared to the country's total final energy consumption: by 2020 – 30%, by 2030 – 45%, by 2050 – 100%. RES will become the main source of energy in electricity, heating and cooling, and transport sectors.

National Strategy for Climate Change Management Policy[24]

The National Strategy for Climate Change Management Policy sets GHG emission reduction targets and measures. This Strategy presents the vision of Lithuania's climate change management policy until 2050: by 2050, Lithuania will have ensured adaptation of the sectors of the domestic economy to environmental changes caused by climate change and climate change mitigation (reduction of GHG emissions), developed a competitive low-carbon economy, implemented eco-innovative technology, achieved energy generation and consumption efficiency and use of RES in all sectors of the domestic economy, including energy, industry, transport, agriculture, etc.

3.3.4 General plans of municipal territories

The planned onshore connection cables would intersect the territories of two municipalities: Palanga City Municipality and Kretinga District Municipality, both of which have approved general plans of municipal territories.

Palanga General Plan[25]

In the territory of Palanga City Municipality, planned alternatives of the connection corridors intersect with residential areas of low land development rate and green areas of extensive use, as well as forests of state significance (Fig. 3.3.3).

The solutions of the plan amending the Palanga General Plan to define the priority territories of municipal infrastructure development mark these territories as the territories of non-priority development and non-urbanised territories (see Fig. 3.2.10).

[22] Approved by Resolution of the Seimas of the Republic of Lithuania No. XII-1626 of 16 April 2015 "On Approval of the National Environmental Protection Strategy."
[23] Approved by Resolution of the Seimas of the Republic of Lithuania No. XI-2133 of 26 June 2018 "On Amendment of the Resolution of the Seimas of the Republic of Lithuania No. XI-2133 of 26 June 2012 'On Approval of the National Energy Independence Strategy.'
[24] Approved by Resolution of the Seimas of the Republic of Lithuania No. XI-2375 of 6 November 2012 "On Approval of the National Strategy for Climate Change Management Policy."
[25] Approved Decision No. T2-317 of 30 December 2008 of Palanga Municipality Council.

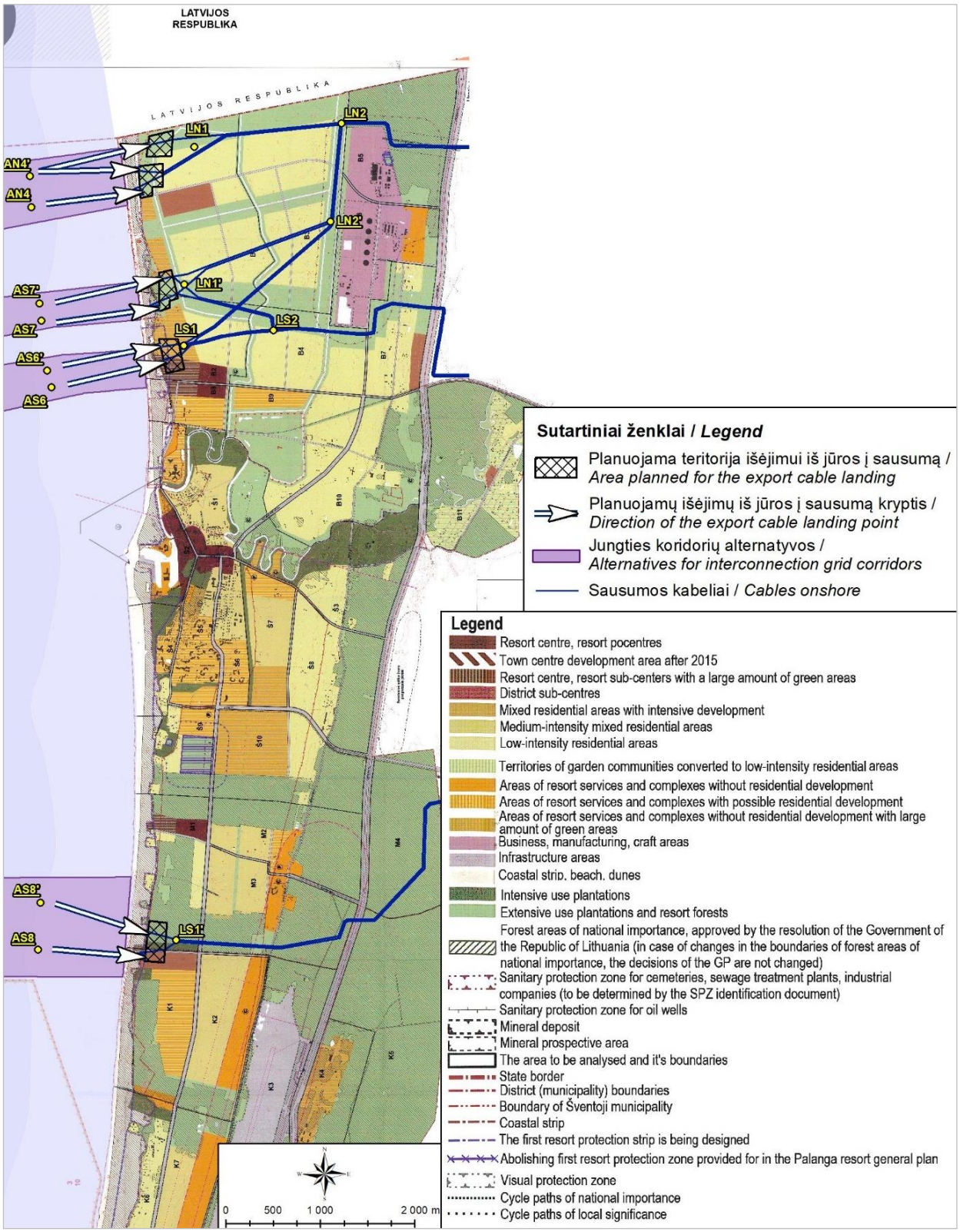


Fig. 3.3.3. Layout of connection alternatives in relation to the solutions of the main drawing of Palanga General Plan (source: Strategic EIA Report of the Engineering Infrastructure Development Plan, the basis of the map: the main drawing of the Palanga General Plan).

Kretinga District Municipality territories and Kretinga General Plan[26]

In its General Plan, the territory of Kretinga District Municipality is divided into non-urbanised territories, urbanised and to be urbanised territories. A major part of the territory of the district municipality is agricultural land – 57%, followed by forestry land – 36%, land for other purposes – 4.9%, water management land – 0.8%, and conservation land – 0.5%.

In all functional zones, the following types of land use are possible: engineering infrastructure corridors, engineering infrastructure sites, water sources, commonly used spaces, green areas, and squares (in residential areas). Existing cultural heritage objects must be assessed in all functional zones. Additionally, new plots of cultural heritage objects are possible in all functional zones. All functional zones can include forest land sites.

Alternatives for connection corridors, provided for in the forest land, are marked as Zk and Zu functional zones in the solutions of Kretinga General Plan (Fig. 3.3.4). In these zones, the site of communication and engineering infrastructure facilities, engineering network corridors, and power supply infrastructure facilities are possible.

[26] Approved by Decision No. T2-322 of 18 December 2008 of Kretinga District Municipality Council. Amended by Decision No. T2-178 of 13 May 2021 of Kretinga District Municipality Council „On the Approval of the Amendment of the General Plan of Kretinga District Municipality Territory and Part Thereof, Kretinga Town."

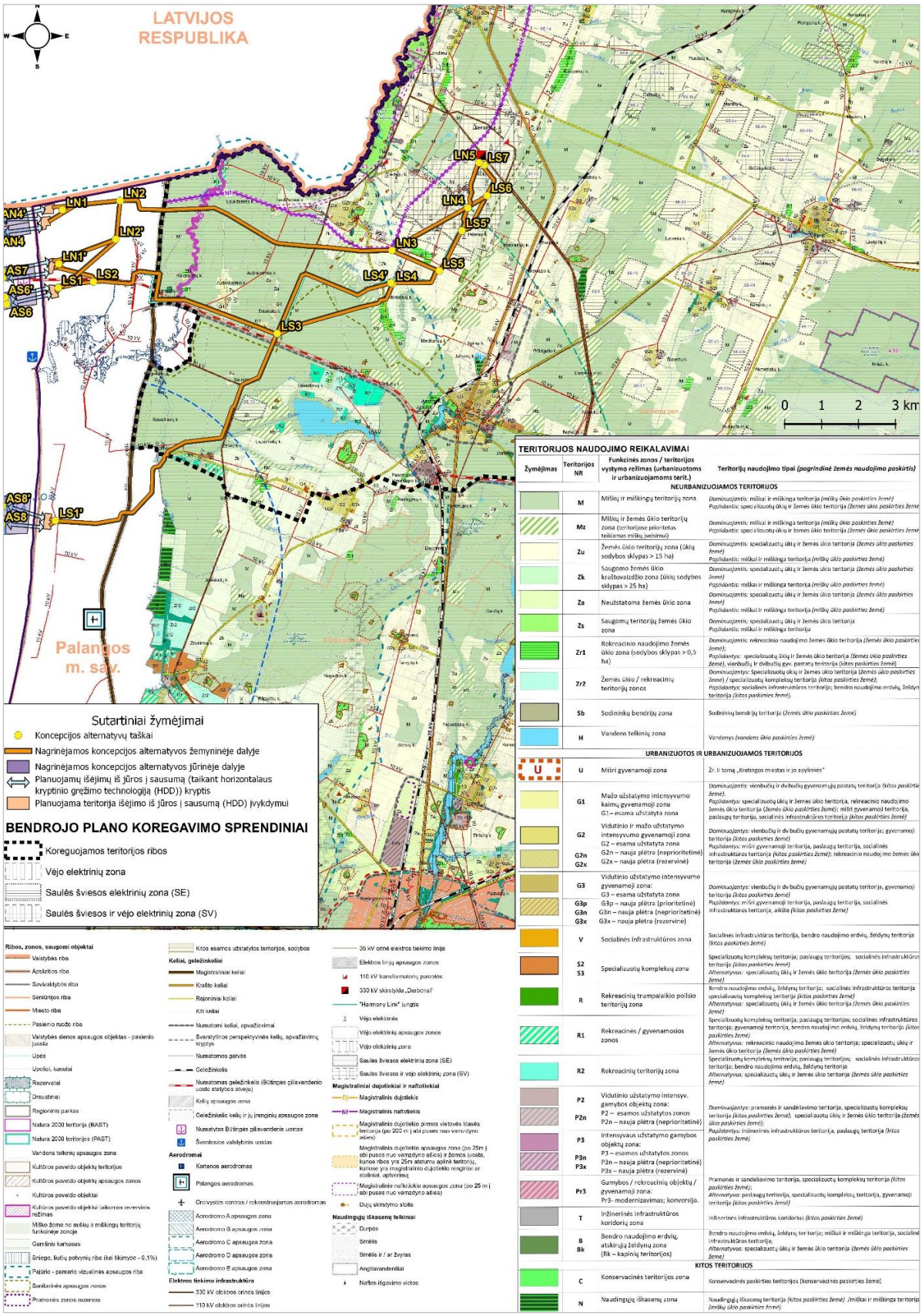


Fig. 3.3.4. Layout of connection alternatives in relation to the solutions of the main drawing amending the General Plan of Kretinga District Municipality Territory and Part Thereof, Kretinga Town (source: Strategic EIA Report of the Engineering Infrastructure Development Plan).

3.4 Development of the OWF in the territories adjacent to the area designated for the RES development

The PEA site is a part of the marine area designated for the development of RES facilities, which is divided into four different areas (Fig. 3.4.1). In 2022–2023, site No. 1 (Fig. 3.4.1) underwent an EIA; the EIA Report was prepared (the organiser of the PEA is the Ministry of Energy of the Republic of Lithuania, the Drafter of the report is Public Institution Coastal Research and Planning Institute), and on 23 October 2023, EPA adopted Decision No. (30-2)-A4E-10794 stating that "the installation and operation of the PEA of the Ministry of Energy of the Republic of Lithuania, offshore wind farm, in Lithuania's marine territory, according to the alternative III of the Project implementation, i.e. OWF development, where WTG installation sites are located 2 km further away from the border of the biosphere Reserve of the Klaipėda-Ventspils Plateau, using WTG models up to 350 m high, once the measures and conditions provided for in Section 6 and 11 of this decision are implemented, meets the requirements of environmental safety, public health, immovable cultural heritage safety, fire safety and civil safety legislation."

Part of site No. 2 (Fig. 3.4.1) also underwent the EIA for the installation of OWF. Moreover, on 4 March 2022, EPA adopted Decision No. (30.2)-A4E-3820 regarding the extension in validity of the EIA decision for the installation and operation of the OWF in the Lithuania's waters of the Baltic Sea for the OWF planned by UAB "AVEC" in the adjacent marine area (within the borders of the site for the OWF development as planned within the scope of the Development Plan).

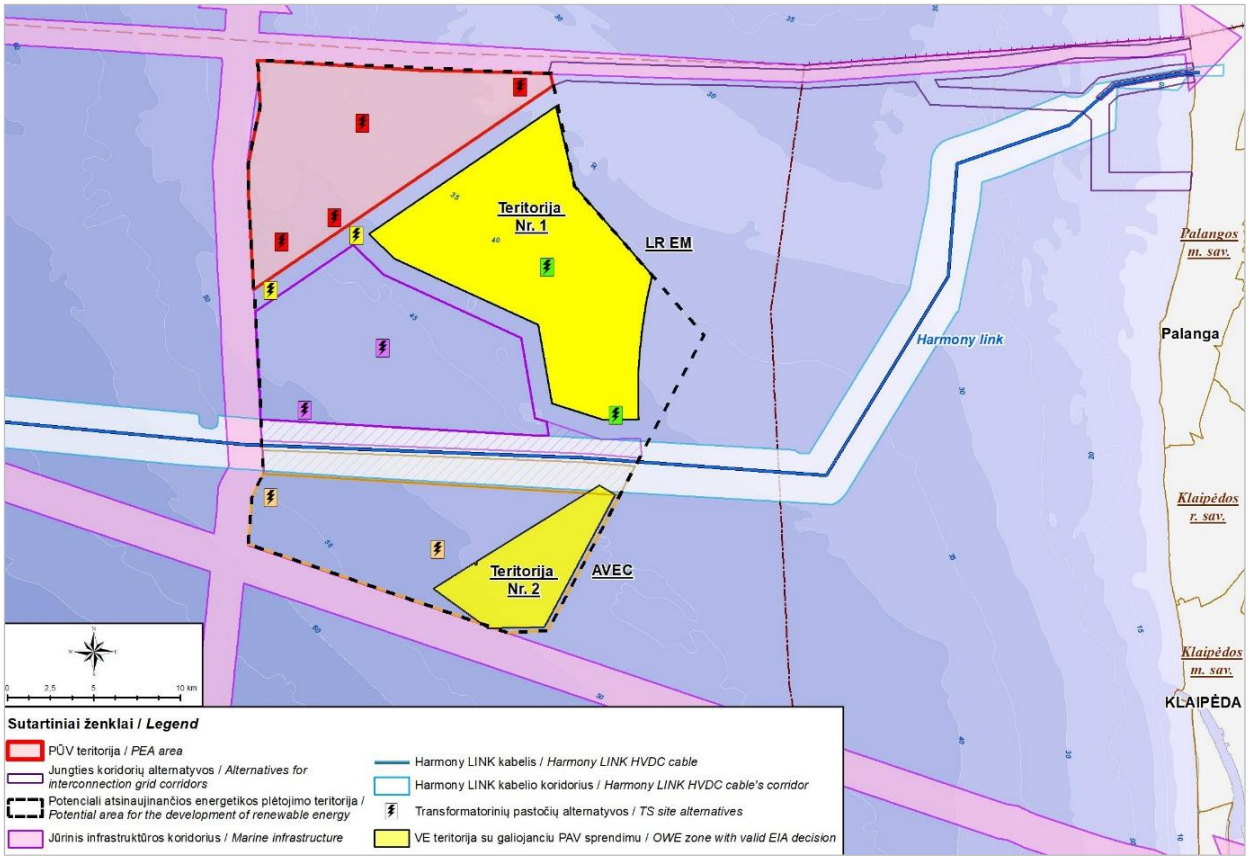


Fig. 3.4.1. OWF projects planned in the adjacent territories.

4. INFORMATION ON CONSIDERED ALTERNATIVES

Pursuant to Article 12.2 of the Procedure, the EIA Programme shall include information on feasible alternatives to be considered (e.g., location, time, technical and technological solutions, measures to reduce the environmental impact), including a 'zero' alternative, i.e., without carrying out any activities.

The 'zero' alternative, or, non-performance, shows the current situation and the state of environment in which the project is not implemented. In this case, changes in the environmental situation of Lithuania's marine territory in the Baltic Sea would have no connection with the development of the PEA. It should be noted that not developing the OWF in case of the 'zero' alternative would hinder the implementation of the objectives of the EU Energy and Climate Policy and the NEIS aimed at reducing GHG emissions.

OWF development alternative: the OWF of up to 700 MW generated capacity and operated in the site approved by the Resolution No. 171. The Developer could also install an OWF of capacity greater than 700 MW provided that the restrictions specified in the EIA for the WTG design parameters are maintained for the purpose of managing the environmental impact, such as size and number of WTG, and provided that the legislation valid at the time allows this.

The EIA Report will include the assessment of several alternatives for the OWF deployment based on the study results, the defined significant impact on the environment and/or necessity of measures to avoid and reduce the impact.

4.1. Technical solutions of the OWF

Taking into account the development of the most advanced technologies in offshore WTGs, technical solutions of the existing OWFs in the Baltic and North Seas, and evaluating economic efficiency related to the implementation of advanced technologies, for the installation of the planned OWF with a generated capacity of up to 700 MW, up to 20 MW offshore WTG models should be considered in the initial evaluation stage. The tip height of such offshore WTG may reach up to 350 meters. Depending on the power of the WTG model, the number of such WTGs in the proposed site may tentatively reach up to 55 pcs.

4.1.1 Principles of WTGs layout in the PEA site

The WTGs layout aims to ensure optimised energy yield and ensure cost-effective and sustainable electricity generation. The preliminary layout will be designed aiming for a minimum distance of 3 rotor diameters between WTGs.

4.1.2 Installation solutions for the OSP

The OSP is designed to collect the electricity generated by each WTG of the OWF, increase the voltage level, and to transmit the electricity to the TS onshore, which is connected to the electrical grid. An OSP is usually built in the centre of the OWF or in another location suitable for connecting medium and high-voltage cable lines. OSP do not occupy much space in the PEA site:[27] dimensions of the OSP foundation might be similar that of the WTG, if MP foundations are selected. The number (2 or 1) of required OSPs will be defined after performing an electrical system design study.

The location of the OSP is also determined by such factors as:

- Sea depth: construction of foundations is more cost-efficient in shallower waters;
- Lengths of medium-voltage cables and energy losses therein - it is cost-efficient to build in the center of generating sources;Proposed high-voltage connections with onshore and other OWFs;
- Additional wind turbulence caused by the OSP as a structure.

Preliminary alternatives for the locations of the OSPs of the planned OWF according to the solution alternatives provided for in the Engineering Infrastructure Development Plan are shown in Fig. 4.1.1.

[27] https://www.nordseeone.com/engineering-construction/offshore-substation.html

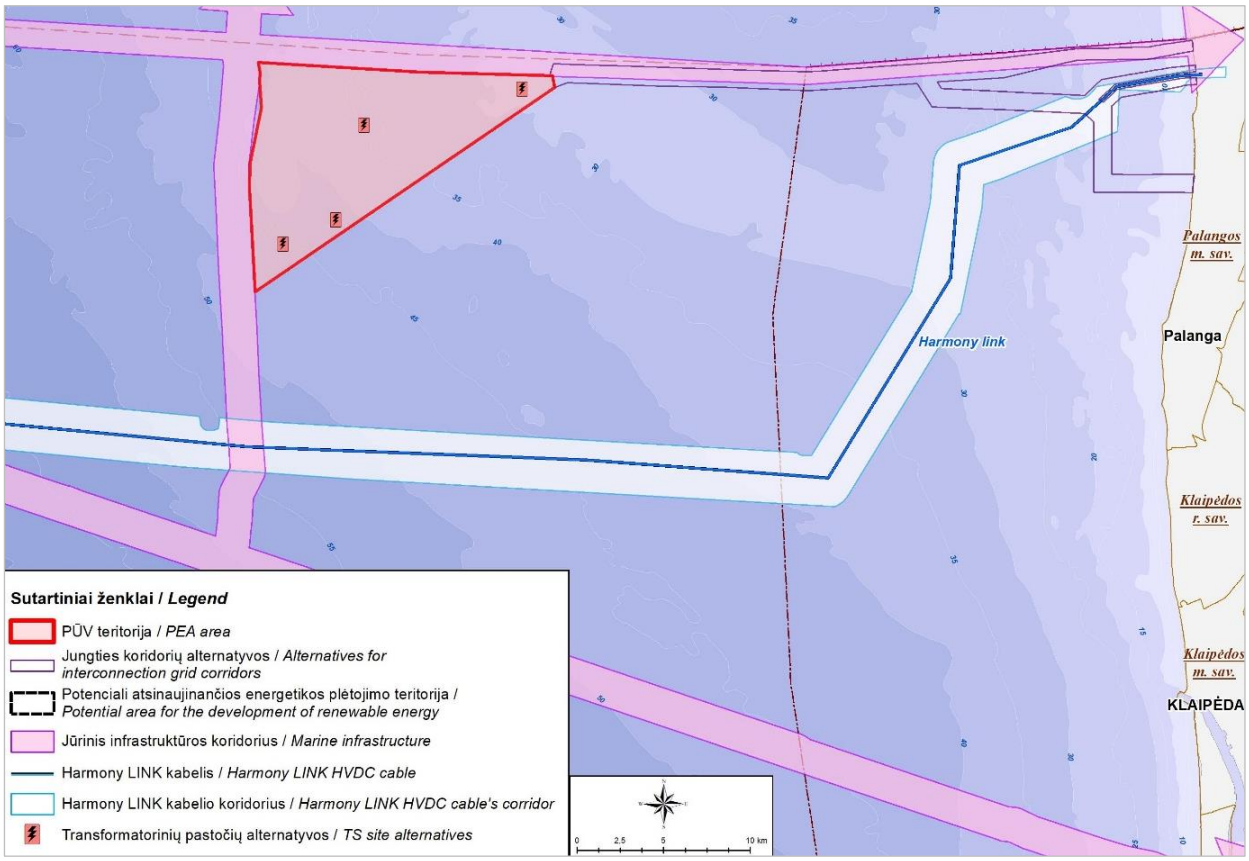


Fig. 4.1.1. Possible alternatives for the locations of the OSP.

The technical design will specify the number of OSPs and the electrical network connection scheme. During the technical design phase, taking into consideration the above criteria, the proposed location of the OSP may change.

4.2. Alternatives of the OWF grid connection covered by the Engineering Infrastructure Development Plan concept and associated SEIA Report

The locations of alternatives for the export cable corridor are provided in the Concept of the Engineering Infrastructure Development Plan of the Special National Importance (see Annex 1) and analysed in the SEIA Report. The proposed alternatives of the grid connection onshore intersect the territories of Palanga City Municipality and Kretinga District Municipality and reach until the connection site to the Darbėnai 330 kV Switchyard (Kretinga District Municipality, Darbėnai township, Žyneliai village 9) (Fig.4.2.1 and Fig. 4.2.2).

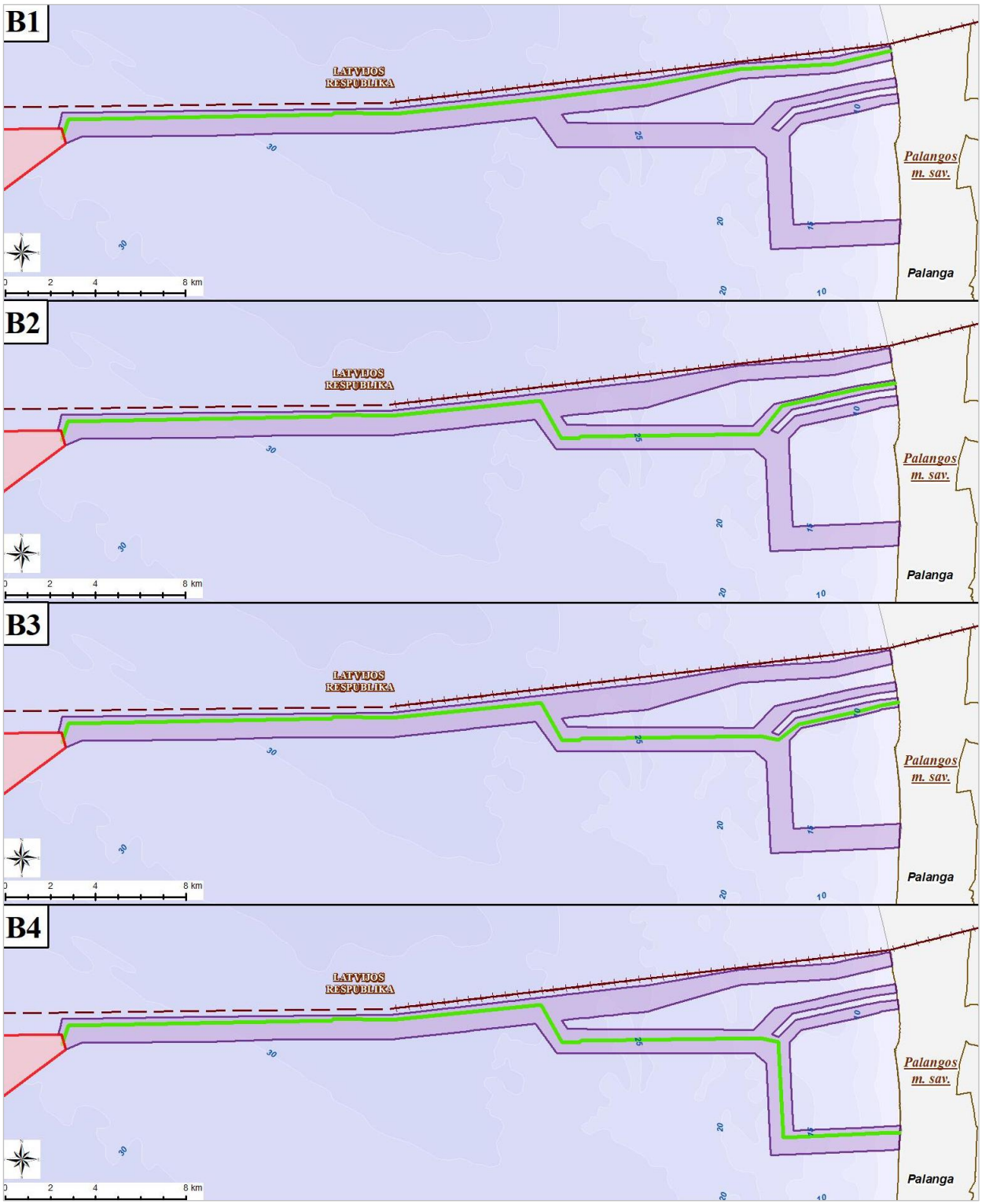


Fig. 4.2.1. Location of the proposed offshore connection (alternative corridors according to the Concept of the Engineering Infrastructure Development Plan and the SEIA Report).

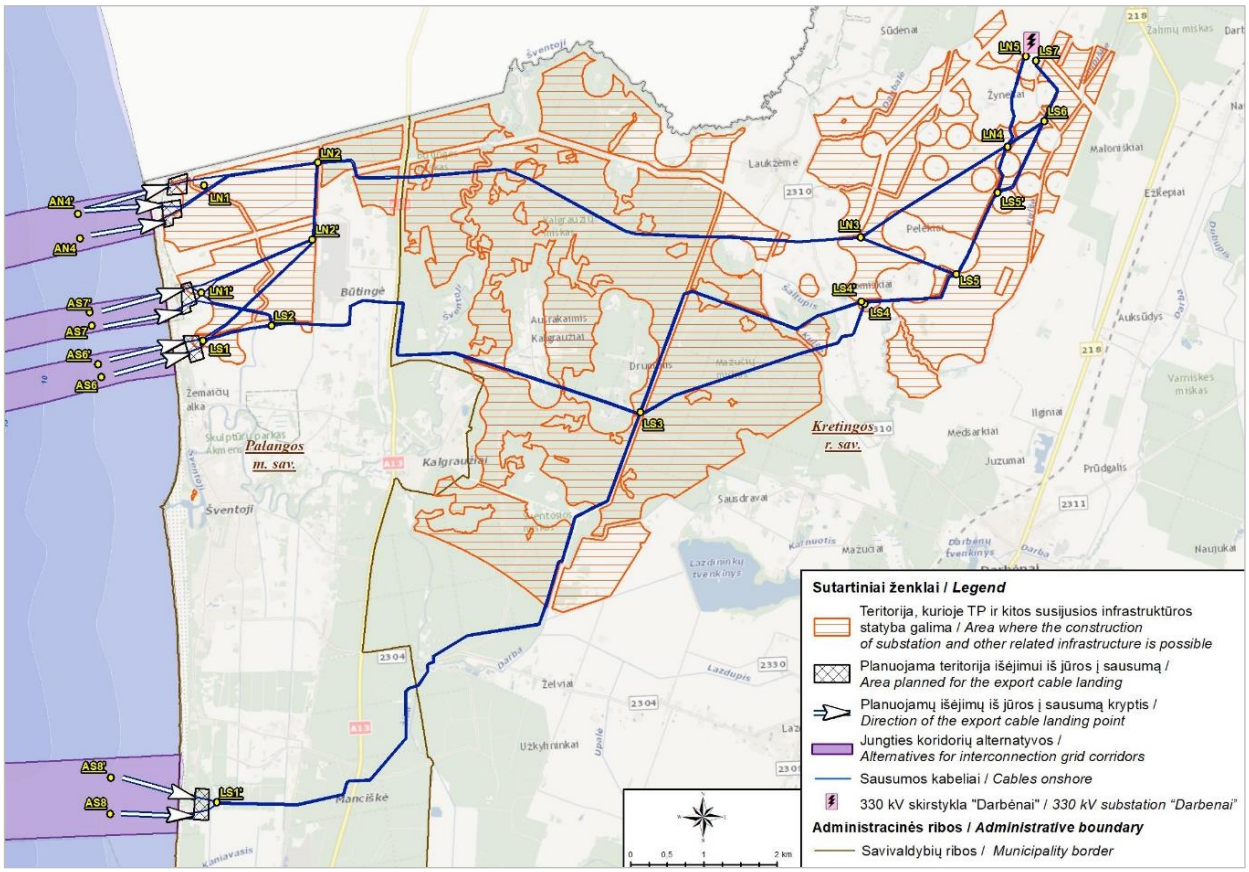


Fig. 4.2.2. Grid interconnection alternatives onshore (source: SEIA of Engineering Infrastructure Development Plan)

The voltage of the electricity transferred by submarine cables from the OWF to land will have to be increased up to 330 kV; only after this will it be possible to connect to the electricity transmission network in the Darbėnai 330 kV switchyard. For this purpose, it is planned to install a TS onshore in the area designated by the Engineering Infrastructure Development Plan, where TS construction is possible.

The environmental impact assessment of the export cable corridor offshore and onshore will be based on approved special solutions of the Engineering Infrastructure Development Plan and provided in the EIA Report.

5. EXPECTED SIGNIFICANT IMPACT OF THE PEA. MEASURES TO PREVENT, MITIGATE AND COMPENSATE FOR SIGNIFICANT ADVERSE IMPACTS ON THE ENVIRONMENT

The methodology and the scope of the EIA follows (where appropriate) the guidance and recommendations of:

- Guide to an offshore wind farm, Published on behalf of The Crown Estate and the Offshore Renewable Energy Catapult, January 2019;
- Standard Investigation of the impacts of offshore wind turbines on the marine environment, published by BSH 2013; and
- Other relevant national and international standards.

5.1 Water

5.1.1 Hydrological and hydrodynamic conditions of the Lithuanian Baltic Sea

Hydrological and hydrodynamic conditions of Lithuanian marine area (open sea, territorial sea, coastal waters) in the Baltic Sea, including the PEA site, are typical of the common conditions of the south-eastern Baltic Sea (Žaromskis, Pupienis, 2003).

Wave height

Wind waves prevail in the Baltic Sea; thus, a wave regime aligns with the wind regime. The highest waves are observed in autumn and winter (October to February, especially in December), when strong W-SW and W winds prevail, and the lowest in May–August. The annual mean wave height is about 0.7 m, 50% of which are up to 0.6 m and 90% are up to 2 m high. Waves above 5 m occur on average once every 10 years (Kelpšaitė et al., 2011).

The direction of wave propagation almost coincides with direction of prevailing winds. In the southeastern part of the Baltic Sea, SW-W-NW waves prevail:

- 2 m high waves, caused by winds of 4–9 m/s speed, account for ~70% of cases, of which calm conditions (wave heights below 0.25 m) are normally observed in summer and spring (~5%).
- 2–4 m high waves, caused by winds of 10–19 m/s speed, account for ~24% of cases;
- 4–7 m high waves, caused by storm winds, account for ~4% of cases;

Mixed waves, i.e., 2–3 m high waves and swell, are quite frequent in the Baltic Sea. Extreme values of the parameters of wind-induced waves on the coast of the Baltic Sea are determined by strong W-SW and W winds. The decrease in wave height in the sea is observed at 20–25 m isobath. Wave parameters have a significant impact on both hydrodynamic and sediment transportation processes at the Baltic Sea coast.

For the analysis of wave height and direction in the open sea, available baseline data from the ECMWF (European Centre for Medium-Range Weather Forecasts, www.ecmwf.int) for the period 2016–2018 (inclusive) have been used. The results show that the open sea is dominated by SW-NE waves caused by the predominant winds, while the average wave height in the PEA site is 0.8–0.9 meters (Fig. 5.1.1.).

The latest measured data for the period from July to December 2022 from the floating lidar observation systems (EOLOS FLS200, buoys E01 and E06) installed in the vicinity of the PEA area revealed that the highest waves in the adjacent planned OWF (CORPI, 2022–2023. The EIA Report for Development of the Offshore Wind Farm in the Lithuania's Marine Territory) were observed during September–October (6.69 m max). By comparison, in the summer months the highest wave reached 3.77 m in July and 5.5 m in August. It was found that the highest waves were in September–December period, and the smallest in July–August (Table 5.1.1). In the summer period the waves are generated by the western, whereas in autumn by southwestern and in December by southern winds (Fig. 5.1.2).

Table 5.1.1. The regime of waves measured by EOLOS FLS200 in the second half of 2022.

H(max), m	July–August	August–September	September–October	October–November	November–December
Mean	1.01	1.64	1.98	1.74	1.58
Max	3.77	5.29	6.69	5.51	6.65
Min	0.09	0.14	0.17	0.28	0.14
Standard deviation	0.81	1.04	1.07	0.95	1.30

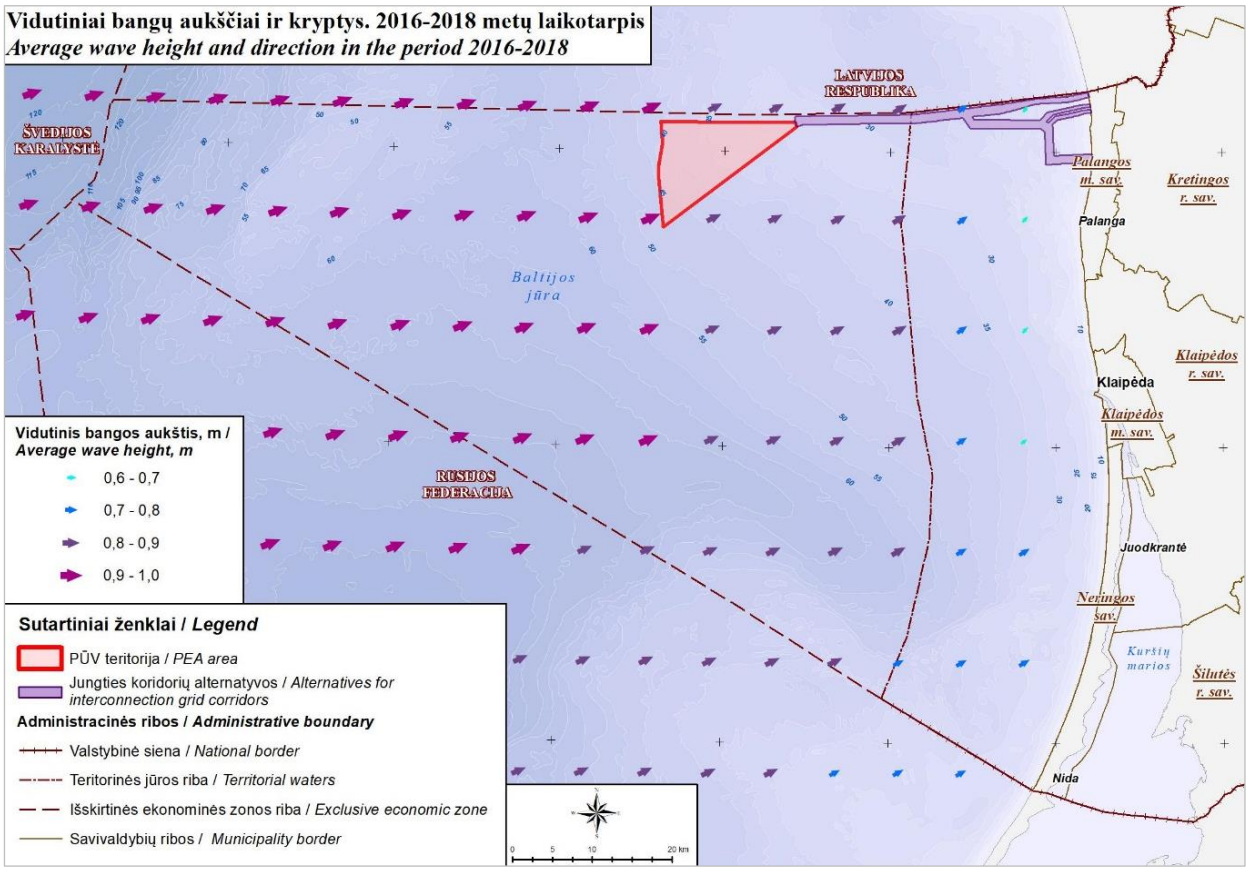


Fig. 5.1.1. Average wave height and direction (2016–2018).

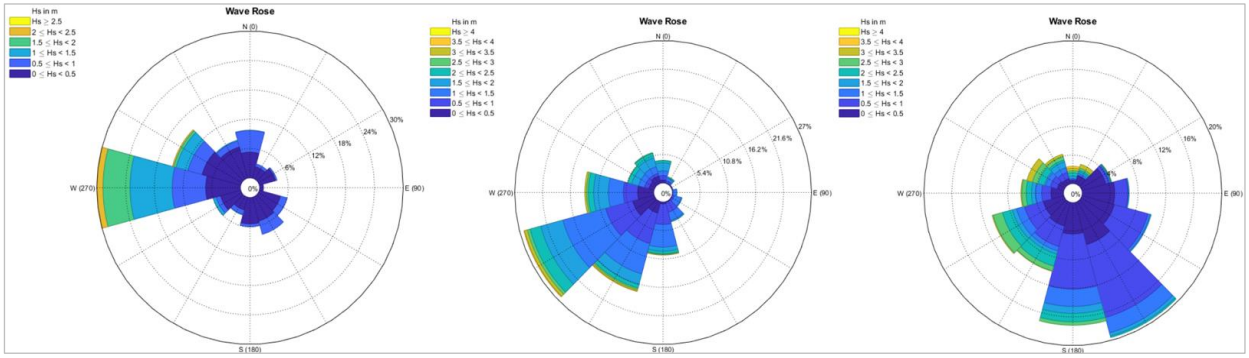


Fig. 5.1.2. Significant wave (Hs) roses for summer (on the left), autumn (in the centre) and December (on the right) (after Eolos, 2022 m. E01 buoy data).

Currents

Lithuania's marine waters have a basic cyclonic direction of currents in the Baltic Sea (counterclockwise) (Žaromskis, 1996), which form prevailing flows of water masses along the coast from south to north. The interaction between atmospheric processes and inert water mass forms a complex structure of surface and deep currents. Varying seasonal activity of atmospheric processes above the Baltic Sea is reflected in the annual change of current rates. The lowest current rates are observed in the spring-summer season; the highest in autumn-winter. Moreover, the speed of wind-induced currents decreases at greater depths.

At the sea surface, within the depth layer of 0–10 m, there are weak and medium currents prevailing, with a speed normally not exceeding 0.20 m/s (Žaromskis, Pupienis, 2003). The marine area between the coast and 35 m isobath has northward currents. Currents are directed toward the south far less often; toward the south-west least often. To the north of Klaipėda, the current direction (relatively constant northward direction of the current) is also determined by the freshwater flowing from the Curonian Lagoon. The 35–45 m deep area away from the shore is predominated by south-west, south, and west currents. Even further, i.e., beyond the 45 m isobath, currents are directed toward the east and north-east.

In the intermediate water layer (10–30 m), various current regimes are formed. The water area of up to 35 m depth, like in the surface layer, mostly has northward currents. Less frequently, currents are directed south and westward. Beyond the 45 m isobath, there are north and north-east currents prevailing. In the intermediate water layer, current speed is 0.11 to 0.14 m/s.

Weak, 0.07–0.09 m/s rate currents normally prevail in the bottom layer. The water area to 35 m isobath mostly has north-west and south-east currents, in 35 to 45 m isobath – north-west, west, and south-west currents, and beyond 45 m – north currents (Žaromskis, Pupienis, 2003).

Temperature, salinity, and water clarity

The Lithuanian marine area in the Baltic Sea is relatively shallow. As a result, the thermal regime of the water reacts very quickly to seasonal fluctuations of climate conditions (Dailidienė et al., 2011). Minimum water temperatures are reached in February (up to -0.5 °C), and maximum in July–August (up to 28.2 °C).

In any single year, the coastal area of territorial waters of the Baltic Sea, are characterised not only by a specific horizontal distribution of water temperature, but also by a certain vertical stratification of water associated with temperature differences. A homothermic convective and turbulent mixing layer is formed on the sea surface up to a depth of 10 m in all seasons. The summer thermocline (a rapid temperature decrease layer) is formed at the depth of 10–40 m; the water temperature gradient in this layer is 0.5–1.0 °C/m. The thermocline separates the surface warm water mass from the intermediate cold sublayer. Meanwhile, the differences between the water temperature in coastal areas and in deep-water areas may reach 15 °C/m and more. In a halocline area and deeper, the temperature fluctuations are minor throughout the year.

In autumn, open sea waters mix and maintain the same temperature up to the depth of 40 m (Vyšniauskas, 2003). At this time, not only does intense convective mixing occur, but stronger winds and higher waves are also observed. In the halocline area and deeper, temperature fluctuations are minor throughout the year (Dailidienė et al., 2011).

Salinity variations in the southeastern part of the Baltic Sea, which also includes the Lithuanian marine area, depend on the inflow of fresh river water and the variations of salinity in the Baltic Sea. The average water salinity in the Lithuanian marine waters is about 7‰. The western part of the Lithuanian EEZ belongs to the Central Baltic Sea which has a two-layer water structure. In the upper layer (0 m to approx. 60 m depth), salinity reaches 6–8‰. This layer is isolated from the saltier deeper layer by a permanent halocline. In the Central Baltic Sea, the boundaries of a halocline are at a depth of 64–90 m, its centre is at a depth of 74 m; and the salinity of this layer increases sharply from 7.7 to 10.4‰ (Matthäus, 1990). At greater depths, isolated with a halocline, water saturation with oxygen decreases. A lack of oxygen is observed in the bottom layer and hydrogen sulphide zones are formed.

There is no clear and permanent salinity stratification in the coastal areas and in the shallow part of the open sea. On average, a homogeneous well-mixed water mass prevails up to a depth of 55–60 m (Dailidienė et al., 2011). According to the measurement data of the EPA Department of Environmental Research from 2012 to 2017, the Baltic Sea shows regular variations in horizontal and vertical salinity. Surface layer salinity increases moving away from Klaipėda Strait towards the open sea. In transitional waters, salinity varies between 2.36 and 7.48‰. Meanwhile, variations in the open sea are significantly smaller – salinity varies between 6.5 and 7.4‰. The increase in salinity is also observed in the vertical direction, i.e., the maximum salinity value at the seabed layer reached 12.85‰, while salinity value at the surface was approx. 7‰. The maximum salinity variations are observed up to a halocline (60–80 m) with a more homogenous water layer below it.

Based on the data of the monitoring carried out by the EPA in 2012–2017 (using the Secchi disk), water transparency in the coastal area reaches an average of 3.8 m (from 1.5 m to 9.5 m), in the territorial waters the water transparency increases up to 6.1 m (maximum water transparency reaches up to 12 m), and the water transparency in the open sea reaches an average of 7 metres.

Sea ice

A permanent ice cover does not form in the Lithuanian area of the Baltic Sea. On the coast, during moderate and cold winters, a shore ice belt of several metres to several kilometres is formed. It usually consists of piled ice rocks, brought to the shore by wind and water currents which remain stable only in calm and cold weather.

Ice cover develops up to 1.5 km from the shore. Drifting ice sheets up to 10 cm thick form ice jams up to 7 km from the shore. Due to climate change and, thus, milder winters, fewer days of ice phenomena in the Baltic Sea are observed. The decrease in the number of days with ice is inversely proportional to the annual increase in water temperature. On

the Lithuanian coastline, an average duration of ice phenomena decreased by approx. 50% during the period 1961–2009 (Dailidienė et al., 2011).

5.1.2 Water quality

In Lithuania, the ecological and chemical status of the Baltic Sea is constantly monitored by the state environmental monitoring of the Curonian Lagoon and the Baltic Sea (www.aaa.lrv.lt).

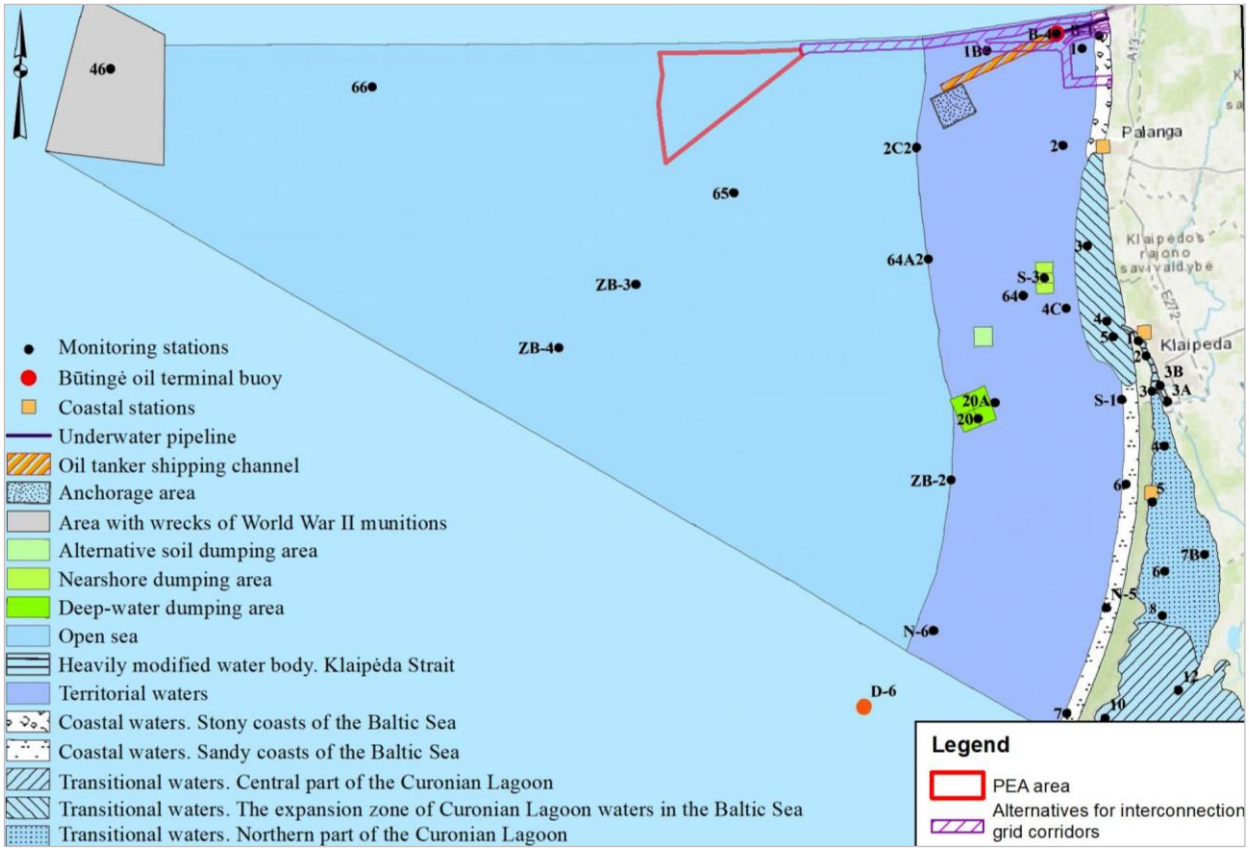


Fig. 5.1.3. Monitoring sites in the Baltic Sea and the Curonian Lagoon.

Pursuant to the Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive; hereinafter – WFD), research indicators are mainly focused on the monitoring of eutrophication and chemical pollution in the Curonian Lagoon and coastal waters of the Baltic Sea. MSFD expanded the list of environmental studies and impacts of the marine area to include non-native species, food webs, commercially exploited fish and shellfish, biodiversity (fish, birds, mammals), physical disturbance of the seabed, marine litter on beaches and the seabed, underwater noise and contaminants in fish and other seafood for human consumption.

Ecological state of the Baltic Sea

The ecological state of the Baltic Sea coastal waters is assessed according to the indicators of nutrients (concentrations of total nitrogen, total phosphorus, coastal waters transparency, phytoplankton, macroinvertebrates, macrophytes and fish (only in lagoons)). Based on the research data from 2014–2020, the Baltic Sea coastal waters did not achieve a good environmental status (hereinafter – GES). The ecological condition of the Baltic Sea mainly reflects the phenomena of eutrophication of the water body.

Long-term (1980–2021) research data show that total nitrogen concentrations in the Baltic Sea have decreased by about 30% compared to 1980–1990 period. Despite long-term positive changes, concentrations of total nitrogen in the Baltic Sea are still too high to achieve the GES (EPA, 2023).

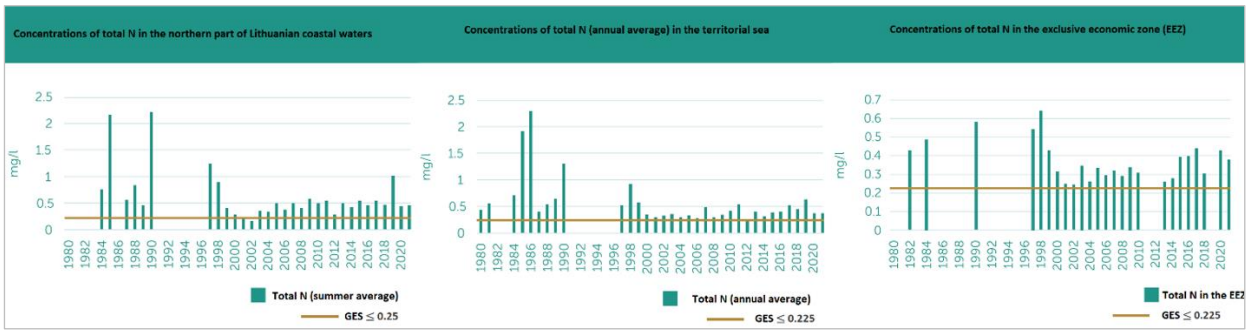


Fig. 5.1.4. Concentrations of total nitrogen in the northern part of the Baltic Sea coast, territorial sea and EEZ (Source: Environmental Protection Agency, 2023).

In the coastal waters of the Baltic Sea and in the territorial sea, the concentrations of total phosphorus in recent years corresponded to a GES (Figure 5.1.5).

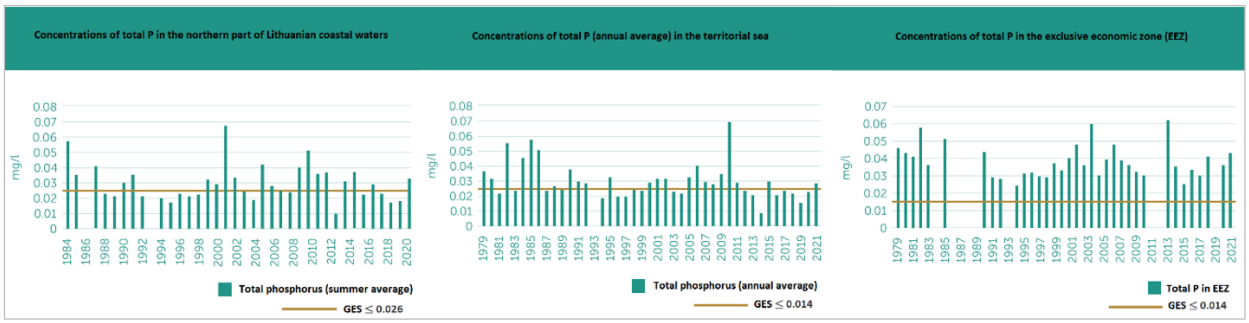


Fig. 5.1.5. Concentrations of total phosphorus in the northern part of the Baltic Sea coast, territorial sea and EEZ (Source: Environmental Protection Agency, 2023).

Chemical state of the Baltic Sea

The chemical state of a water body is assessed based on the concentrations of various chemicals in water, bottom sediments and biota. Based on the data for the period 2014–2021, the Lithuanian part of the Baltic Sea did not correspond to a GES.

During 2010–2021 period concentrations of organic compounds such as di(2-ethylhexyl) phthalate (DEHP) and polycyclic aromatic hydrocarbons (PAHs) in the waters of the Baltic Sea of Lithuania were exceeding the available limit values. The sea area also did not achieve GES due to episodically determined exceedances of the environmental quality standard (AQS) of organotin compounds (especially tributyltin) in water at several monitoring stations of the Baltic Sea.

5.1.3 Surface and groundwater bodies in the onshore cable connection route

The onshore site proposed for the installation of electrical connection infrastructure belongs to Venta River Basin District (hereinafter – RBD) Šventoji basin.

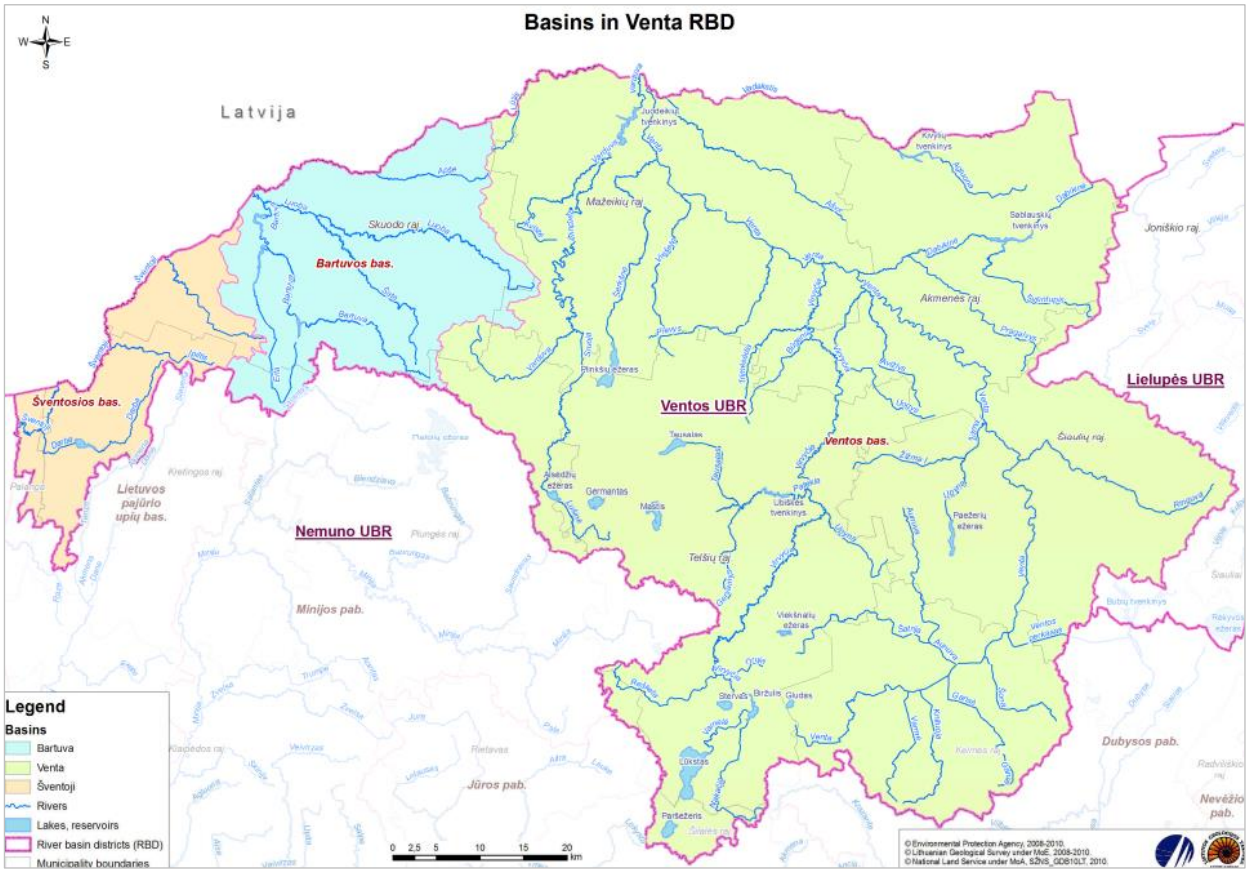


Fig. 5.1.6. River basins in the Venta RBD.

58% of the area of Šventoji basin is in Kretinga district municipality, 32% in Skuodas district municipality, and 10% in Palanga city municipality.

Ecological status of Venta RBD water bodies

The ecological status of water bodies in the categories of rivers and lakes is an expression and description of the quality of functioning and structure of water ecosystems classified according to Annex V of WFD, assessed according to biological, hydromorphological, physicochemical quality elements. The ecological status of each river category (river, channel or their parts) and lake category (lake, pond, quarry) water body is described based on biological (phytoplankton, aquatic flora – phytobenthos and macrophytes, benthic invertebrates, fish), hydromorphological (hydrological regime, rivers integrity, morphological conditions) and physicochemical (nutrients, organic matter, oxygen saturation, water transparency, specific pollutants) quality elements. Hydromorphological and physicochemical quality elements are auxiliary elements for determining the ecological condition, which directly determines the conditions of biological quality elements (presence and changes in the water ecosystem). Therefore, the latter are the main elements characterizing the ecological condition. The ecological status of water bodies in the categories of rivers and lakes is determined according to the methodology for determining the status of surface water bodies, approved by the Minister of the Environment of the Republic of Lithuania on 12 April 2007 by order no. D1-210 "On the approval of the methodology for determining the condition of surface water bodies".

Based on the available monitoring data from the 2014–2018 period in the Šventoji sub-basin, no water bodies of the category of rivers meeting the requirements of good ecological condition were identified. In 2014–2018, monitoring of priority and priority hazardous substances was carried out in the Šventoji river mouth (LT700108103, LTR138). The following priority and non-priority hazardous substances and groups of substances were studied in the Šventoji river mouth LTR138 (LT700108103): heavy metals, pesticides, polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds, phenols, di(2-ethylhexyl) phthalate (DEHP), perfluorooctanesulfonic acid and their derivatives (PFOS), polychlorinated biphenyls, brominated diphenyl ethers and tributyltin compounds (tributyltin cation). During 2014–2018 no environmental quality standards were exceeded.

According to the monitoring results, a decrease in cadmium and lead concentrations was observed in the bottom sediments of Šventoji river mouth LTR138 (LT700108103). The concentrations of polycyclic aromatic hydrocarbons

(PAHs) – benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene and indene(1,2,3-cd)pyrene increased, fluoranthene concentrations remained stable, and benzo (a) pyrene – decreased. In the bottom sediments of Šventoji river mouth LTR138 (LT700108103), other tested priority and non-priority hazardous substances were found in very low concentrations or below the limit of quantification (LOQ). Biota monitoring was not carried out in this water body.

In the onshore area, the planned cable laying works will cross the rivers in the area (Figure 5.1.7).

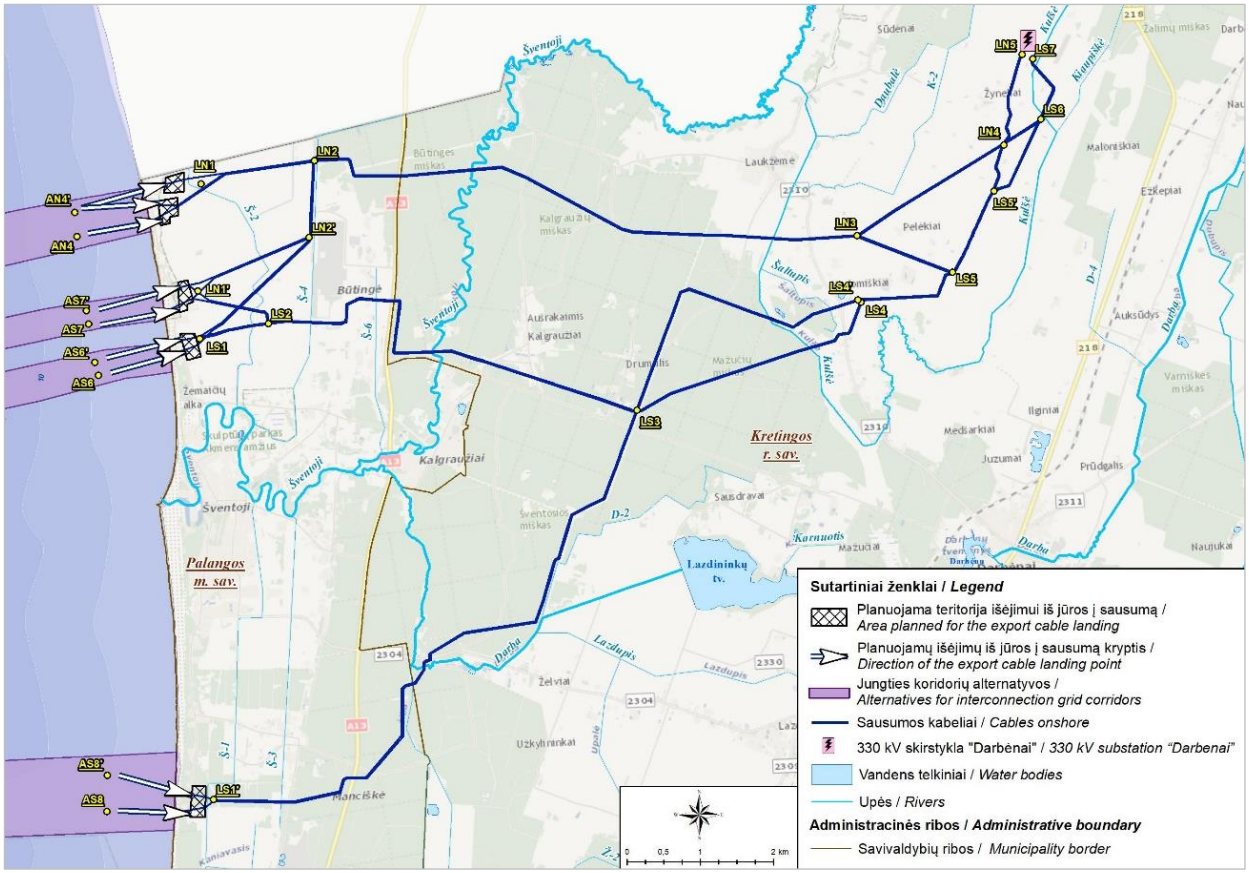


Fig. 5.1.7. Surface water bodies in relation to planned land cable corridors.

According to the data of the Lithuanian Geological Service, there are currently 1,780 water bodies registered in the Register of Geology in Lithuania, and 39% of the water bodies use the studied and approved resources. Location of groundwater aquifers in Palanga and Kretinga district municipalities is shown in Figure 5.1.8.

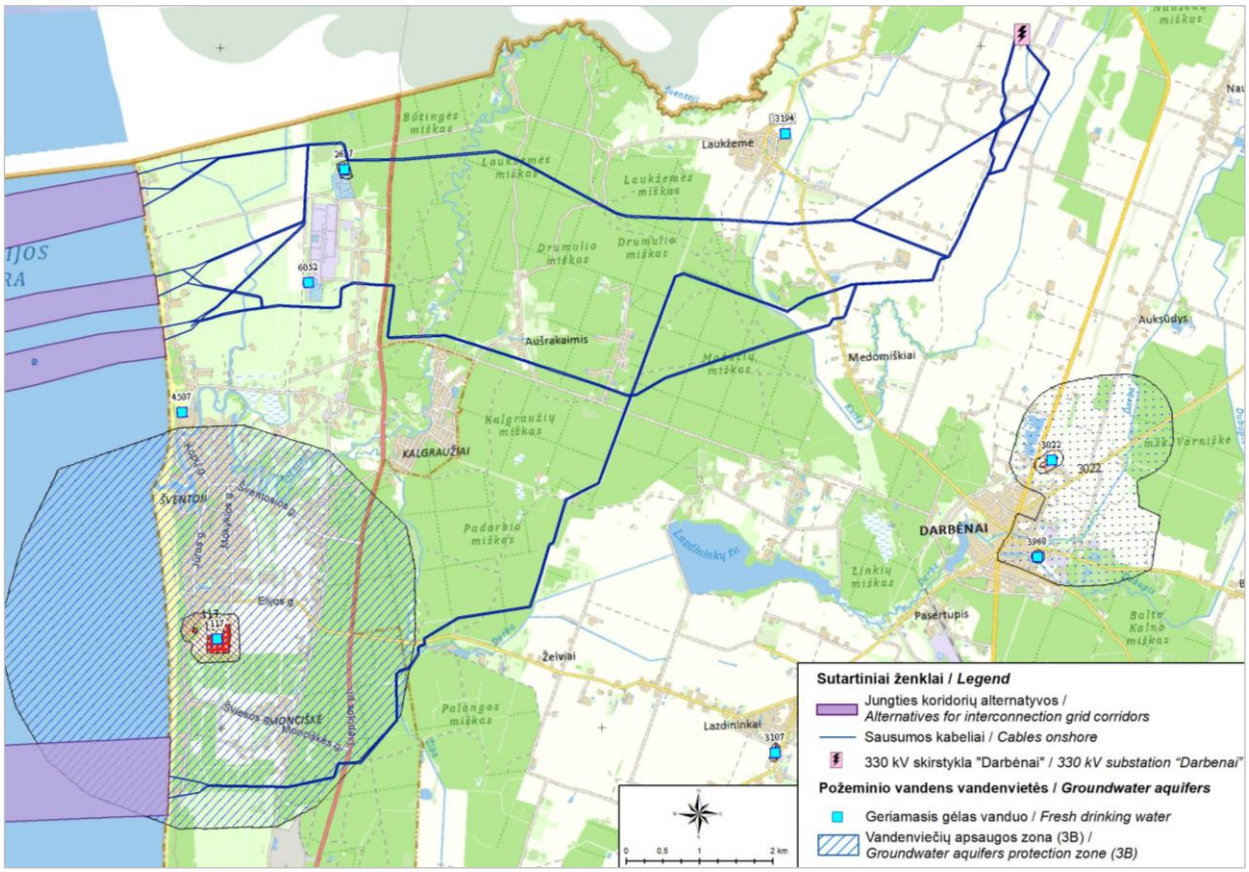


Fig. 5.1.8. Groundwater aquifers in relation to planned land cable corridors.

Alternative routes for electrical connections have been selected to avoid groundwater bodies. In this regard, no adverse impacts or consequences are anticipated.

5.1.4 Potential impact of the PEA on water

Offshore

Under normal operating conditions, the operation of the OWF will not have any significant impact on seawater quality. However, temporary changes in water quality are possible during construction, i.e., during the installation of foundations and laying cables at their respective installation sites due to a temporary increase in suspended sediments (turbidity) in the bottom layers of the water column. Potential short-term impact on water quality is also possible during OWF operational (maintenance activities, such as cable repairs) and decommissioning phases. Potential additional chemical water pollution is associated with an accidental collision between tankers and a wind turbine, in adverse weather conditions or in the event of a ship breakdown. In such a case, most of the problems would be caused by oil spills into the marine environment from the wrecked tanker. Smaller-scale contamination of the marine environment with synthetic compounds is also possible due to possible spillage of hydraulic fluids and lubricating oil from systems operating in the nacelles of wind turbines (Bonar et al., 2015). There is insufficient scientific data on accidental chemical spills from offshore wind turbines. However, the amounts are believed to be very small compared to the operation of offshore oil production facilities (Kirchgeorg et al., 2018).

During cable laying, there is a potential for sediment resuspension, wherein chemicals such as heavy metals and organic compounds, previously accumulated in finely dispersed or sludgy sediments, may be released due to the disturbance of seabed sediments. Possibility of sediments resuspension increases the most during operations in technogenic affected parts of the seabed (soil dumping areas, territories of buried chemical weapons, etc.). Since both the OWF and the laying of power transmission cables are planned in the part of the sea where moraine (sandy loams and loams) sediments of glacier origin prevail, where there is sand of fine and average coarseness, gravel, pebble, and boulder fields that show no typical historical chemical pollution, the possibility sediment resuspension is minimal.

Where the PEA relates to the sea, information on the marine environment and its characteristics shall be provided. Particularly important are the hydrological (currents, salinity) and hydrochemical properties (pH, dissolved oxygen,

suspended matters, chemicals) of the Baltic Sea water, waves, including average and storm values, their recurrence, seasonal and perennial fluctuations.

The characteristics of GES of the sea have been established by Order of the Minister of Environment of the Republic of Lithuania No. D1-194 of 4 March 2015 "On Approval of the Characteristics of the Good Environmental Status of the Lithuanian Marine Area." The qualitative descriptors for determining GES (according to MSFD) have been established in Order of the Minister of Environment of the Republic of Lithuania No. D1-500 of 14 June 2010 "On the Approval of the Procedure for Assessment of the Marine Environmental Status, Setting of Characteristics of Good Environmental Status of the Baltic Sea, Objectives of Protecting the Marine Environment, the Monitoring Programme and Measures," Annex 2.

Onshore

The majority of onshore cabling operations are planned to be carried out via open trenching. If necessary, HDD or other trenchless technology may be applied at the surface water bodies crossing points.

Onshore cabling must be planned pursuant to the requirements specified in Articles 98–100 and 106 of the Law on Special Land Use Conditions for activities near groundwater and surface water bodies, not to violate the hydrological regime of the territories, and to provide for the restoration of melioration systems, if such are affected.

During the operation of the OWF, factors that can lead to a significant negative impact on water are unlikely. Nevertheless, the EIA will assess the peculiarities of the hydrological and hydrochemical conditions of the site in question – the available data will be evaluated and new studies on hydrological and hydrochemical parameters of water will be conducted.

5.1.5 Scope of the EIA

Table 5.1.2. Overview of the EIA research activities and the information to be provided in the EIA Report.

Research to be carried out	
Type of research	Parameters/Methods
Hydrological measurements	Speed and direction of water currents, temperature, salinity, suspended matter, dissolved oxygen/CTD "in situ" measurements.
Hydrochemical measurements	pH/ Water quality – Determination of pH (ISO 10523:2008), petroleum hydrocarbons/ISO 9377-2:2000 Water quality Determination of hydrocarbon oil index, polyaromatic hydrocarbons/EN ISO 17993:2004. Water quality – Determination of 15 polycyclic aromatic hydrocarbons (PAH) in water by HPLC with fluorescence detection after liquid-liquid extraction (ISO 17993:2002), heavy metals/ISO 17294-1:2004 Water quality. Application of inductively coupled plasma mass spectrometry (ICP-MS); ISO 15587-1:2002 Water quality. Digestion for the determination of selected elements in water.
Information to be provided in the EIA Report	
Aspect considered	Information to be provided
Baseline data and sources	Description of the hydrological and hydrodynamic regime of the marine area and peculiarities thereof (literature review, measurements data). Information on hydrochemical conditions and water quality (literature review, measurements data). Surface and groundwater bodies intersected by the power transmission cable.
Potential significant impact during the installation, operation, and decommissioning phases of OWF	Potential impact of construction, operation and decommissioning of the OWF and cabling on the hydrodynamic situation. Potential accidental water pollution with oil products. The impact of accidental spillages / contaminant release impacting the chemical status of the coastal waters during construction and decommissioning of the onshore transmission assets.

	Increases in suspended sediment concentrations affecting water quality status during construction, operation, and decommissioning. Cumulative impacts on all the above if other projects are under construction or operation at the same time. Potential impact on surface and groundwater bodies intersected by the power transmission cable.
EIA methods	Hydrological and hydrochemical measurements in the study area. Analysis of primary and secondary data. GIS mapping. Two-dimensional digital model system MIKE 21 Evaluation by expert.
Impact mitigation measures	Analysis of impact mitigation measures.

5.2 Ambient air and climate

5.2.1 Wind speed

The key meteorological factor of favourable conditions for the development of offshore wind energy projects is wind speed. Based on the aggregate data (Fig. 5.2.1), the wind speed at sea increases moving further away from the shore and varies from 7 to 10 m/s. Based on wind speed measurements in the area adjacent to the proposed OWF, the average wind speed at the height of 200 m is approx. 8.6 m/s.

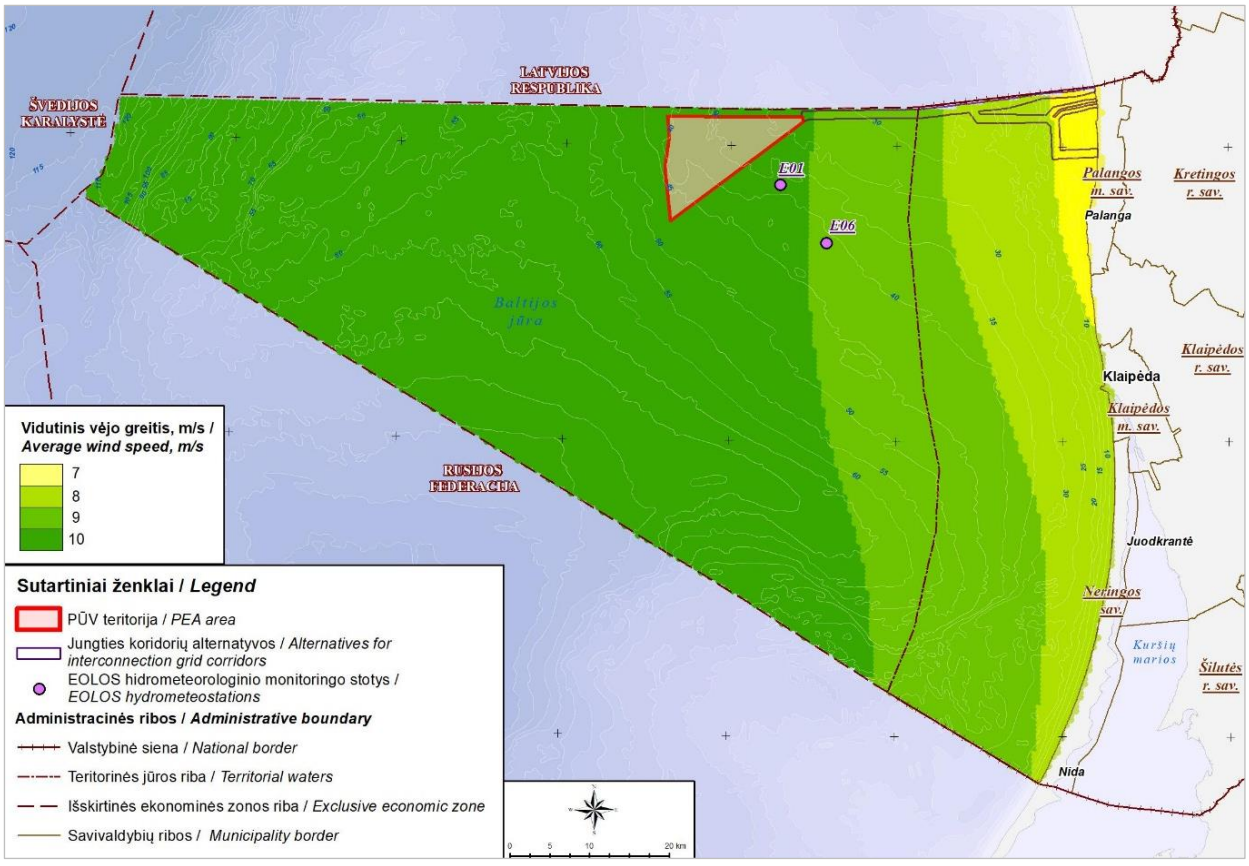


Fig. 5.2.1. Average wind speed at sea (at 100 m above the water level)**.**

5.2.2 Air pollution

Air pollution is associated with mechanisms of construction and maintenance of wind farms rather than with the main proposed activity, i.e., technological process of electricity generation by wind turbines. Main sources of ambient air pollution during the OWF construction, including cabling, operation, and dismantling phases, are means of transport and operating construction machinery.

The use of RES is highly valued within the context of climate impact as a method of mitigating climate change. As a RES, use of wind energy reduces dependence on fossil fuels and, in so doing, the emission of CO_2 and other substances associated with the burning of fossil fuels into the ambient air. The use of wind energy plays a major role in the fight against climate change by reducing greenhouse gas emissions in the energy sector. The implementation of the PEA is expected to result in a reduction of GHG emissions and a positive impact on the climate.

5.2.3 Scope of the EIA

Table 5.2.1. Overview of the information to be provided in the EIA Report.

Aspect considered	Information to be provided
Current situation	Climate conditions and ambient air quality in the region (onshore only). Distribution of speed and directions of wind in the PEA site.
Potential significant impact during the installation, operation, and decommissioning phases of the OWF	Sources of ambient air pollution and emissions. Provisional quantities of ambient air pollutants from mobile sources. Potential impact on the climate and GHG emissions.
Assessment methods	Ambient air pollution from mobile sources will be assessed using available pollution calculation methodologies (i.e., EMEP/EEA air pollutant emission inventory guidebook 2023).
Measures to prevent, reduce, or compensate for major adverse effects on the environment	Description of mitigation measures.

5.3 Seabed, soil and the geology

5.3.1 Seabed of Lithuanian marine area

The seabed of the Lithuanian part of the Baltic Sea is shaped by glacial activity, fluctuations in water levels across different stages of development of the Baltic Sea, and modern sedimentation processes. As a result, modern seabed morphology is represented by both elevated topographic forms – plateaus, and negative – depressions (Fig. 5.3.1.).

In terms of the PEA, the most important topographical feature is the Klaipėda-Ventspils Plateau, situated in the northern part of Lithuanian marine area. It starts from the Gulf of Riga, stretches along the shore, and somewhere at the latitude of Liepaja turns to the southwest, intervening between the Gotland and Gdańsk depressions. There are also more prominent elevations at this location. One of these is the Bank of Klaipėda, located in the north-western part of the Lithuanian EEZ. The depth of the sea here reaches 47 m (Gelumbauskaitė et al., 1999). Westwards, this bank descends steeply into the Gotland depression.

The most fragmented relief is in the southern part of the Klaipėda-Ventspils Plateau, which stretches up to the nearshore of Šventoji-Palanga and joins the shore of Giruliai. This area has a large variety of fragmented seabed patterns. Herein, relative height of some seabed hills (drumlins) normally may reach 4–5 m, and sometimes 6–8 metres.

Depths of 35–40 m prevail in the PEA site (Fig. 5.3.2).

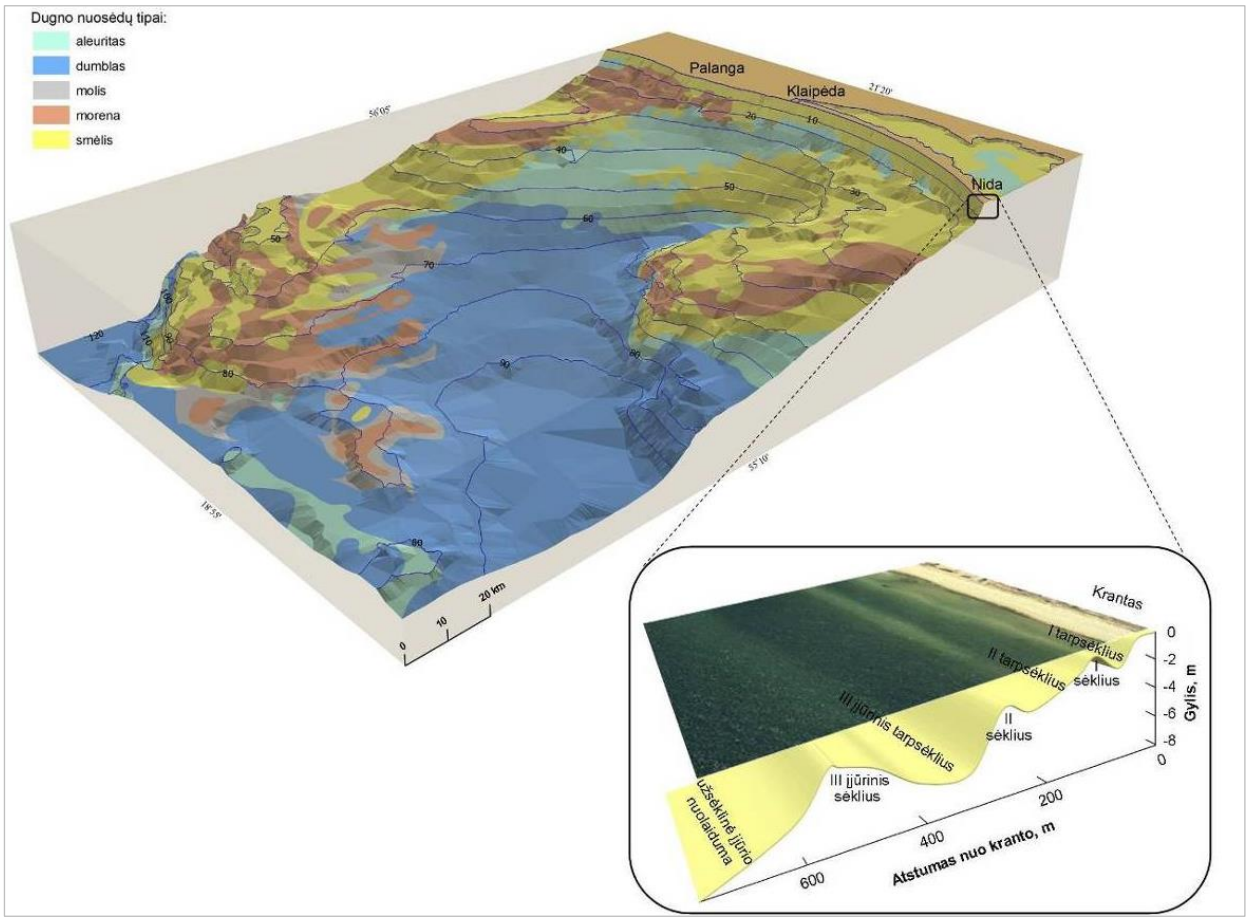


Fig. 5.3.1. Model of seabed of the Lithuanian marine area.

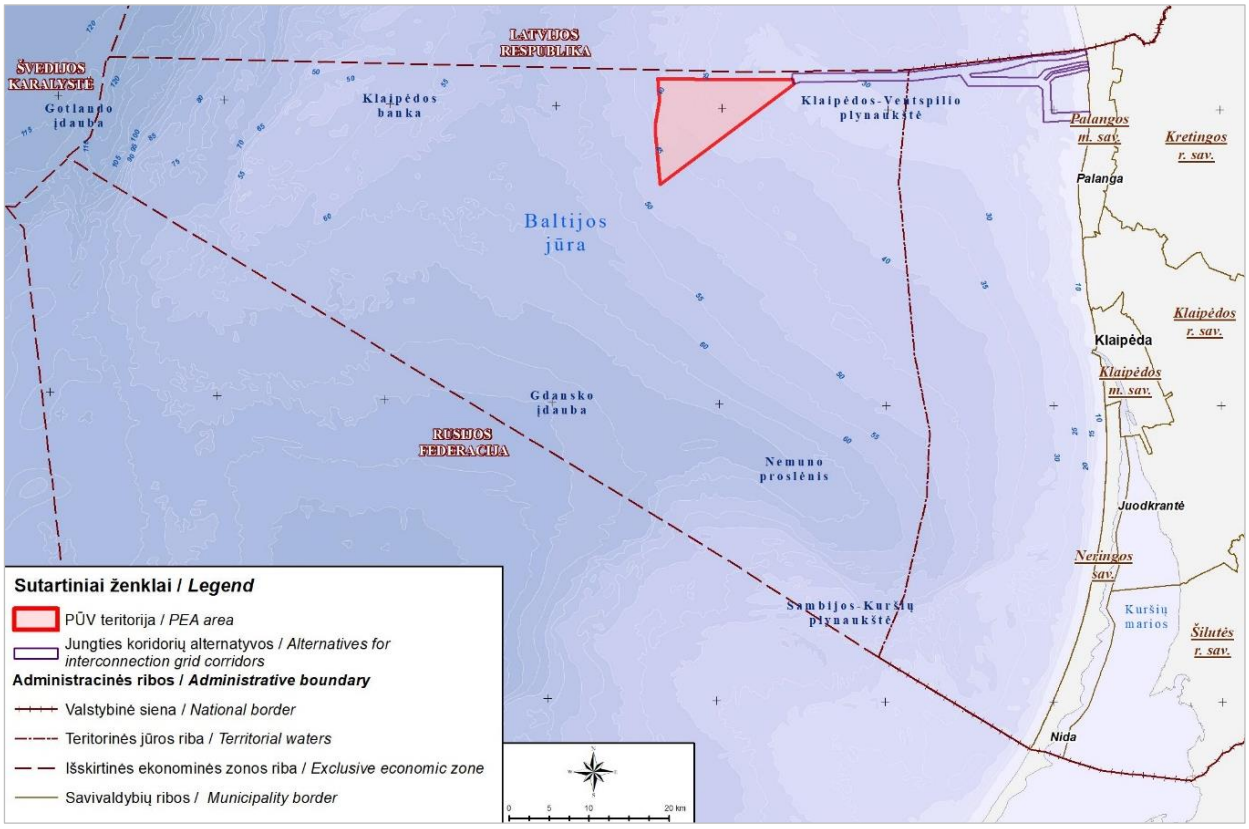


Fig. 5.3.2. Bathymetry of the Lithuanian Baltic Sea and in the PEA site.

5.3.2 Distribution of the sediments at the seabed

The seabed of the Lithuanian marine areas is covered with modern and relict bottom sediments (Gulbinskas, 1995). Relict sediments originate from the Ice Age and sedimentation during various evolution stages of the Baltic Sea. These sediments prevail in the hydrodynamically active areas where modern sedimentation is limited, and bottom erosion may occur. In these areas, glacial deposits (moraine) are often heavily eroded; their surfaces are covered with boulders, pebble, gravel, or various grained sand.

The Klaipėda-Ventspils Plateau, where the PEA site is located, is also covered by relict deposits, including moraines of diverse composition (sand, loam, boulder clay) and the eroded elements (boulders, pebble, gravel). Such a boulder field separates the terrestrial nearshore of Lithuania from the open sea. The boulder field distribution near Giruliai is at water depths of 14–18 m, at Karklininkai – 16–20 m, at Dutchman's Cap (*Olando kepurė*) – 5–25 m, at Nemirseta – 10–22 m, at Palanga – 4–23 m), at Šventoji – 17–29 m, and at Būtingė – 21–32 metres.

Accumulation zones host modern sediments, primarily consisting of sand, silt, and mud (Emelyanov et al., 2002). Fine-grained sand dominates the other sand fractions. One distribution area at the foot of Klaipėda-Ventspils Plateau can be distinguished, settling at a depth of 26–40 m. Deeper marine areas (45–65 m) are covered with silty sediments. Mud consists of fine and very fine silt. These sediments are widespread at depths of 50–60 m and cover the bottom of Gdańsk and Gotland depressions.

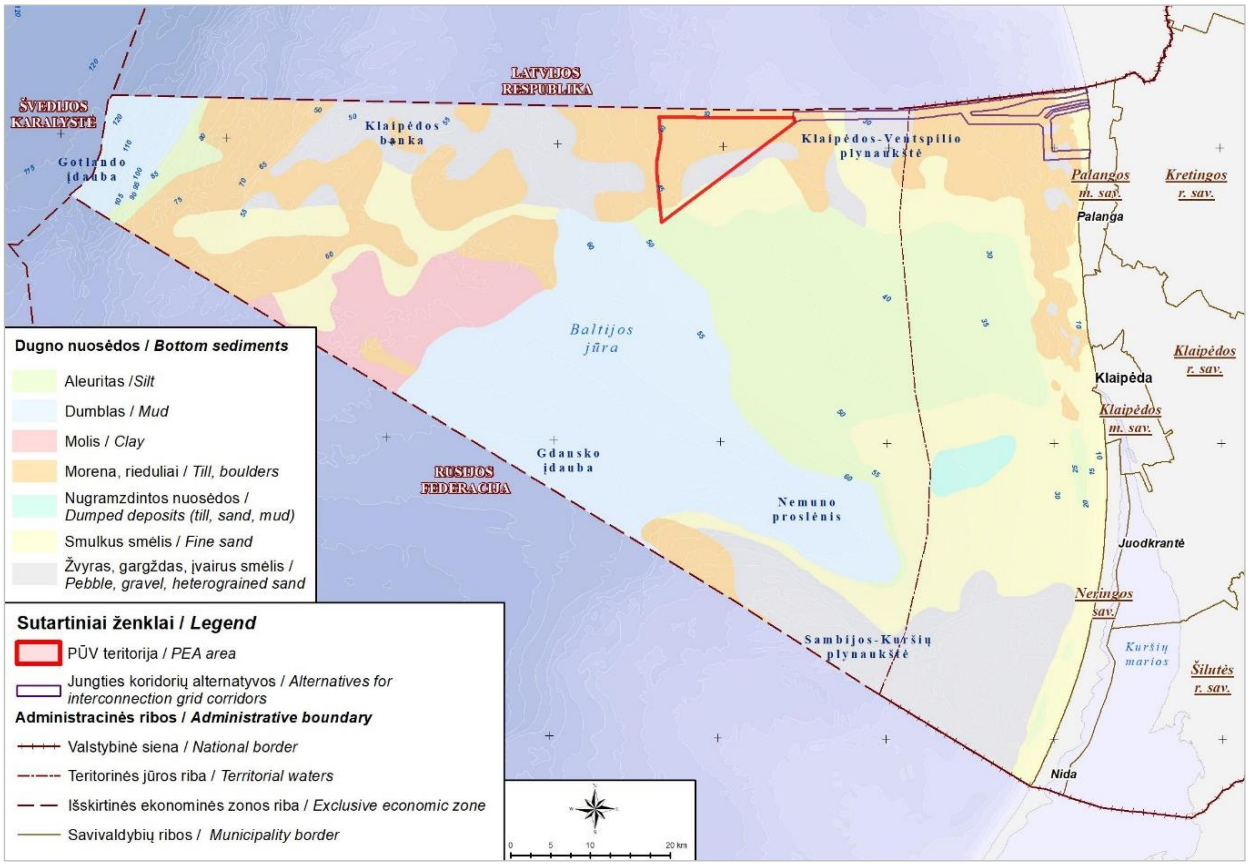


Fig. 5.3.3. Lithological composition of bottom sediments.

Sediments of various ages, origin, and composition are found on the seabed of the Baltic Sea. Depending on the intensity of sedimentation, in certain areas, the modern formation of sediments does not occur. Instead, sediments and rocks formed in previous geological periods are revealed. In the Lithuanian marine area, the sedimentary rock column is approx. 2 km thick.

The upper part of the geological section consists of Quaternary sediments. The thickness of these sediments varies, ranging from 5–10 m in plateaus to over than 100 m in paleosections. The Middle and Upper Devonian (sandstone, siltstone, dolomite), Permian (dolomite limestone), Lower Triassic (clay, clayey siltstone, and marl), Middle and Upper Jurassic (argillite), and Lower and Upper Cretaceous epochs (terrigenous clay, siltstone, glauconitic-quartz sand) lie beneath the Quaternary sediments (Fig. 5.3.5).

In the PEA site, the Quaternary sediments column is of approx. 20–30 m thickness, with deposits from Triassic period, less often – from the Permian period, subsiding beneath them.

A preliminary lithological scheme (Fig. 5.3.4) was developed based on seabed surveys along potential cable routes. Three key groups of sediments can be identified therein: a layer of fine and medium coarse sand extends to a depth of approx.14–16 m at the nearshore (marked in yellow), the entire eastern zone of the PEA site is filled with glacial moraines (sandy loams and loams, marked in orange) and variously coarse sand, gravel, pebble, and boulder fields (marked in green) formed by the erosion of moraine and glacial meltwater activity.

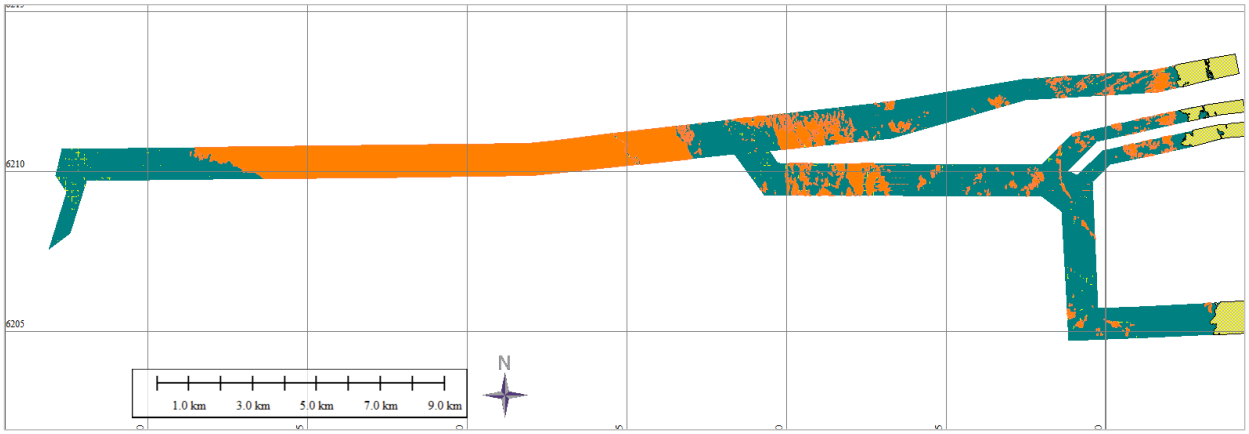


Fig. 5.3.4. Preliminary lithological scheme of the seabed surface.

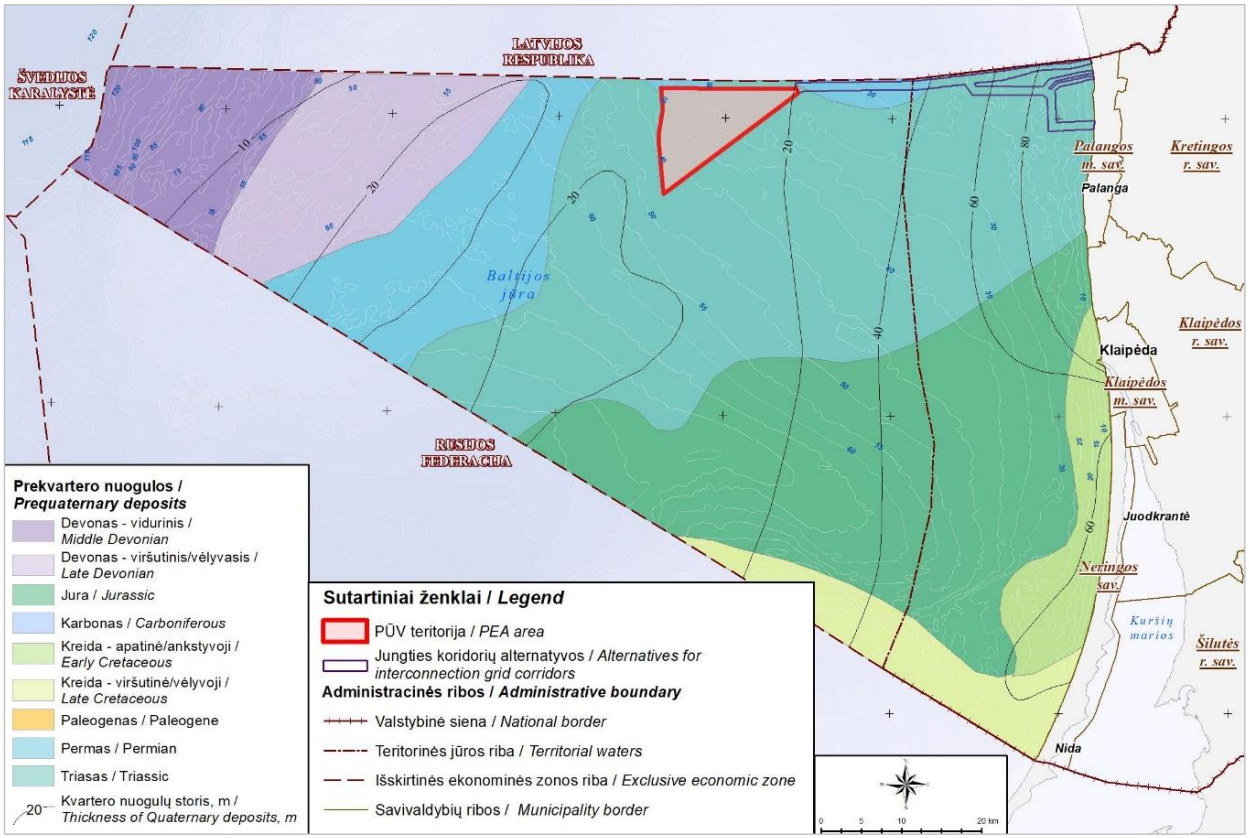


Fig. 5.3.5. Distribution of Pre-Quaternary sediments and Quaternary column thickness.

5.3.3 Mineral resources

Oil

According to data from the Lithuanian Geological Survey, the marine part of Lithuania holds potential oil structures, suggesting a potential oil reserve of approx. 40–80 million tons within the Lithuanian EEZ.

Chapter 8 of the solutions of the CPTRL 2030 “Preservation and usage of resources, development of bio-production economy,” p. 465, states that regulation for the development of oil resources in the marine area shall be envisaged in coordination with other activities (wind energy, shipping, etc.), internal, intersectoral, and international cooperation shall be promoted and enhanced.

Figure 5.3.7 presents a comprehensive scheme of deep-sea structures and their locations in relation to the proposed OWF. The scheme clearly illustrates that the proposed OWF site falls within the area of the tectonic fractures and detected Ordovician/Cambrian structures that could have a potential for oil exploration and extraction.

The Ordovician/Cambrian structures with a potential for oil exploration and extraction are identified in the north-eastern and north-western edges of the PEA site (Fig. 5.3.6.). Structure E2 (Fig. 5.3.7.) extends to the north beyond the PEA site, thus its insularity, area and volume remain unexplored. Structures D11 and D13 are entirely within the territory of the Lithuania shelf and could have a perspective for the tenders related to the use of hydrocarbon resources. Structure D11, in particular, is characterised by an extremely large area and volume and adjoins the Telšiai fracture, near which significant onshore oil fields, such as Girkaliai, Genčai, Kretinga and Nausodis, have been discovered and exploited.

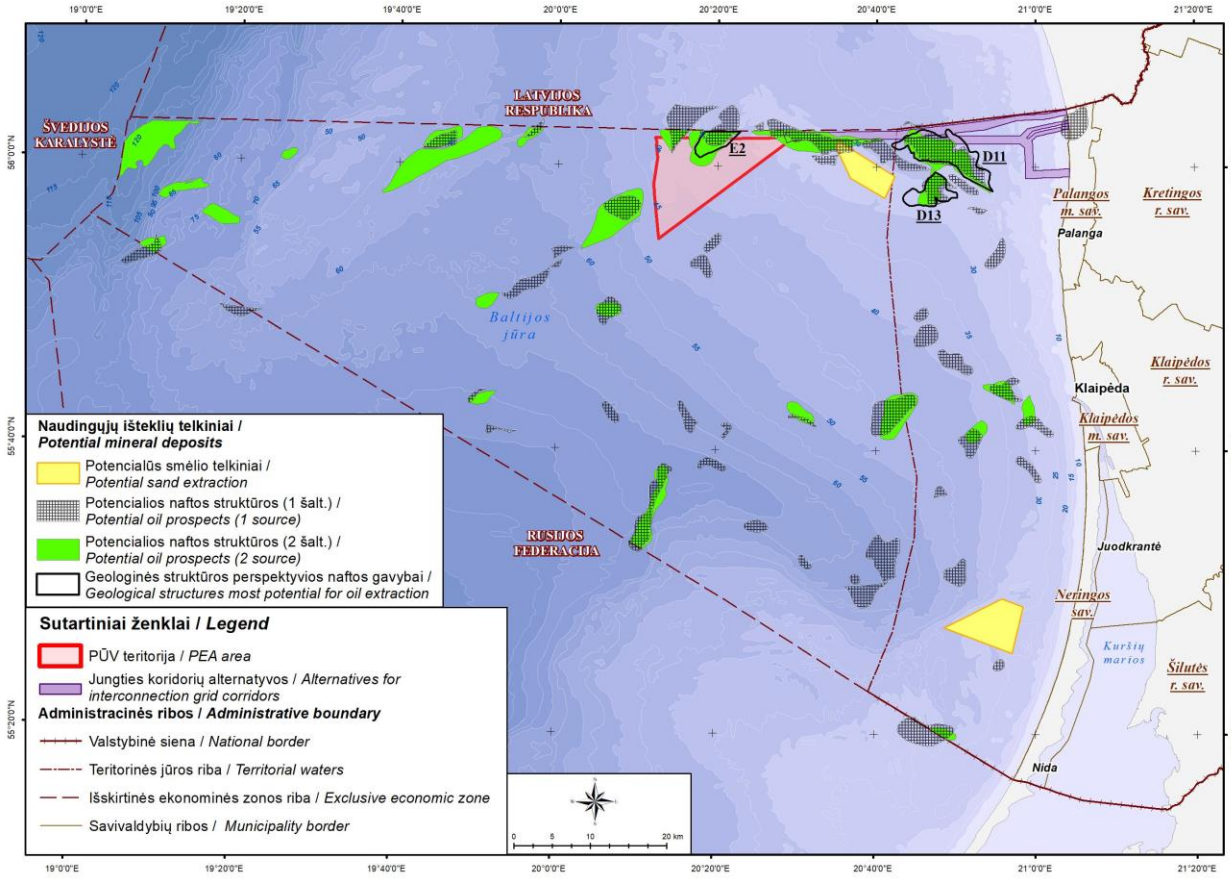


Fig. 5.3.6. Scheme of the PEA site in terms of potential mineral deposits. Legend: source 1 - Underground Register, Lithuanian Geological Survey, Deposits of underground resources (with borders) (as per data of the Sea Bottom Surveys, Part I, 2022); source 2 – Under-quaternary sediment prevalence and thickness of quaternary sediments.

Sand and gravel

The sand and gravel resources in the Lithuanian EEZ have not been explored and are not officially registered in the state register of mineral resources as a mineral deposit. Nevertheless, potential accumulations of these resources have been identified through the geological mapping. The highest prevalence of sand is observed in the zone with active hydrodynamic circulation up to 20 metres. However, the sand in this area maintains the dynamic balance of the shoreline, nourishes the beaches, and cannot be exploited due to environmental and coastal protection restrictions.

Another notable area of sand dispersal is found on the southeastern slope of the elevation of Liepaja – the Klaipėda-Ventspils Plateau and the Curonian-Sambian Plateau and its north-western slope. Sand and coarse-grained sediments formation in these areas is associated with the coastal formations shaped during the transgressions-regressions of the

Baltic Sea. Modern marine sands often overlay these ancient sediments, covering with recently formed sea sands, with thicknesses reaching 5 meters and more.

Several locations have been identified as potential sand sources for shore management:

- Southeast slope of the Klaipėda-Ventspils Plateau, depths of 25–30 m, coastal formations of transgressive-regressive phases of the Baltic Sea. Sand dispersal over relatively large areas on the slopes of the plateau. The thickness of the sand layer can reach 1 or more metres.
- Relict formations from the Ice Age or the Baltic Sea evolution stages on the surface of the Curonian-Sambian Plateau. The sea depth is 20–30 m and this area boasts the largest sand dispersal, with layer thickness surpassing 3 metres.
- In Preila-Juodkrantė district, the most promising is elevation area between 20–27 m isobaths. Sand from this area has been utilised in beach restoration programs, particularly for Palanga's beaches.

There are no approved sand deposits in the PEA site.

Amber

The largest amber deposits in the world are located on the Sambian Peninsula, now part of the Kaliningrad region. Here, in the vicinity of the village of Yantarny, the world‘s largest amber reserves are extracted in the open-cast mine. Although in the close neighbourhood, there are no large amber deposits in Lithuania. Small deposits of amber have been found near Priekulė, next to the King Wilhelm Canal, as well as in the districts of Preila, Juodkrantė, and Nida, though, of minor commercial significance. There are no known amber deposits in the PEA site.

5.3.4 Tectonic activity and seismic intensity of the PEA site

The Baltic Sea belongs to the tectonically relatively stable Eurasian lithospheric plate. The sea itself is very young, formed in the Quaternary period and its brief history is notably influenced by continental glaciations and the deglaciation process. Geologically, morphologically, and in terms of development history, the Baltic Sea basin can be divided into two parts: a smaller, shallow, and young southwestern section associated with the Western European platform, and a larger northeastern part, including part of the Lithuanian Baltic Sea, belonging to the East European Craton. The latter underwent active tectonic processes in the late Pleistocene, leading to the formation of key geomorphological and deep-sea structures (Šliaupa, 2004).

Compared to the neighbouring countries, Lithuania experiences relatively low seismic activity. It is caused by post-deglaciation glacioisostatic processes and occasional minor seismic events linked to earthquakes from distant, seismically active zones. Major earthquakes of natural origin recorded in the Kaliningrad Region, on the coast of the Baltic Sea in September 2004, reached magnitudes of 4.8 and 5.2 (https://www.lgt.lt/index.php/apie-lietuvos-zemes-gelmes/seismologija/biuleteniai).

Vertical movements of the Earths’ crust due to glacioisostatic processes can reach up to 2 mm per year. The horizontal compressive force resulting from glacier retreat gradually weakens over time but may still activate older fracture systems, particularly in neighbouring Latvia and Estonia. In Lithuania, these processes are comparatively weaker, contributing to the region's lower tectonic activity when compared to nearby areas (Šliaupa et al., 2004).

Tectonic fractures are marked in red in the scheme (Fig. 5.3.7). Thinner lines represent tectonic fractures active during the Caledonian orogenic period, persisting no later than the Early Devonian. Younger fractures are depicted with brighter lines, intersecting practically the entire sedimentary layer and terminating in the Permian or even younger sediments. However, it is not possible to fully assess this based on the available data; seismic reflection of the Triassic ridge is not detected. Review of historic tectonic fractures plays a crucial role in evaluating the seismic activity of the PEA site. A comprehensive list of the detected fractures is provided in Table 5.3.1, and the position of the fracture location along with their identification numbers are provided in Fig. 5.3.7.

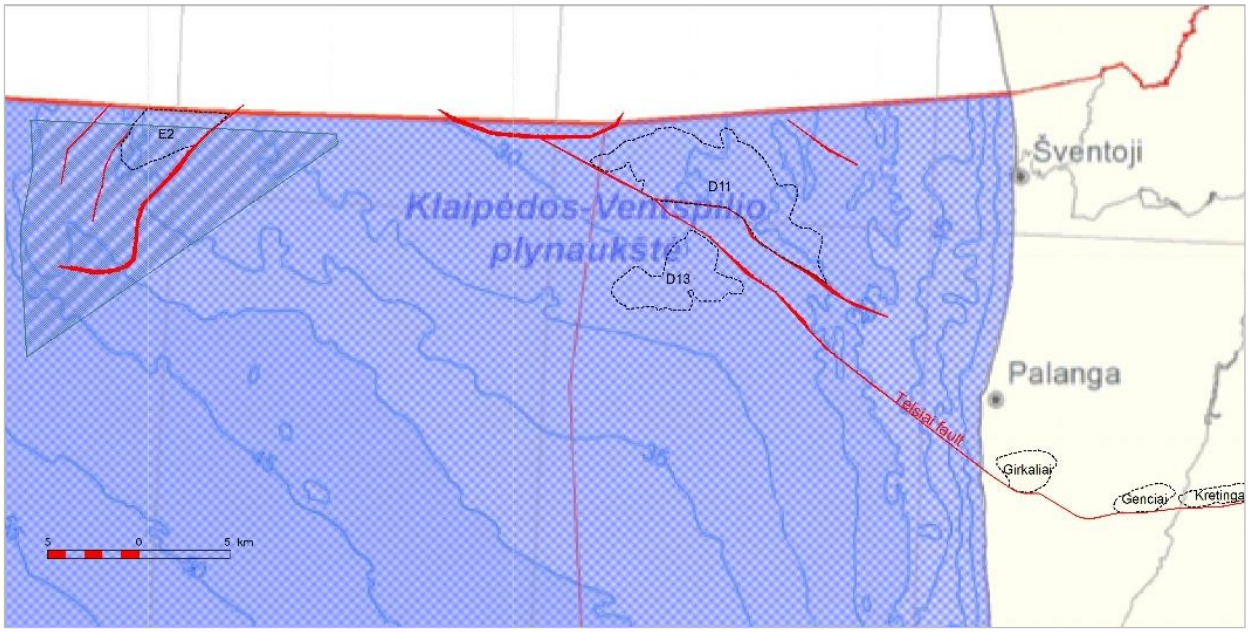


Fig. 5.3.7. Location of the OWF in relation to deep-sea geological structures (Early Devonian tectonic fractures – red thin line, Triassic-Permian tectonic fractures – red thick line, potential oil structures – black dashed line).

Table 5.3.1. Summary list of tectonic fractures and key parameters thereof.

Fracture ID	Age	Max amplitude in the Ordovician, m	Predominant direction
Telšiai	pre-Permian	150	NW–SE
1	Permian	700	SW–NE
2	Permian	350	W–E
3	Lower Devonian	80	SW–NE
4	Lower Devonian	100	SW–NE
5	Lower Devonian	100	NW–SE
6	Lower Devonian	70	NW–SE

5.3.5 Soil

The sandy beaches and the protective ridge in the coastal zone, which are crossed by the export cable route alternatives, will be protected by means of trenchless technologies. When such technologies are applied (cables laid deep under the surface) – this area will be crossed by export cable without significant impact.

In the region crossed by the export cable alternatives, various types of soils are present onshore. Closer to the sea, within the limits of the municipality of Palanga City, soils such as histosols, podzols, gleysols and sandy soils are prevalent. Moving inland, within the borders of the municipality of Kretinga District, luvisols dominate, with interspersed areas of albeluvisols, fluisols and gleysols.

In the areas crossed by the export cable corridors, two notable geological features are identified – the Šventoji oil field (No. 2165, predicted resources) and the Vanagupė (Pajūris) peat deposit (No. 954, predicted resources).

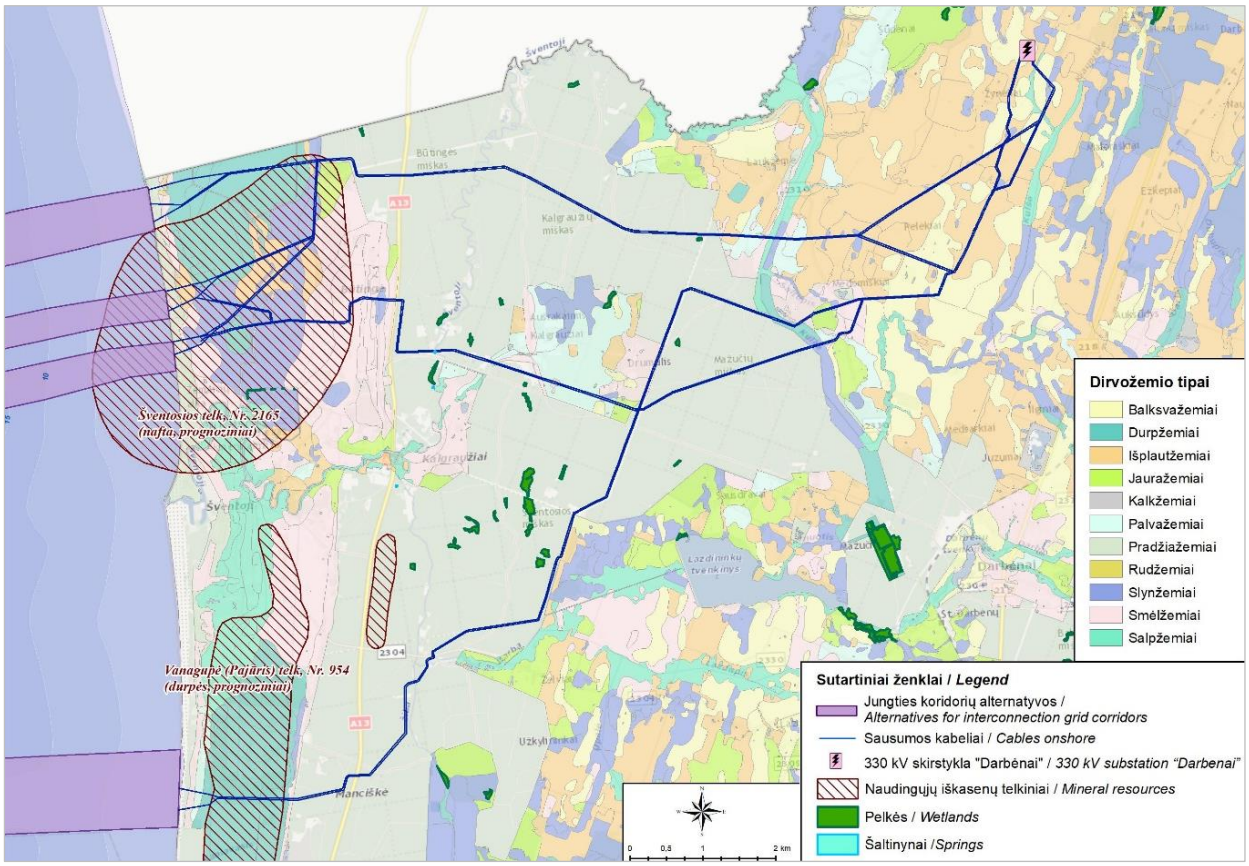


Fig. 5.3.8. Soil types and mineral deposits in the area crossed by the export cable corridor alternatives.

5.3.6 Scope of the EIA

The EIA will primarily concentrate on the assessment of geological conditions within the PEA site and along the export cable routes in order to determine the potential impact of the OWF installation on the seabed's integrity and the extraction of both potential and existing mineral resources. Regarding the onshore areas, the impact of the installation of export cables on the soil, mineral resource deposits and the location of export cables in terms of the sources of pollution will be assessed.

Table 5.3.2. Overview of the EIA research activities and the information to be provided in the EIA Report.

Type of study	**Research to be carried out/method**
Seabed morphology	Investigations of the seabed including multibeam echosounder and side scan sonar.
Geological set up of the sea bottom	Distribution and composition of sea bottom sediments, using side scan sonar imagery and VanVeen grab sampling and lab analysis of the soil.
Geochemical investigations	Lab analysis of sea bottom sediments for determination of contamination level.
Identification of dangerous objects	Analysis of side scan imagery and magnetic anomalies for identification of anthropogenic objects on the seabed.
Information provided in the EIA Report	
Aspect to be considered	Information to be provided
Current situation	Seabed characteristics, morphology, depths. Sedimentation conditions. Geological structure and mineral resources. Summary of anthropogenic and other dangerous objects detected on the seabed.

	Geological and tectonic structure of the PEA area, seismic activity and intensity of the site. Distribution of potential oil structures in the marine area; impact of exploration, prospecting and/or extraction of potential oil on the development of the OWF. Soil characteristics of the onshore export cable corridor. Location of export cables in terms of the sources of pollution.
Potential significant impact during the OWF installation, operation, and decommissioning phases	Potential impact on the seabed and sedimentation. Assessment of potential contamination of sediments. Increase in suspended sediments and secondary deposition associated with foundation and cable installation activities. Impacts to the hydrodynamic regime due to presence of infrastructure and scour protection. Impacts to sediment transport and sediment transport pathways. Potential impact of accidental spillages/contaminant release on the quality of soils. Potential fragmentation of the seabed sediments integrity. Assessment of sedimentary cover at the nearshore and near the coastline in terms of potential shore erosion and stability of the dune ridge. Identification, description and assessment of potential direct and indirect impact on soil, all relevant geological processes and phenomena. Possible impact of export cables for sources of pollution. Information on anthropogenic and other dangerous objects detected on the seabed, preliminary assessment of origin, including identification of potential danger to engineering structures and cable routes.
Assessment methods	Analysis of primary and secondary data, GIS mapping and modelling, interpretation of side scan sonar mosaic and magnetic anomalies, expert based judgement.
Impact mitigation measures	Measures to reduce the impact on the seabed and sedimentation processes.

5.4 Biodiversity

5.4.1 Protected areas and Natura 2000 Sites

National PAs and sites within the European ecological network Natura 2000 have been designated in the Lithuanian Baltic Sea. To the east, the OWF site borders the Klaipėda-Ventspils Plateau biosphere polygon, as well as sites designated for the protection of birds and habitats (Fig. 5.4.1).

The offshore export cable corridors would inevitably intersect the sites of the Natura 2000 areas, specifically Special Area of Conservation (for protection of habitats; hereinafter – SAC) and Special Protected Area (for protection of birds; hereinafter – SPA) Klaipėda-Ventspils Plateau (SAC LTPAL0002, SPA LTPALB002), and the biosphere polygon of the Klaipeda-Ventspils Plateau. The offshore and coastal parts of the export cable corridor would intersect with Būtingė Geomorphological Reserve. Cabling in the coastal waters (sea–onshore connection) will be performed using HDD or other trenchless techniques to prevent disturbance to the beach, coastline dunes, and protected values.

The planned onshore connection corridor intersects Šventoji river, which is a Natura 2000 SPA, Baltic Šventoji River (LTKRE0006).

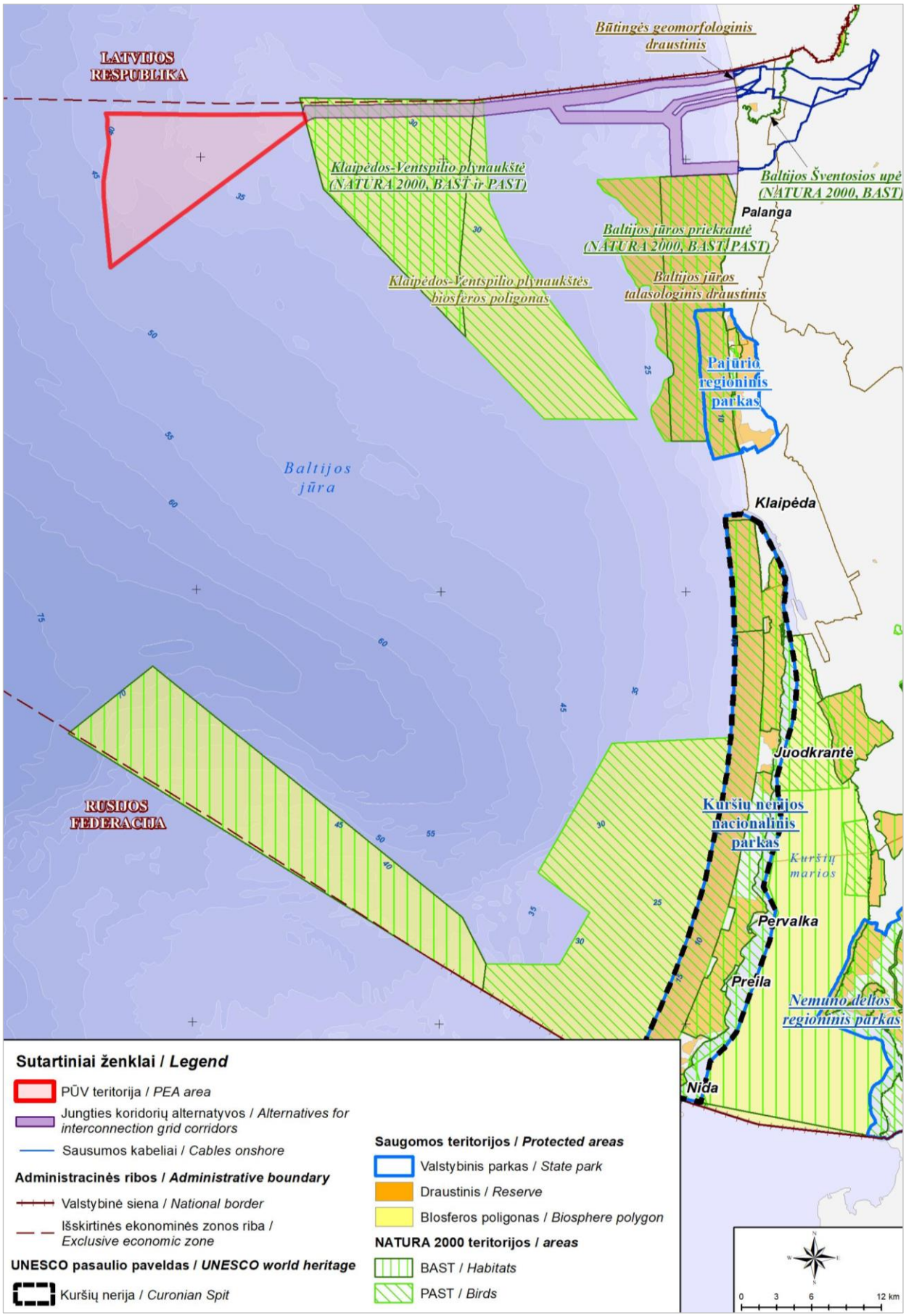


Fig. 5.4.1. National PAs and Natura 2000 sites closest to the PEA site.

Information on the national and Natura 2000 PAs adjacent to the OWF and the export cable route alternatives, as well as the values and conservation objectives is provided in Figures 5.4.2 to 5.4.3, and Tables 5.4.1 and 5.4.2.

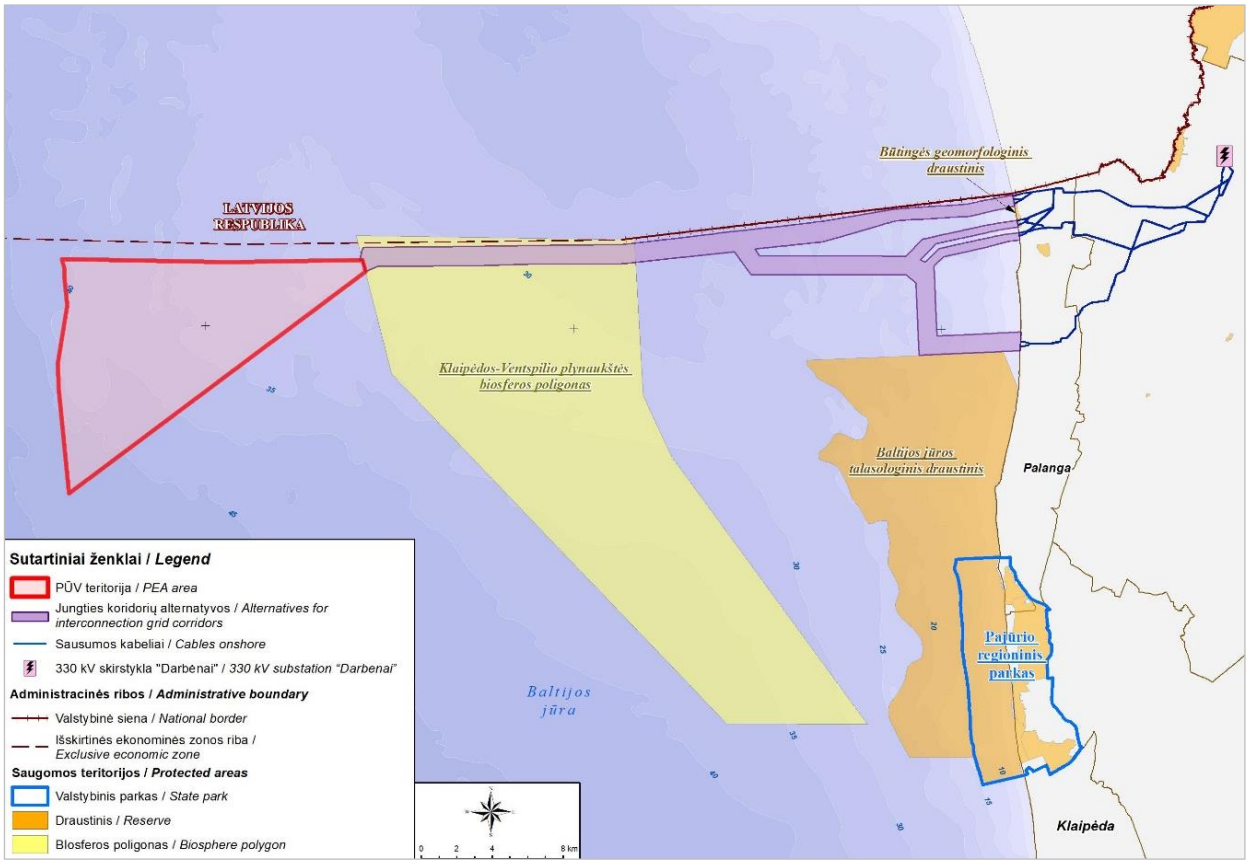


Fig 5.4.2. National PAs closest to the site of the PEA.

Table 5.4.1. Information on the national PAs bordering the PEA site (according to the State Cadastre of Protected Areas of the Republic of Lithuania).

Protected area	Area, ha	Purpose of establishment, protected values	Distance from the boundary of the PEA site
		Offshore	
Biosphere polygon of the Klaipėda-Ventspils Plateau	31,949.31	To protect a valuable part of the Baltic Sea ecosystem in the Klaipėda-Ventspils Plateau, with a particular focus on preserving: • Areas of natural marine habitat of EU importance – reefs (Natura 2000 code 1170), and to ensure a favourable habitat protection status; • a place of regular gatherings of protected wintering water birds of EU importance: Velvet scooter (*Melanitta fusca*), and to ensure a favourable status of their protection; • populations of Razorbill (*Alca torda*), Long-tailed duck (*Clangula hyemalis*) in their wintering and migration areas, and to ensure a favourable status of their protection; • to conduct monitoring of the natural habitat and protected species, engaging in scientific research related to the protected values, and to collect information on status thereof;	The OWF area borders PA; Alternatives of the export cable corridor site intersect PA

Protected area	Area, ha	Purpose of establishment, protected values	Distance from the boundary of the PEA site
		• to analyse the impact of human activities on the marine ecosystem; • to ensure the sustainable use of natural resources; • to promote ideas and ways for biodiversity conservation.	
Baltic Sea Thalassological Reserve	14,027.10	To protect the wintering and migration gathering sites of Red-throated diver *(Gavia stellata)*, Steller's eider (*Polysticta stelleri)*, Common goldeneye (*Bucephala clangula*), Common merganser (*Mergus merganser*) and Little gull (*Larus minutus*). To protect areas of natural marine habitat of EU importance – reefs (Natura 2000 code 1170), and to ensure a favourable habitat protection status	Alternatives of the export cable corridor site border PA
		Onshore	
Būtingė Geomorphological Reserve	34.48	To protect the coastal dune ridge.	Alternatives of the export cable corridor site intersect PA

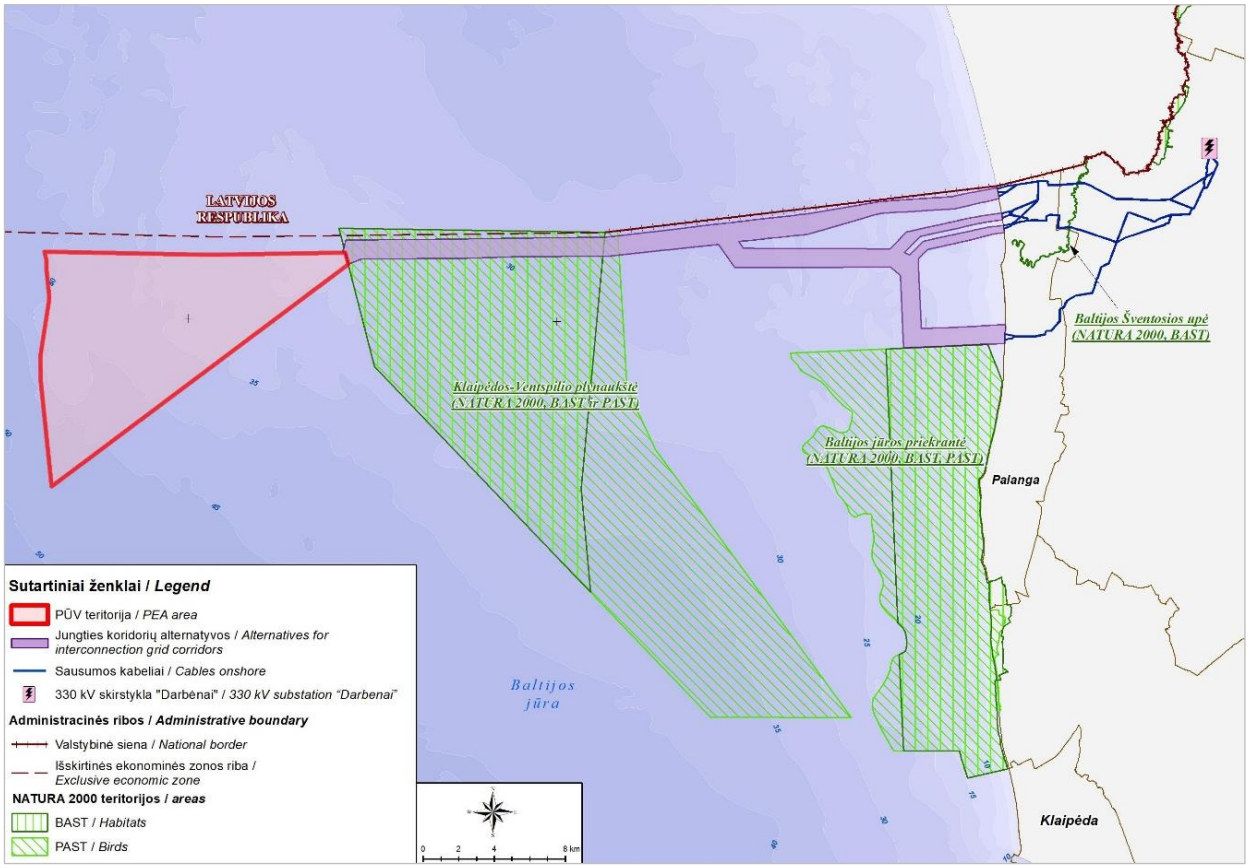


Fig. 5.4.3. Natura 2000 sites closest to the PEA area.

Table 5.4.2. Information on the nearest Natura 2000 sites (according to the State Cadastre of Protected Areas).

Protected area	Area, ha	Purpose of establishment, protected values	Distance from the boundary of the PEA site
		Offshore	
Natura 2000 SPA Klaipėda-Ventspils Plateau	31,949.31	To protect gatherings of the wintering Velvet scooter (*Melanitta fusca*)	The OWF area borders PA; Alternatives of the export cable corridor route intersect PA
Natura 2000 SAC Klaipėda-Ventspils Plateau	17,948.50	1170 reefs	The OWF area borders PA; Alternatives of the export cable corridor route intersect PA
Natura 2000 SAC Baltic Sea coastal waters	17,096.70	Steller's eider (*Polysticta stelleri*), Common goldeneye (*Bucephala clangula*), Common merganser (*Mergus merganser*), Little gull (*Larus minutus*).	Alternatives of the export cable corridor route border PA
Natura 2000 SPA Baltic Sea coastal waters	12,633.57	1170 reefs, River lamprey *(Lampetra fluviatilis)*.	Alternatives of the export cable corridor route border PA
		Onshore	
Natura 2000 SPA Baltic Šventoji River	27.14	River lamprey *(Lampetra fluviatilis)*, Thick shelled river mussel (*Unio crassus*).	Alternatives of the export cable corridor site intersect PA

5.4.2 Seabed habitats

Pursuant to the Commission Decision (EU) 2017/848[28], seabed habitats of Lithuania's marine waters are classified into 13 major types, corresponding to Level 2 of the EUNIS classification (Fig. 5.4.4).

[28] Commission Decision (EU) 2017/848 of 17 May 2017 laying down criteria and methodological standards on GES of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU. Official Journal of the European Union L125, 18 May 2017, p. 43-74.

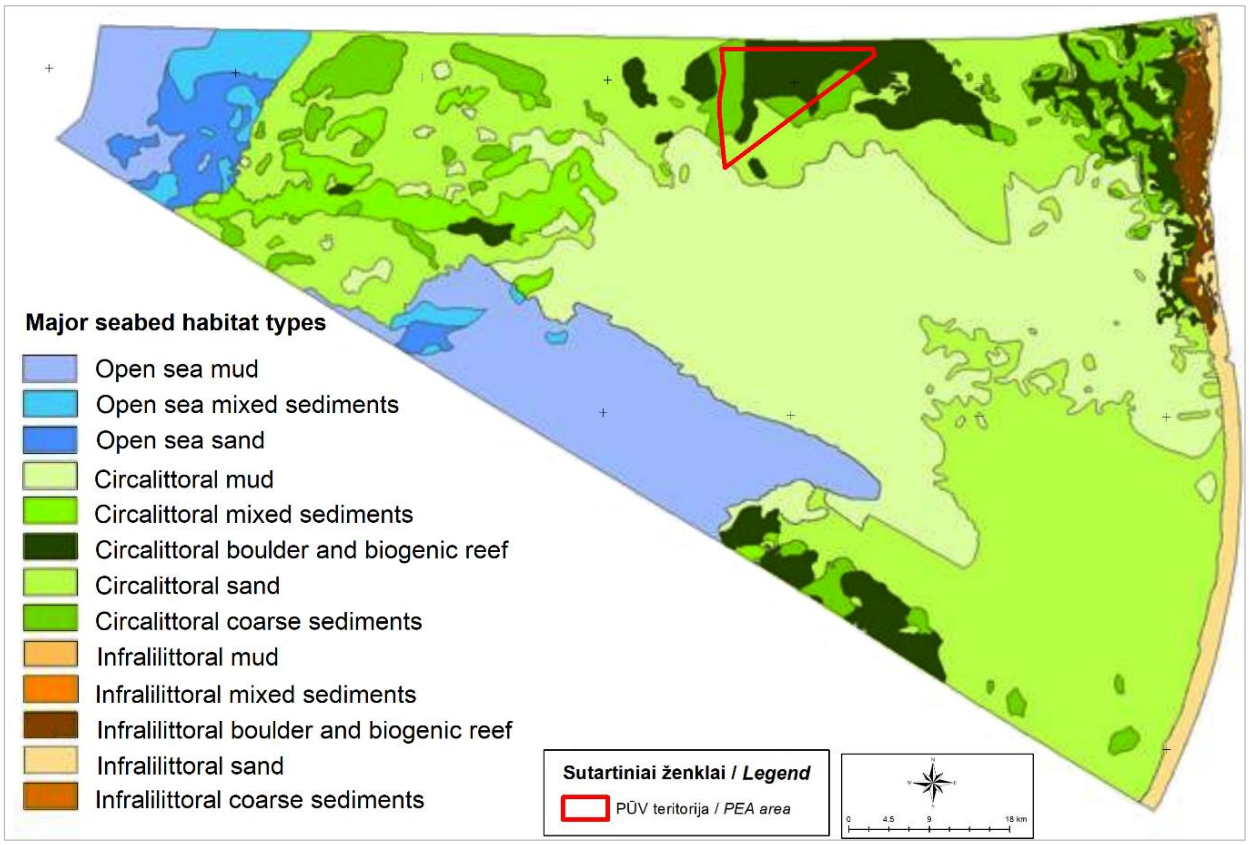


Fig. 5.4.4. Distribution of benthic habitats in Lithuania's marine waters.

According to the results of the inventories conducted from 1993 to 2007, seven main habitats are found in the territorial sea of Lithuania (Table 5.4.3). The Karklė-Palanga section along the shore of Lithuania stands out for its notable habitat diversity, particularly in the upper sublittoral area where the underwater slope is more protected from wave impacts due to the seabed geomorphological characteristics. Based on the available data, moraine seabed habitats (comprising boulders, gravel, pebbles) occupy less than 20% of the territorial sea. These habitats support approximately half of all benthic macrofauna species and include all recorded benthic plant species[29] of the territorial sea.

Table 5.4.3. List and distribution of habitats in the Lithuanian Baltic Sea area (*bottom habitats classified as reefs)

Habitat name	Area, ha
Wave-exposed moraine seabed with *Furcellaria lumbricalis**	2,343
Wave-exposed moraine seabed with *Amphibalanus improvisus*	10,757
Wave-exposed moraine seabed with *Mytilus edulis trossulus* and *Amphibalanus improvisus**	17,494
Wave-exposed moraine ridges with *Mytilus edulis trossulus* and *Amphibalanus improvisus**	43
Wave-exposed sandy seabed with *Macoma balthica*	138,497
Wave-exposed sandy seabed with *Pygospio elegans* and *Marenzelleria neglecta*	7,879
Wave-exposed sandy seabed with boulders and amphipods*	377

According to EPA, 2023[27], the infralittoral reef habitat covers 6840 ha, the circumlittoral reef habitat – 42,080 ha. 1170 reefs are identified according to habitat types of Annex I of the Habitats Directive. About half of the area of reef habitats belongs to the Natura 2000 SAC (Table 5.4.4).

[29] EPA, 2023. Studies of sea reefs (1170) habitats in the Baltic Sea and macrophytes in the Baltic Sea and the Curonian Lagoon belonging to the Natura 2000 Network in 2021 [agreement No. 28t-2021-17/sut-21p-5, final report, 31 Jan 2023].

Table 5.4.4. Areas of reef (1170) type habitats (ha) in the Lithuanian Baltic Sea waters, Natura 2000 SAC sites and area's percentage share.

No.	Natura 2000 SAC, code and area		Lithuanian Baltic Sea reef (1170) habitat types		
			Infralittoral reefs	Circalittoral reefs	Infralittoral + circalittoral
		Area, ha	6,840	42,080	48,920
1	Baltic Sea coastal waters (LTPAL0001) 12,633.57 ha	Area, ha	5,537.3	2,983.7	8.52
		Reef habitat type share, %	81	7.1	17.4
		SAC area's share, %	43.8	23.6	67.4
2	Klaipėda-Ventspils Plateau (LTPAL0002) 17,948.5 ha	Area, ha	-	6,626.8	6,626.8
		Reef habitat type share, %	-	15.7	13.5
		SAC area's share, %	-	36.9	36.9
3	Sambija Plateau (LTNER0006) 25,041 ha	Area, ha	-	9.20	9.20
		Reef habitat type share, %	-	21.9	18.8
		SAC area's share, %	-	36.7	36.7
	Total: 55623 ha	Area, ha	5,537.3	18,810.5	24,347.8
		Reef habitat type share, %	81	44.7	49.8
		SAC area's share, %	10	33.8	43.8
	Indicative traits	Zoobenthos	*Mytilus edulis trossulus*	*Mytilus edulis trossulus*	*Mytilus edulis trossulus*
		Macrophytes	*Furcellaria lumbricalis*		*Furcellaria lumbricalis*
		Seabed sediments	Boulders, pebbles	Boulders, pebbles	Boulders, pebbles

Within the proposed OWF site, the most valuable habitat in the aphotic zone is circalittoral boulders and biogenic reef. In the export cable corridor areas, transitioning from aphotic to photic zone, the circalittoral and infralittoral boulders and biogenic reef habitat 1170.

5.4.3 Macrozoobenthos communities

The quantity, abundancy and biomass of benthic fauna species consistently decreases as the underwater slope of the Eastern Baltic deepens. The highest species diversity is observed up to 30 metres. Beyond this depth, from 30 to 50 m, conditions become unsuitable for shallow-water species, and are also unfavourable for deep-water organisms, remnants from the Ice Age. These deep-water organisms, typically mobile and capable of moving freely in the bottom layer, are regularly found only at depths exceeding 60 m, where water salinity is higher[30].

More than 50 macrofauna species are found on the seafloor of the Eastern Baltic, classified as *Coelenterata*, *Nemertini*, *Annelida*, *Arthropoda*, *Mollusca*, etc.

[27] EPA, 2023. Studies of sea reefs (1170) habitats in the Baltic Sea and macrophytes in the Baltic Sea and the Curonian Lagoon belonging to the Natura 2000 Network in 2021 [agreement No. 35t-2022-8/sut-22p-4, final report, 17 Jul 2023].

[28] Daunys D., Šiaulys A., Zaiko A. 2012. Environmental Status of Lithuanian Baltic Sea: Preliminary Assessment. Drafting of the Lithuanian Baltic Sea Environmental Management Strengthening Documents. Drafters: Olenin. S, Daunys D., Bučas M., Bagdanavičiūtė I. KU publishing house, Klaipeda.

Benthic fauna habitats in the assessed area are formed by various species, including the bivalve molluscs *Macoma balthica* burrowing in loose bottom sediments, the bivalve molluscs *Mytilus edulis trossulus* and acorn barnacle *Amphibalanus improvises*, forming colonies in boulders. Perennial algae contribute to biofouling in the photic zone.

The primary species of benthic fauna in the assessed area include:

- *Marenzelleria spp.,* forming a community along the coast in sandy bottom sediments at a depth of 3 to 45 metres. The community comprises 12 benthic fauna taxa, with *Bathyporeia pilosa* and *Hediste diversicolor* being common in the shallows, and *Pygospio elegans* and *Oligochaeta* – in deeper waters;
- The *Macoma balthica* community, widely distributed in the sandy and silty bottoms of the central Baltic Sea, encompassing all known infauna and mobile species for the area. Four forms of this community are identified depending on the depth, with *M. balthica* dominating in all, typically exceeding 70–80% in biomass. The shallower part of the underwater slope (up to about 30 m) shows a more diverse benthic community, including species such as *Mya Arenaria and Cerastoderma glaucum.* In deeper waters, the community biomass is significantly greater and often exceeds 100 g m^{-2} and dominated by large individuals of *M. balthica* and isopod crustacean *Saduria entomon*. However, the species composition is less diverse and the number of its permanent members, such as *Halicryptus spinulosus* or *Bylgides sarsi,* is low;
- *Pontoporeia* communities form at around 50 m depth. *Monoporeia affinis* dominates in shallower areas, with an average of 8 species in the community. Deeper waters are dominated by *Pontoporeia femorata,* with a significantly smaller number of species (2–4). Both species are known to be dominant in deep muddy areas of the Baltic Sea. In all cases, the degree of dominance of amphipods is typically below 50% of the total benthic fauna biomass, indicating a dynamic community composition on the underwater slope which is usually composed of a random set of species that can survive in that environment.

5.4.4 Fish

In the Lithuanian Baltic Sea, a total of 65 fish species have been registered, including 21 freshwater, 33 marine, and 11 migratory species. Approximately 19 of these species fall under protection measures outlined in the Habitats Directive, the Bern Convention, or CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Additionally, five are listed in the Red Book of Lithuania, and 18 are categorised as very rare. Some fish species are frequently encountered, while others, such as swordfish (*Xiphias gladius*), anchovy (*Engraulis encrasicolus*), and hooknose (*Agonus cataphractus*) are found very infrequently, with only one or a few reported occurrences.

Marine Fish

The Lithuanian EEZ is home to some abundant fish populations, including herring (*Clupea harengus membras*), cod (*Gadus morhua callarias*), and flounder (*Platichthys flesus*). These populations represent the area's most abundant fish stocks and are intensively fished.

Three commercial fish species dominate in the PEA site: herring, cod, and flounder. Among dominant fish species the shorthorn sculpin (*Myoxocephalus scorpius*) can be found, with seasonally significant biomass.

The Lithuanian coast of the Baltic Sea is a shallow water area spreading along its entire length, which serves as a vital part of of the Baltic Sea and Curonian Lagoon ecosystems. The coast showcases unique fish communities formed by short-term variations in physical environmental factors, such as wind, wave height and light. Shallow coastal waters also serve as nursery areas for numerous juvenile fish. Most marine, anadromous or freshwater fish that migrate between coastal waters and Curonian Lagoon juvenile fish feed in this area.

The coast features a variety of anadromous fish, such as smelt (*Osmerus eprlanus*), vimba bream (*Vimba vimba*), salmon (*Salmo salar*), sea trout (*Salmo trutta trutta*), whitefish (*Coregonus lavaretus*), twaite shad (*Alosa fallax*), eel (*Anguilla anguilla*), and river lamprey. Most migratory fish species stay close to the shoreline, usually in a depth of up to 20 m; only salmon migrates after pelagic fish shoals which cover significatly greater distances. In the coastal zone where the Curinian Lagoon dischages its waters, freshwater fish regularly occur, such as bream (*Abramis brama*), zander (*Sander lucioperca*), silvery bream (*Blicca bjoerkna*), ide (*Leuciscus idus*), roach (*Rutilus rutilus*), bleak (*Alburnus alburnus*), asp (*Leuciscus aspius*), perch (*Perca fluviatilis*), ruff (*Gymnocephalus cernuus*), and three-spined stickleback (*Gasterosteus aculeatus*).

In summer, the sea is dominated by marine and migratory fish species, while the coast, especially near Klaipėda, is rich in freshwater fish from the Curonian Lagoon. In autumn, September–October, along the coastline of the Baltic Sea,

there are many anadromous fish species, heading to rivers for spawning. In November, only after the water temperatures drops, herring, flounder and cod appear in the coastal waters.

Lithuania's EEZ and coastal waters are of high importantance for the reproduction of the majority of commercial fish stocks. These regions serve as spawning grounds for valuable fish, such as herring and turbot (*Scophthalmus maximus*). Additionally, the EEZ and coastal waters act as nursery grounds for a diverse range of fish, including marine, freshwater, anadromous and semianadromous species. Many fish migration routes pass through these waters. Certain non-commercial fish species, yet essential for the nutrition of commercial fish, also spawn in these areas, including gobies, small sandeel, lumpfish (*Cyclopterus lumpus*), three-spined stickleback, and others. Lithuanian coastal waters are highly important for the restoration of Baltic sprat stock, with abundant sprat spawn and larvae, especially north to Palanga. Approximately 20% of yearling sprat biomass in the eastern part of the Baltic Sea is found in the Lithuania's EEZ, while the rest is distributed in the EEZ of Russia and Latvia. It is also noteworthy that the Lithuanian EEZ marks the northern limit of cod distribution in the Baltic Sea.

Freshwater and Anadromous Fish

Commercial catches of river lamprey in coastal fisheries indicate their accumulation in coastal waters and active migration to rivers for spawning. Unlike most migratory fish, river lamprey do not exhibit natal homing and instead choose for spawning the first rivers encountered during active migration. Given their electroreception capability, an intensive electromagnetic field (hereinafter – EMF) can act as a physical barrier separating the lamprey population. Such impact could have the highest impact during the river lamprey accumulation in the coastal waters and initial migration stages.

Inland water bodies in the area, especially the Baltic Šventoji river and its tributaries, are important for anadromous fish species, such as salmon, sea trout and river lamprey. The river also hosts other rare and protected fish species, such as brook lamprey (*Lampetra planeri*), the lesser studied in Lithuania Ukrainian brook (*Eudontomyzon mariae*), goby (*Cottus gobio*), bitterling (*Rhodeus sericeus*), and spined loach (*Cobitis taenia*). Bivalve molluscs, such as thick shelled river mussel, sensitive to water quality and thermal pollution, are also found here. All the power cable alternatives would inevitably intersect with the tributary of the Baltic Šventoji – Kulšė, a river crucial for sea trout spawning, where some of the highest sea trout parr density in the region is regularly recorded during the national salmon monitoring.

5.4.5. Birds and Bats

The Lithuanian Baltic Sea area hosts over 20 species of seabirds[31], and much wider species composition is observed during migration. Geese, ducks, swans, waders, herons and the largest proportion of migrating birds use the sea cost for migration.

Wintering–staging birds. Lithuanian Baltic Sea is also an area of great importance for wintering seabirds. Various species of seabird, including Velvet scoter (*Melanitta fusca*), Long-tailed duck (*Clangula hyemalis*), razorbill (*Alca torda*), Common guillemot (*Uria aalgea*), Red-throated diver (*Gavia tellata*), Great crested grebe (*Podiceps cristatus*), and others, are observed both in coastal waters and the open sea. Benthic feeding birds, such as diving sea ducks, are found diving at depths of 5 to 35 m and occasionally dive deeper, up to 40–50 metres. Therefore, their numbers are high in suitable habitats. Pelagic birds, such as diver and razorbill, can dive to depths of 50–60 m, regularly feeding at a depth of 20–30 metres. The areas used by seabirds for feeding are distributed based on depth and feeding resources, within various distances from the shore. In close proximity to the PEA there are several Natura 200 areas designated for wintering seabird protection.

Migration. The Baltic Sea serves as an important route for migratory birds flying to wintering or breeding grounds. Geese, cranes, divers, passerines, and other birds engage in intensive migration over the Lithuanian marine waters, up to 10 km from the shore. Depending on the species, birds fly either just above the water surface or at heights of several hundred metres or kilometres. Spring migration starts in March and ends in May, while autumn migration starts in August and ends in December, when movements of Northern Baltic of sea ducks peak.

Breeding period. In summer, a few bird species remain in the Lithuanian marine waters. In Lithuania or neighbouring countries there are no marine islands that can hold colonies of sea ducks. The remaining sea birds use the Baltic Sea as a feeding habitat, but nest onshore. The coastal waters are actively used by the local breeding Great cormorant (*Phalacrocorax carbo*), Common tern (*Sterna hirundo*), and various gulls: European herring gull (*Larus argentatus*),

[31] The concept 'seabirds' herein includes any birds that use the marine environment at various stages of their lives: grebes, divers, sea ducks, and some waders.

Common gull (*Larus canus*), Black-headed gull (*Chroicocephalus ridibundus*), and Great black-backed gull (*Larus marinus*). Occasional razorbills and guillemots are also observed in the open sea.

Bat migration. During the autumn migration, an intensive migration of bats is observed over the coast of the Baltic Sea and in the western onshore areas of Lithuania, extending up to approx. 70 km inland from the sea. It is known that some bats captured at the Ventė Cape Ornithological Station and the Pape Ringing Station were observed in the United Kingdom (hereinafter – UK) during the winter. These individuals likely crossed the North Sea or the English Channel. Therefore, bats are capable of flying short distances over the sea, covering the required distance in a single night. Consequently, there is a possibility that bats can migrate to wintering locations over the Lithuanian Baltic Sea near the coast, under favourable conditions. For instance, one of Europe's furthest migratory species, the Nathusius' pipistrelle, migrates over a broad area, traversing both land and coastal regions or flying over the sea from continental Europe to the UK. From the EIA surveys conducted in 2022 for the Lithuanian offshore area, it was observed that bat migration is more prevalent near the coast, with up to 1000 registrations per night within 300 m of the coast. However, this frequency decreases significantly (more than tenfold) at distances of about 5–7 km from the coast. At distances of 30–35 km from the coast, only three random bat ultrasound recordings were detected throughout the entire summer and autumn.

5.4.6 Marine mammals

Three seal species inhabit and breed in the Baltic Sea: Grey seal (*Halichoerus grypus macrorhynchus),* Baltic ringed seal (*Phoca hispida botnica)*, and Eastern Atlantic harbour seal (*Phoca vitulina vitilina*). Among these, only the grey seal, is in listed in the Red Book of Lithuania[32], signifying its status as part of Lithuanian fauna. While the other two species have been observed in Lithuanian marine waters, they are not formally listed among the Lithuanian fauna.

The number of grey seals counted in the whole Baltic Sea region in 2021 was approximately 42,000 individuals. Assuming a haulout fraction of 70%, the total population estimate would be around 60,000 animals. In the southern Baltic Sea Grey seal estimated number is just below 7,000. Seals are regularly observed in the Lithuanian marine waters, particularly in the cold season when they migrate after the fish (Fig. 5.4.5). However, the exact number of these animals is not known.

There is still some uncertainty as to whether the Grey seal population has reached or is close to the carrying capacity of the environment, i.e. the maximum population size of a biological species that can be sustained by that specific environment. Distribution is still slowly expanding, but had not reached the pristine level in the southwest Baltic and fittness estimates such as blubber thickness or pregnancy rate are below their threshold values for GES. The population at the moment is estimated not to have reacehd good condition (HELCOM. 2023).

[32] https://www.raudonojiknyga.lt/

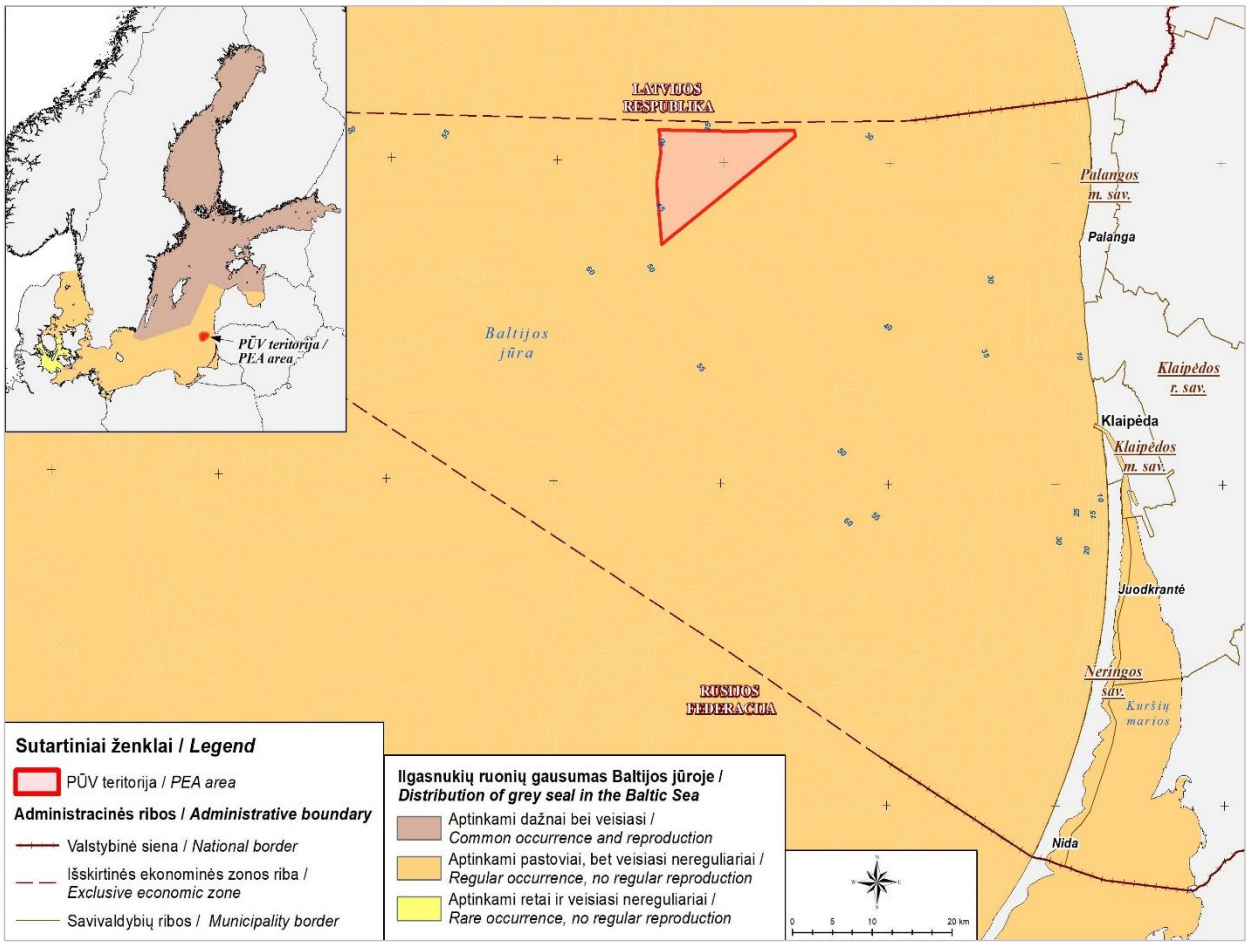


Fig. 5.4.5. Distribution of harbour seal in the Baltic Sea, based on expert input (HELCOM HOLAS 3 Dataset, 2023).

The Baltic Sea is home to two distinct populations of harbour porpoises – one breeding in the Belt, Sound, Kattegat, and Skagerrak, and another along the coasts of Germany, Poland, and eastern Sweden in the central part of the Baltic Sea. These animals migrate seasonally, i.e., they move from the North-East Baltic to the South-East Baltic between November and April. Their diving habits range from 20–60 m, with occasional dives to 200 metres. They feed mostly at night and choose feeding grounds depending on migration of their prey.

Most of Lithuania's EEZ is considered of medium importance for harbour porpoises (Fig 5.4.6), with detection probability ranging from 10% to 20%. The highest average probability of encountering harbour porpoise in the PEA is during the winter season, while the lowest is in the summer season, which is also confirmed by the results of the research in the adjacent OWF area conducted in 2022[33]. However, compared to other Baltic Sea regions, the likelihood of porpoise detection in the Lithuanian EEZ is significantly lower than in the Southeast Baltic or the Western Baltic coasts.

Currently, the status of both Baltic Sea porpoise populations is assessed as unfavorable. The local condition of the Baltic Sea porpoise population is considered to be extremely poor, the size of this population reached only 500 animals according to research data from 2011–2013.

[33] CORPI, 2022–2023. Environmental impact assessment report on the installation and operation of OWF in the maritime territory of Lithuania.

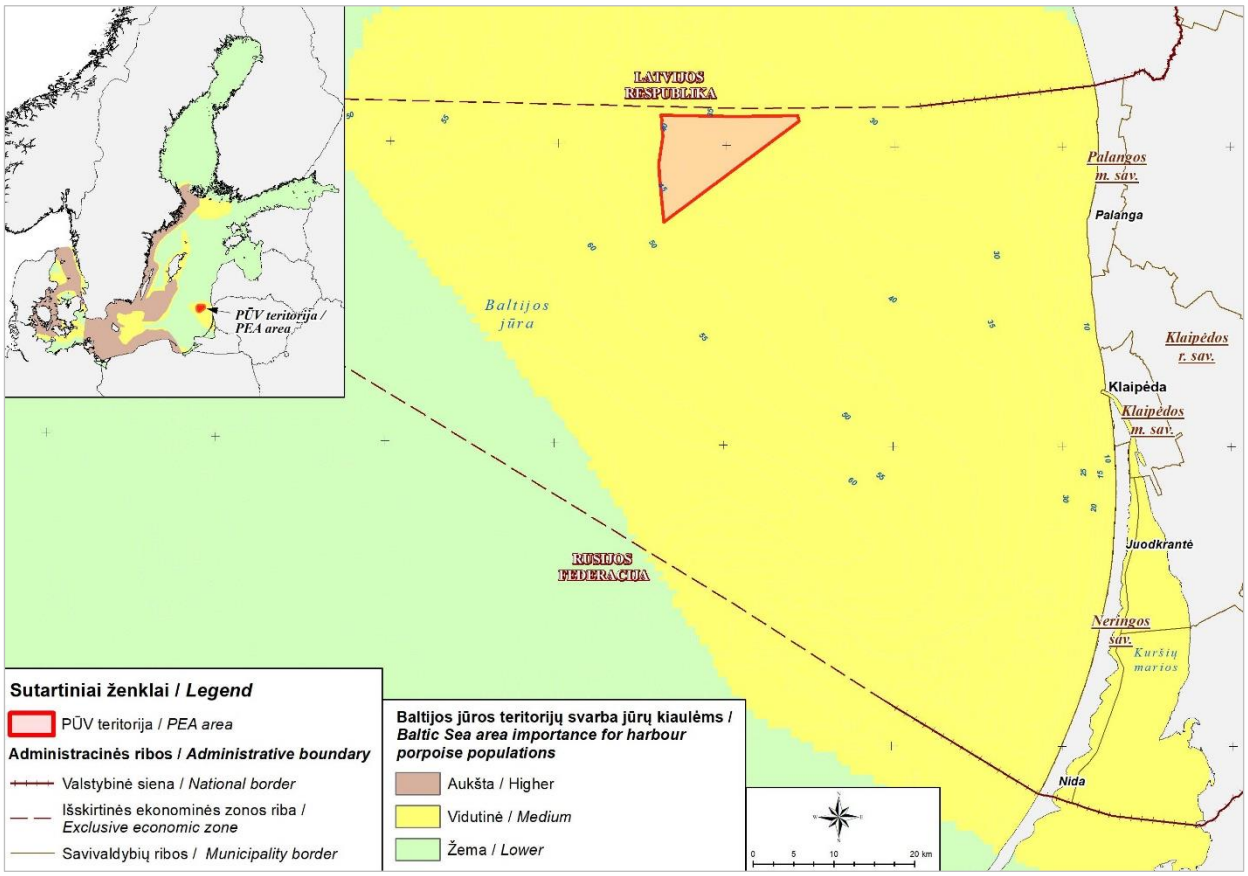


Fig. 5.4.6. Map of areas of importance for the two harbour porpoise populations in the Baltic Sea, based on data from harbour porpoise tracking data, national monitoring data and the SAMBAH project (HELCOM HOLAS 3 Dataset, 2023).

5.4.7 Biodiversity in the onshore part of export cable corridor

In the onshore area, the export cable corridors were proposed during the development of the Engineering Infrastructure Development Plan and the SEIA. This planning takes into consideration existing PAs, Natura 2000 areas, forests, wetlands, and other sensitive and important areas in terms of nature. Additionally, the process incorporates information from the Information System of Protected Species (SRIS) and other available biodiversity data. The connection route would inevitably intersect with forested and agricultural areas.

Common tailless amphibian (*Anuria)* and Sand lizard (*Lacerta agilis*) are found in meadows. Šventoji river is a spawning ground for European river lamprey and smolt (*Salmo trutta morpha fario*) as well as occasionally salmon. Common roach, European perch and other fish species are found in rivers. In Šventoji and its tributaries Darba and Kulšė rivers, pike (*Esox lucius*), perch, roach, rudd (*Scardinius erythrophthalmus*), bleak, minnow (*Phoxinus phoxinus*), gudgeon (*Gobio gobio*), stone loach (*Barbatula barbatula*), sunbleak (*Leucaspius delineatus*) and species of animals and plants of European Community importance, for the protection of which it is necessary to establish protected areas – bitterling, spined loach, goby, the brook lamprey and the Ukrainian brook.

Onshore meadows attract common bird species, such as the Western yellow wagtail (*Motacilla flava*), Whinchat (*Saxicola rubetra*), Eurasian skylark (*Alauda arvensis*), Northern lapwing (*Vanellus vanellus*) for breeding, and Common starling (*Sturnus vulgaris*) and White stork (*Ciconia ciconia*) for feeding. Forests are the home of forest birds, such as woodpecker, Eurasian jay (*Garrulus glandarius*), Eurasian chaffinch (*Fringilla coelebs*), and various titmouses.

Open and forest habtitas in the site are used by the European hare (*Lepus europaeus*), roe deer (*Capreolus capreolus*), wild boar (*Sus scrofa*), and other mammals.

The EIA Report will include details regarding the vegetation, protected habitats, as well as plant and animal species identified within the export cable corridor outlined in the Engineering Infrastructure Development Plan.

5.4.8 Potential impact of the PEA on biodiversity

The installation of the OWF may have both positive and negative impacts on biodiversity.

On the positive side, the OWF may become an artificial reef for invertebrate communities or refuge area for fish.

The main negative aspects for birds are:

- Disturbance and loss of feeding grounds for seabirds;
- Barrier effect for migrating birds;
- Direct collision and fatalities due to the OWF presence;
- Breeding ground loss (inland territories).

Additional adverse effects on marine life may occur, such as underwater noise during the installation of OWF, which may harm body tissues, disrupt communication, alter behaviour and/or cause displacement from natural habitats. Migrating bats may also face barriers and risks of harm. The direct loss of breeding and feeding habitats and species due to the construction of the infrastructure, and the indirect loss due to the dispersion of sediment over a wide area will be investigated.

As a part of the EIA, the impact of underwater noise caused, particularly during foundation installation, will be thoroughly assessed. Mitigation measures to minimise noise impact, especially during pile-driving, will be proposed.

Additionally, for the onshore area, the EIA will assess the potential impact of constructing and operating export cables on local flora and fauna.

5.4.9 Scope of the EIA

Table 5.4.5. Overview of the EIA research and the information to be provided in the EIA Report

Type of study	Research to be carried out/method
Flora	Assessment of existing vegetation in the planned export cable corridor.
Seabed habitats	Bottom sediment samples (using VanVeen grab) containing invertebrates will be collected once using snapper / dredger onboard the vessel. The sampling sites will be selected with consideration of lithological soil structure and depth. It is planned to examine the distribution / boundaries of benthic habitats, taxonomic / species composition of benthic fauna, as well as abundance and biomass of each species.
Fish	A yearly survey of fish communities will be conducted in the PEA site or the adjacent waters using trawls over a two-year period. Collection of biological data of fish communities by deployment of specialised multiple sizes of hole scientific nets. The assessment and data collection process will adhere to the methodology approved by ICES and HELCOM.
Birds, bats	Vessel-based surveys of birds resting and feeding on water for a two-year period in total, conducted monthly during the spring-autumn seasons (May-October). Aerial survey of birds, resting and feeding on water for a two-year period in total, conducted monthly during the autumn-spring seasons (November-April). Observation of bird migration by visual and radar methods during the spring and autumn migration seasons. During monitoring, data on species composition, abundance of migrating and resting birds will be collected. Recording of bat migration and flight intensity using an ultrasonic detector in the area and along the sea coast. Monitoring of bird breeding areas (on the ground and in trees); identification of nests and feeding areas along the onshore export cable corridors.
Marine mammals	Conducting monthly marine mammal surveys along the defined transects using planes or vessels throughout all seasons of the year. Passive acoustic monitoring (F-Pods) of porpoises.
Underwater noise	Measuring current underwater noise (using UN monitoring equipment – Sound Traps installed offshore) level and modelling potential noise propagation during the installation of WTG foundations.
Information provided in the EIA Report	

Aspect considered	Information to be provided
Current situation	Information on the national PAs and Natura 2000 sites, respective protected fauna species, their protection goals. Information on the local marine and terrestrial fauna and flora including: • Seabed habitats; • Ichthyofauna; • Bird and bat species specific to the area; • Intensity of gathering, feeding, resting, wintering grounds and migration of birds and bats; • Marine mammals; • Habitats, flora and forests of European Community importance in the onshore part of the export cable corridor; • Fauna in the onshore part of the export cable corridor.
Potential significant impact during the OWF installation, operation, and decommissioning phases	• Potential impact on the PAs and on integrity of Natura 2000 sites in the marine and in the onshore areas. • Potential impact on benthic biotopes, fish species, birds, bats and marine mammals. • Potential impact of the underwater noise generated by the OWF on marine animals, including mammals and fish. • Potential impact of the OWF on migration patterns of animals (birds, fish, mammals) within the Lithuanian waters of the Baltic Sea. • Potential cumulative impact resulting from various existing and/or planned activities, including fishing and shipping, in the PEA site and its vicinity, with a focus on biodiversity. • Potential cumulative impact on biodiversity, including fish, marine mammals, birds and bats, arising from the OWFs planned both in Lithuania's EEZ and other countries marine areas. • Impact on biodiversity due to potential hydrological regime changes, EMF, underwater noise, and other adverse factors resulting from the OWF and export cable corridor. • Potential impact on PAs and biodiversity, encompassing both fauna and flora in the terrestrial part of the export cable corridor.
Assessment methods	Comprehensive analysis of reference materials and peer-reviewed literature. Mathematical modelling of the impact of underwater noise on marine mammals resulting from the installation of various types of WTG foundations. Recording of birds, bats, and marine mammal observations in the PEA site. Collection of biological data of fish communities by deployment of specialised multiple sizes of hole scientific nets (HELCOM, 2019) Expert judgment. GIS mapping for the preparation of visual materials.
Impact mitigation measures	Measures to prevent, mitigate, and compensate for the impact on biodiversity during the construction of the WTGs and operation of the OWF.

5.5 Landscape

5.5.1 Landscape characteristics of the PEA site

The PEA site of the OWF is situated more than 36.8 km from the shoreline in the open sea and falls outside the scope of the general landscape defined in the National Landscape Management Plan[34] (Fig. 5.5.1).

[34] Approved by Order of the Minister of Environment of the Republic of Lithuania No. D1-703 of 2 October 2015 "On Approval of the National Landscape Management Plan."

Based on the morphological zoning of the landscape, defined in the National Landscape Management Plan, the offshore part of the PEA site, within the marine waters of Lithuania, falls within the Eastern Baltic Shallow Sea section (A) the South-East Baltic Sea submarine plateau area (I) Curonian-Western Samogitian nearshore submarine plateaus and depressions region (1). The natural landscape of the large marine water bodies offshore part of the PEA site is characterised by the presence of submarine plateaus and depressions.

The proposed export cable corridor alternatives for connecting the OWF are situated in sections of the Western Baltic depression (B) and the Curonian-Samogitian elevation (C) (Fig. 5.5.2). The onshore part of the PEA site extends across the Coastal Depression Area (II) and the Northern Forested Low-Urbanised Agrarian Plain (7) of the Western Samogitian depression (III).

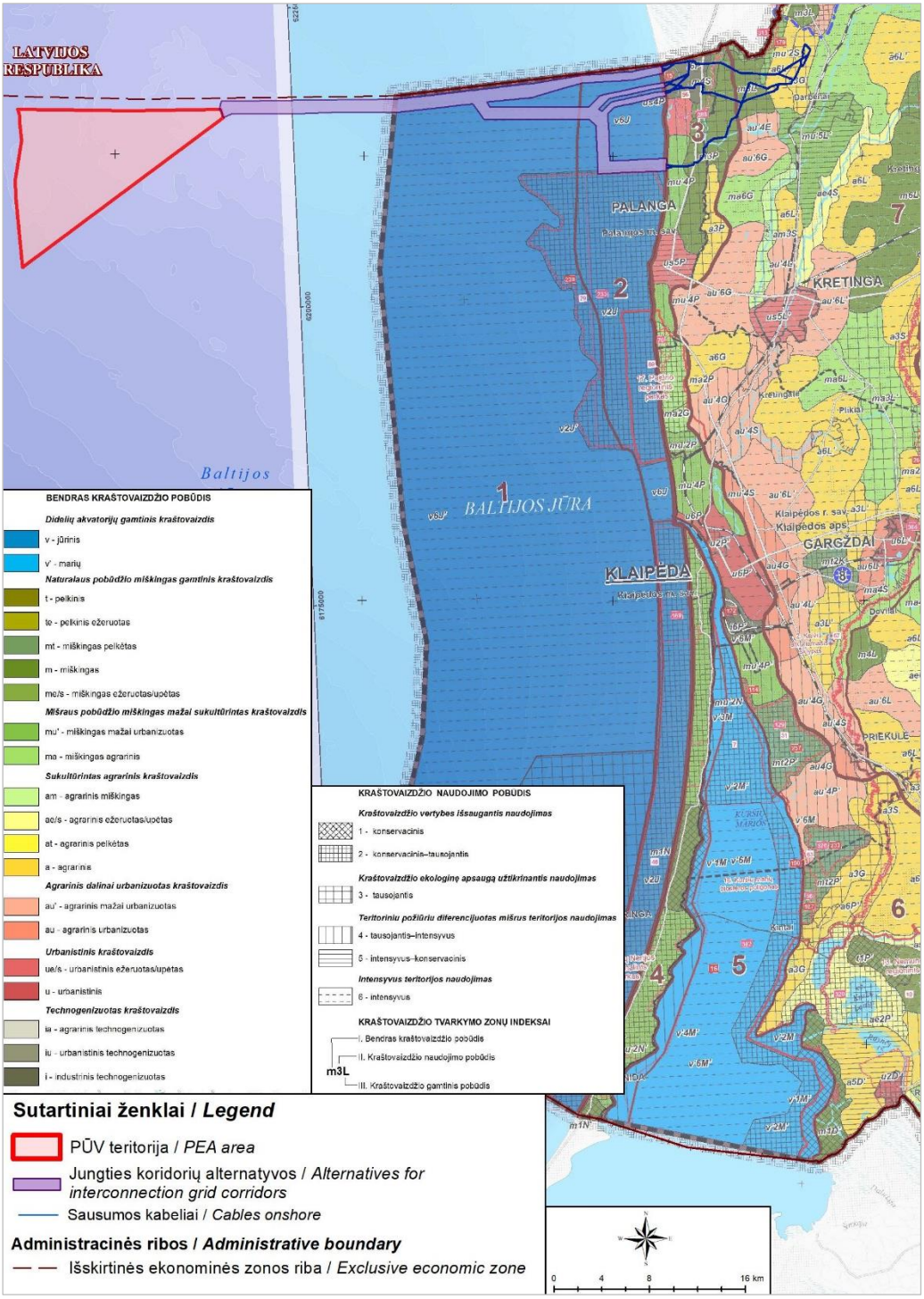


Fig. 5.5.1. Landscape management zones in the PEA site.

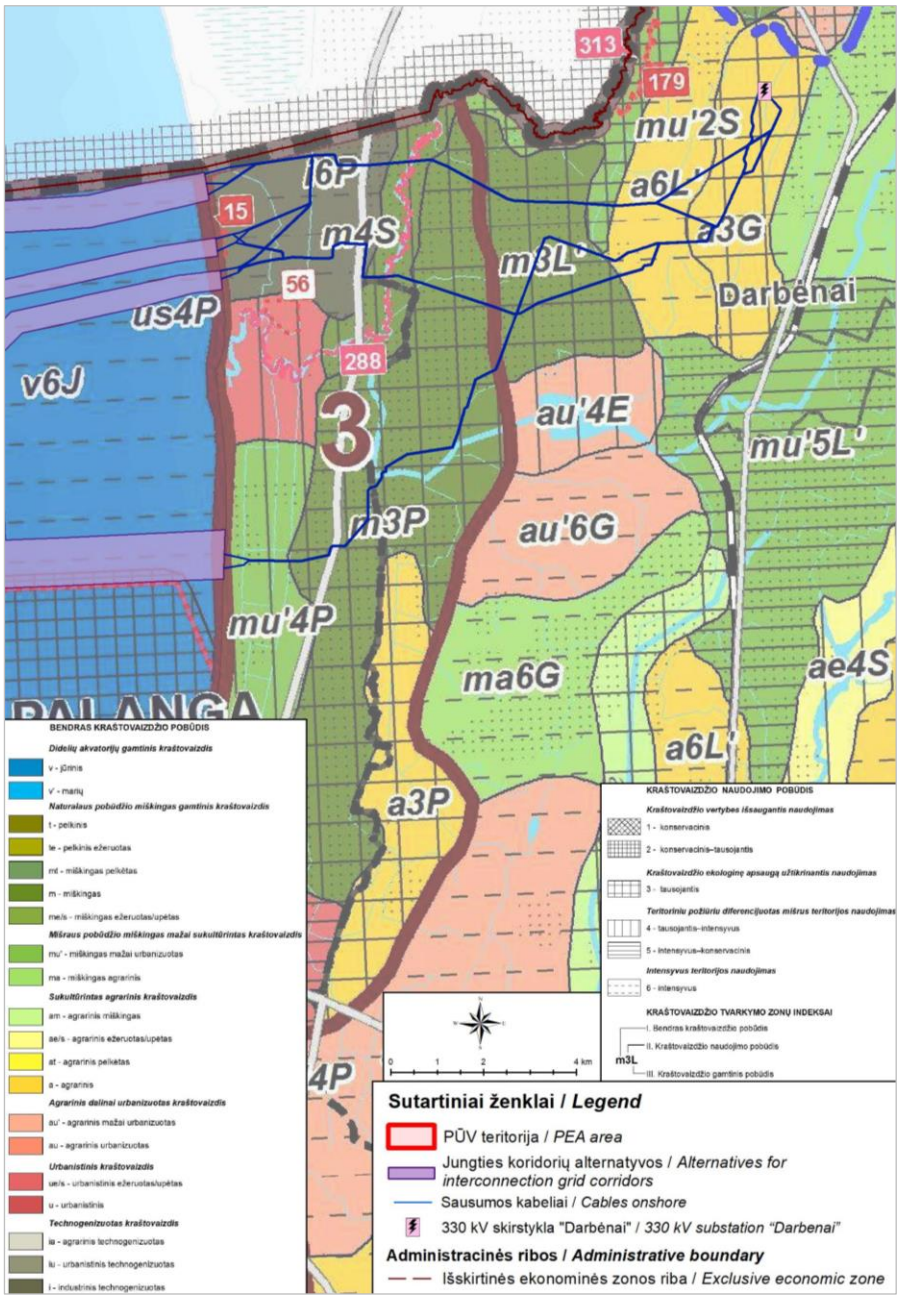


Fig. 5.5.2. Landscape management zones in the PEA site.

The EIA will assess the potential visual impact of the OWF on designated specially protected landscape areas and particularly distinctive landscape complexes, as outlined in the CPTRL. The assessment will extend to the potential visual impact of the OWF on the most valuable landscape and seascape panoramic viewpoints near the shore.

The potential impact on the onshore landscape is particularly associated with the implementation export cable corridors in the areas characterised by aesthetic value and recreational attractiveness, as well as in forested areas where new clearings may be established, or existing ones expanded. The construction of the export cable corridors through rivers, streams, and valleys may have a potential impact on areas of natural framework which are important as migration corridors.

5.5.2 Scope of the EIA

Table 5.5.1. Overview of the EIA research and the information to be provided in the report

Type of study	**Research to be carried out/method**
Determination of potential visuality	Photo fixation and visualisation of the OWF site from the closest viewpoints on the shore, focusing on the most valuable landscape panoramas. Assessment of the visibility of the OWF, considering factors such as the area of visual impact of new facilities and its vertical angle of visibility.
Information provided in the EIA Report	
Aspect considered	Information to be provided
Current situation	Information on landscape: • description of landscape characteristics; • identification of the nearest recreational areas.

	Natural framework in the continental part of the PEA territory.
Potential significant impact during the OWF installation, operation, and decommissioning phases	Impact on the landscape, recreational areas. Potential cumulative impact on the landscape of planned OWFs within the Lithuanian EEZ. Potential impact on the landscape and natural framework in the terrestrial part of the export cable corridor route.
Assessment methods	Comprehensive analysis of reference materials and peer-reviewed literature. Assessment and visualisation of visual pollution of the sensitive receptor(s) through using Zone of Visual Impact modelling and photomontage techniques: aiming for an objective assessment of potential significant impact of the PEA on the local landscape. Expert judgement. GIS mapping for the preparation of graphical materials.
Impact mitigation measures	Measures to reduce visual impact on the landscape.

5.6 Cultural heritage

5.6.1 Review of immovable cultural heritage in the PEA site

Protection of underwater heritage is regulated by the UNESCO Convention on the Protection of the Underwater Cultural Heritage, which Lithuania ratified on 12 June 2006. Under this convention, underwater cultural heritage refers to historically and culturally significant heritage located in the water, containing clear examples of human history.

According to information from official sources such as the Lithuanian Transport Safety Administration and the Department of the Cultural Heritage, several dozen sunken objects (wrecks) have been identified within the Lithuanian EEZ. Some of these area registered in the Cultural Heritage Register. There are also objects of cultural heritage found at the nearshore.

There are no registered cultural values in the planned OWF site. The nearest registered cultural value is the site of “L-14” wreck (38471), located approx. 33.9 km away (Fig. 5.6.1).

None of the considered export cable corridor intersects with known/registered underwater cultural heritage sites. The closest is the “L-1” (3846657) wreck,located approx. 135 m away from the nearest export cable corridor (Figure 5.6.1). The "L-1" wreck has an established 500 m safety zone, which overlaps with the boundaries of one of the planned export cable corridors. However, in this overlapping area, open trenching for the installation of underground cable route is not foreseen, i.e. there will be no direct impact on the bottom, as the entire section of the connection corridor shallower than 7-10 m depth will be handled using HDD or similar technology - laying the cables deep under the seabed (at the depth of approx. 40 m) - thus not disturbing this area (wreck and the safety zone) will not be affected.

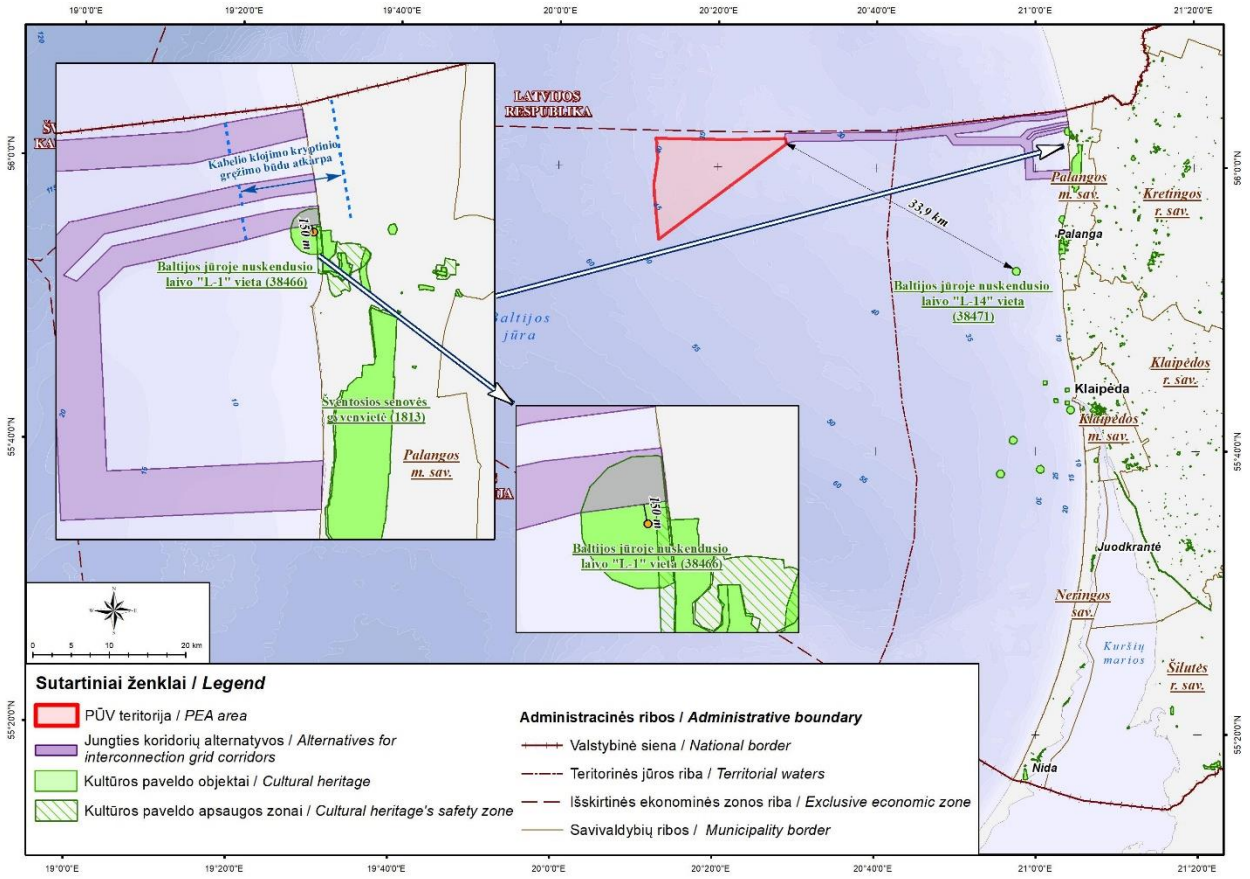


Fig. 5.6.1. Objects of marine cultural heritage.

According to the data of the Lithuanian Transport Safety Administration, dozens of wrecks are identified within the Lithuanian EEZ that are not listed in the Cultural Heritage Register.

Most of the wrecks are industrial ships, but there are also noteworthy discoveries, including the remains of wooden ships of great scientific value. Additionally, several valuable areas of the underwater cultural seascape with natural relicts and tree remains have been identified.

One specific site is marked adjacent to the PEA site, but falls outside its boundaries (Fig. 5.6.2).

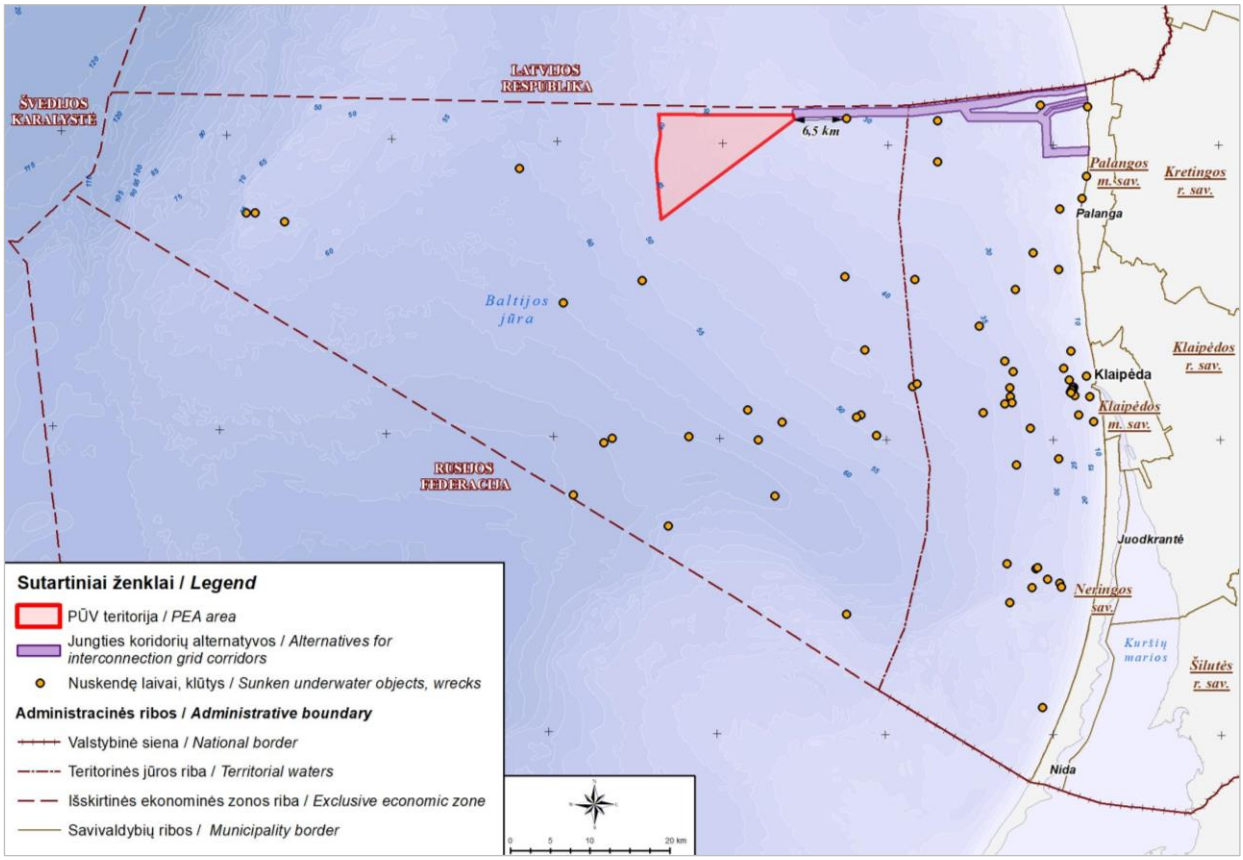


Fig. 5.6.2. Identified locations of wrecks.

The installation of the export cables and TS onshore will require soil movement, potentially impacting both registered and non-registered cultural heritage assets. The EIA Report will thoroughly analyse this potential impact along the export cable corridors approved by the final spatial solutions of the Engineering Infrastructure Development Plan. Approved route(s) will include archaeological investigations as mandated by Heritage Management Regulation PTR 2.13.01:2022 to assess the environmental impact of PEA (clause 7.5) and large-scale earthmoving projects exceeding 1 hectare (clause 7.8).

In accordance with the Regulation, the archaeologist responsible for preparing the archaeological research project will determine the type and extent of archaeological studies within the EIA, subject to approval by the scientific archaeology commission. Notably, further detailed archaeological research (if deemed necessary), according to legal acts, will only proceed after selecting a specific connection alternative and developing a technical project, which reveals the precise design solutions and extent of soil movement activities.

The assessment concerning heritage protection will draw upon historical, archaeological, and other studies. Supplementary documents prepared for other purposes may be used in the EIA report if they meet requisite standards. As one proposed connection corridor option (the southern route, see Fig. 3.2.14) traverses the territory of the state-protected cultural site of national significance – the Ancient Settlement of Šventoji (registered cultural value code 1813) – assessment of potential impacts on its valuable attributes, environmental authenticity, cultural landscape, and topography will be essential post-approval of this corridor alternative by the SEIA.

5.6.2. Scope of the EIA

Table 5.6.1. Overview of the EIA research and the information to be provided in the EIA Report.

Type of study	Research to be carried out/method
Wreck identification	Seabed surveys and wreck identification within the OWF site and along proposed export cable corridors.
Cultural heritage	Archaeological surveys in the area of export cable corridors and TS.
Information provided in the EIA Report	

Aspect considered	Information to be provided
Current situation	Information on registered cultural values offshore and onshore. Information on identified wrecks.
Potential significant impact during the OWF installation, operation, and decommissioning phases	Potential impact on cultural assets. Assessment of potential impacts on the Ancient Settlement of Šventoji valuable attributes, environmental authenticity, cultural landscape, and topography.
Assessment methods	Analysis of raw side scan sonar data (using SonarWiz software) Review and analysis of reference materials and literature. Expert judgement on archaeological survey results. Expert judgement on seabed survey results. GIS mapping and compilation of relevant schemes.
Mitigation measures	Measures/regulatory framework in order to preserve valuable objects.

5.7 Public health

5.7.1 Impact on public health

The expected significant impact of the PEA on public health is determined by assessing the potential direct and indirect effects on public health of biological, chemical and physical factors caused by the PEA, and the interaction between environmental elements and public health.

Offshore

The area designated for OWF in the Baltic Sea is approximately 36.8 km from the coast. Due to the large distance from residential, public and recreational areas on the coast (Figure 5.7.1), the health-related factors of the OWF are expected to be negligible and will not be assessed in the EIA.

During construction, a temporary and localised increase in noise is possible due to the installation of offshore WTGs and the construction of a connection cable corridor in the offshore part of the area.

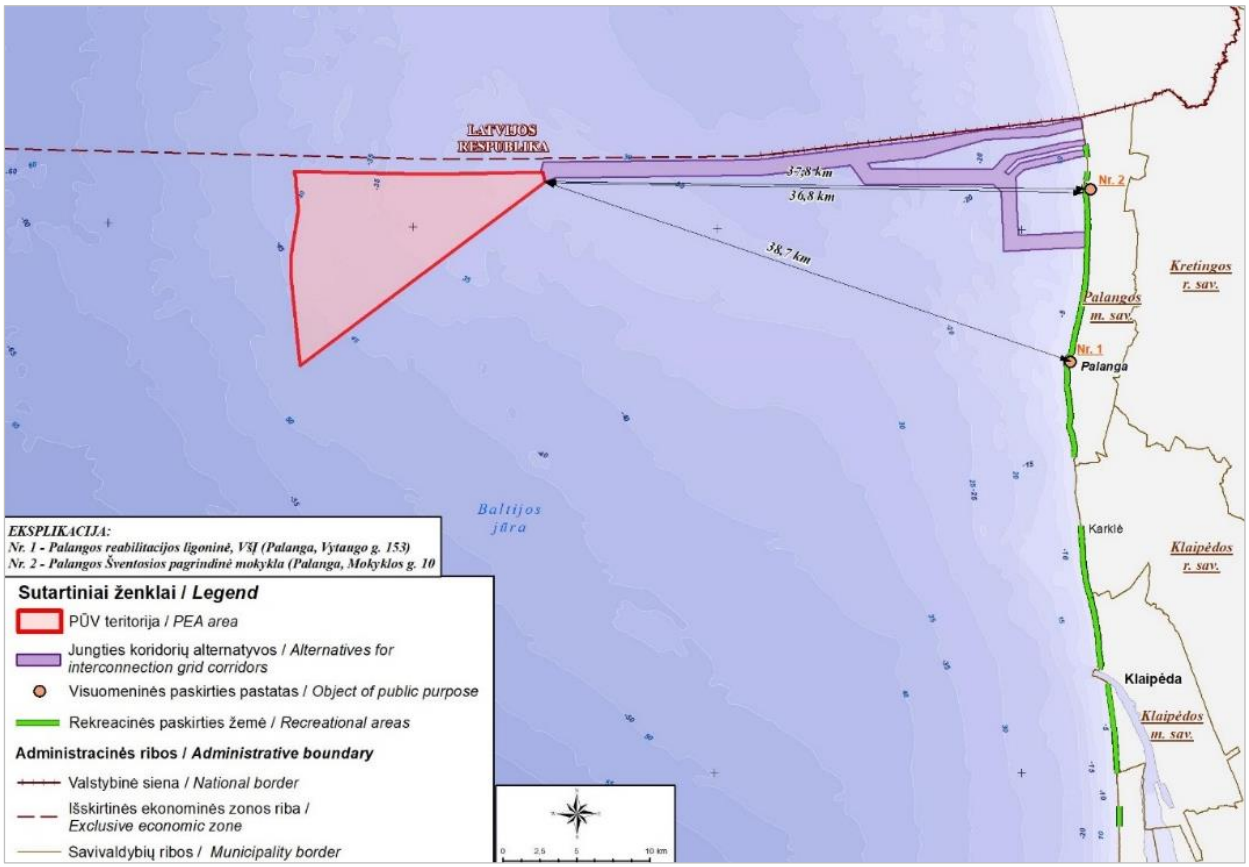


Fig. 5.7.1. Residential, public and recreational and residential areas located on the shore are closest to the area of the OWF.

Onshore

In terms of the PEA, the potential impacts on public health are relevant for onshore areas in Lithuania, especially where the construction of export cables for the OWF is expected. In order to select the export cable corridor routes, the distances from existing and planned residential areas were analysed at the SEIA stage of the Engineering Infrastructure Development Plan, and the most appropriate routes have been selected in relation to urbanised areas.

The onshore part of the export cable corridors is planned in the vicinities of Palanga City and Kretinga District municipalities (Fig. 5.7.2). HDD or other similar technology will be applied for export cable landfall, so that the impact on bathing, beach and recreational areas on the coast will be minimised. Open trenching for the installation of underground cable routes may result in short-term noise and a temporary increase in air pollution.

Additionally, a new onshore TS is planned in one of the designated areas outlined in the concepts of the Engineering Infrastructure Development Plan (Fig. 5.7.2). During the construction works, a temporary increase in air pollution and noise is possible due to machinery, road traffic and ongoing earthworks. The impact of the proposed TS on public health will be assessed in terms of noise and electromagnetic radiation.

The impact on public health is assessed for the population living in the area affected by the PEA, in particular for the most vulnerable groups of the population (e.g., children, the elderly and the sick) who may be most sensitive to increased pollution.

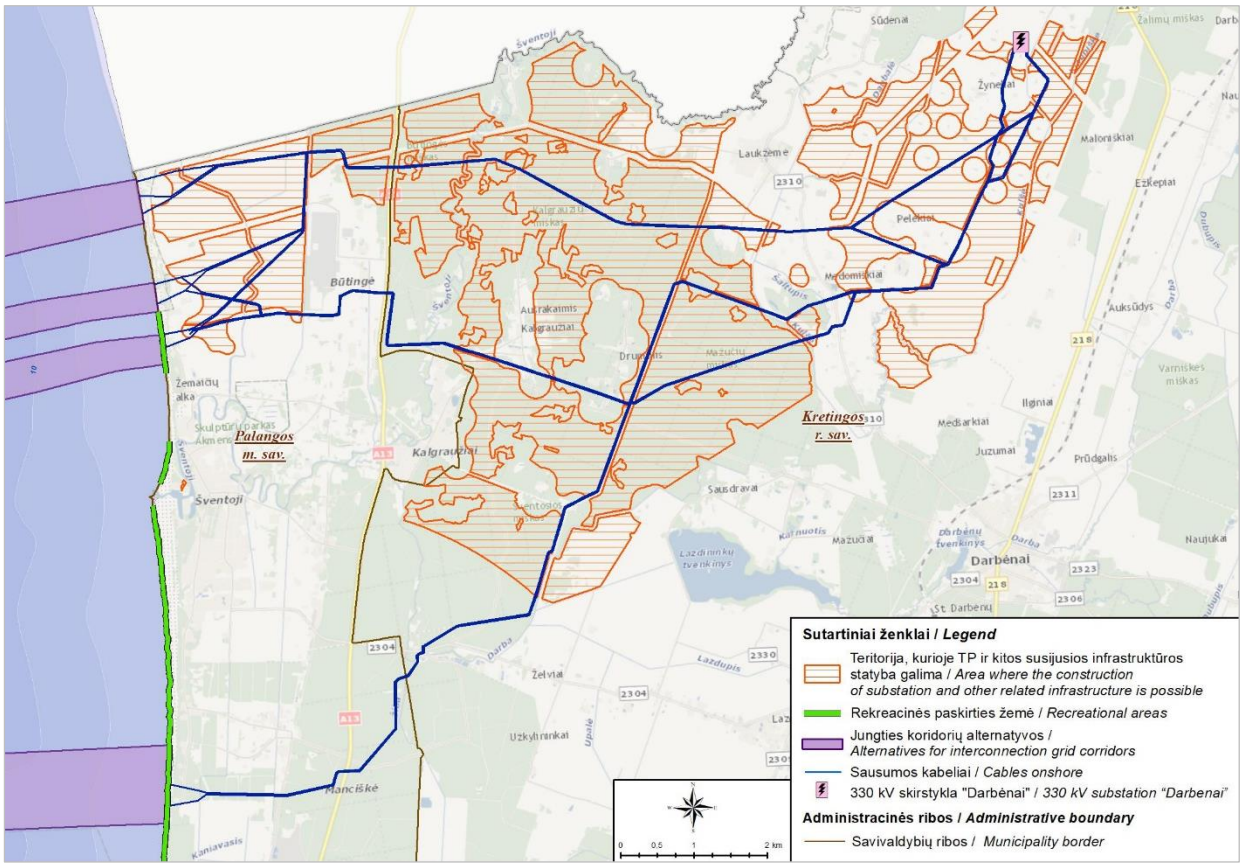


Fig. 5.7.2. Alternatives of the onshore connecting cable routes.

5.7.2 Scope of the EIA

Table 5.7.1. Overview of the information to be provided in the EIA Report

Aspect considered	Information to be provided
Description of the current situation	Identification of residential, public, and recreational areas within the coastal area (municipalities of Palanga City and Kretinga District). Demographic indicators of the regional population. Analysis of population morbidity rates. Description of factors affecting health.
Potential significant impact during the OWF installation, operation, and decommissioning phases	Analysis of physical factors of PEA affecting public health. Assessment of pollution resulting from the PEA, with potential significant impact on public health.
Assessment methods	Application of methodological recommendations for impact assessment on public health. Expert assessment. GIS mapping for the preparation of graphical materials.
Measures to prevent, reduce, or compensate for major adverse effects on the environment	Measures to reduce to the impact of economic activity on public health. Measures to mitigate a potential impact on residential, recreational or other areas as outlined in the approved territorial planning documents.
Graphical material	A map indicating the planned facility, predicted levels of physical pollution, proximity to the planned facility (residential, public buildings, pollution, or other significant facilities), and a size of the protection zone.

5.8 Material assets

5.8.1 Industries that may be affected by the PEA development

The prospects for offshore wind energy development are interconnected with various ongoing activities in the marine and terrestrial areas.

Offshore:

- Shipping, navigation routes;
- Fishing;
- Soil dumping at sea;
- Dredging (including sand excavation for beach nourishment);
- Recreational resources (diving sites);
- Engineering Infrastructure;
- Military, aviation and radar (including military uses and restrictions);
- Other potential activities (prospect sites of useful resources) scoped out as impacts cannot be defined for future sea uses.

Onshore:

- Agriculture and other land uses;
- Recreation.

In order to rationally use marine areas and marine resources, it is crucial to coordinate existing and future activities while considering the interests of sea users.

It should be noted that the installation of the OWF will significantly contribute to the implementation of objectives of the Lithuanian Energy Independence Strategy.

Fishery sector

Marine and coastal fishing is one of the main activities that could be directly affected by the PEA in the long term.

Although fishing efforts in the EIA area are significantly reduced as a result of the EC's fisheries management measures, the EIA Report will include an analysis of the impact on fisheries both with and without the current cod fishing ban. A separate impact analysis will be carried out on nearshore fisheries (possible reduction of fishing areas, deterioration of fishing conditions, etc.) during the construction and in subsequent phases. The activities of each nearshore fishing enterprise are geographically well defined by the official division of coastal fishing areas, and therefore any activity that takes place in the fishing area has a direct impact on the fishing opportunities of specific enterprises.

The Law on Fisheries of the Republic of Lithuania provides for the right of fisheries enterprises to receive compensation for the loss of fishing opportunities (including temporary) as a result of the activities carried out by public authorities, the State, municipalities or carried out on behalf of other legal entities, unless the loss of fishing opportunities is due to the imposed fisheries regulations. The amount of compensation shall be calculated in accordance with Article 171(7) of the Law on Fisheries of the Republic of Lithuania. Therefore, during the construction and operating phases, when fishing opportunities are restricted, companies must be compensated for the losses they incur.

At present, the losses due to the loss of fishing opportunities are calculated according to the Order of the Minister of Agriculture of 3 December 2008 No 3D-695 "On the approval of the rules for calculating and fixing the rates for the loss of fishing opportunities due to the activities of other persons". At the time of construction or operation of cables, losses must be calculated according to the rates in force at that time or according to the new legislation adopted.

5.8.2 Scope of the EIA

Table 5.8.1. Overview of the information to be provided in the EIA Report

Aspect to be considered	Information to be provided
Current situation	Existing usage of considered site onshore and offshore.
Potential significant impact during the OWF installation, operation, and decommissioning phases	Potential impact on other economic sectors, both marine and terrestrial, including the Klaipėda State Seaport, aviation, recreation, national security.

	Potential impact on fisheries and fishing activities (such as decreased fishing grounds, worsened fishing conditions, etc.) during the phases of construction, operation, and decommissioning of the OWF. The sizes and regulations of the protection zones of the export cables connecting offshore and onshore and the requirements specified in the Law on Special Land Use Conditions.
Assessment method	Analysis of primary and secondary data. Expert judgment. GIS mapping for the preparation of graphical materials.
Mitigation measures	Mitigation of the potential socio-economic impacts, including export cable installation impacts on the onshore part. Recommendations for compensatory measures for fishermen.

5.9 Risk analysis and assessment

5.9.1 Potential risks of developing the OWF

Major accidents and disasters

During the construction and operation of an OWF, potential emergency situations and associated risks to people and the social environment may arise. These include hazards related to the rotating blades, assessing the potential for partial or complete detachment of blades, tower collapse, and the impact of electric voltage on maintenance personnel. The risk of collisions with aircraft and ships in proximity to WTGs or the OWF is also present.

Potential environmental hazards resulting from emergencies may include minor oil leaks from rotors, fuel spills from vessels, collisions, and oil spills from TS. The technical design will include measures to protect the TS from potential direct collision with ships, thus preventing oil spillage into the water. Damages of marine fuel tanks is rare, as these tanks are protected against damages during direct collision.

The EIA Report will provide statistical data on transformer oil and ship fuel leakage into the water during such collisions, proposing widely accepted measures to prevent such emergencies. Measures for reducing the potential distribution will also be proposed with consideration of statistics of such events. These measures will be designed to halt pollutant spread and prevent entry into the coastal zone, including areas such as Palanga and other beaches.

The EIA Report will assess the capabilities of the *Maritime Rescue Coordination Centre* of *Naval Forces of the Lithuanian Armed Forces* to address local pollution incidents in the OWF site. There are proposals submitted to append the Plan for Response to Sea Pollution Incidents within the Sea Area approved by the Order of the Minister of National Defence of the Republic of Lithuania, the Minister of Environment of the Republic of Lithuania and the Minister of the Interior of the Republic of Lithuania No. V-1044/D1-673/1V-596 of 9 November 2009, with provisions regarding mitigation of pollution incidents at OWF.

The operation of export cables connecting the OWF to onshore facilities may pose a risk of cable damage and power impact to the environment and humans. However, the likelihood of such impact is minimal due to the cable reliability and will therefore not be analysed separately. Dangerous objects within the cable protection zone and nearby areas, including sites storing dangerous substances will be identified onshore. Other risks for the safe operation of the export cables will be identified.

The primary risk during the construction and operation of an OWF is navigational risk, particularly the potential for ships colliding with WTGs. Table 5.9.1 summarises risk objects, key dangerous factors, and possible external influences that may lead to emergency situations.

Table 5.9.1. Hazardous factors for the risk objects

Risks	Most common hazardous factors
OWF	WTGs OSP Electricity cables
WTG	Rotating blades

	Tower structures Rotor oil Electrical equipment
TS	Electrical equipment Transformer oil
Electricity cables	Cable damage and power impact to environment and humans
External actions and factors	
Passing-by vessels	Transportation of dangerous substances Marine fuel Bilge oils Damages to tower structures
Flying-by aircraft	Aircraft fuel Damages to blades
Birds	Bird deaths Rotor failures
Extreme hydro-meteorological conditions	Icing Hurricanes, severe storms

The existing regulations in the Republic of Lithuania impose an obligation to use the highest values in projects to hedge against potential deformations of construction structures that could lead to accidents and collapses. To ensure safe operation of the WTGs, models are to be selected considering the climatic conditions of the area.

The EIA Report will address a potential impact of accidents and emergencies during the operation of the OWF. It will propose solutions to mitigate such impacts and provide preventive measures to reduce the likelihood and severity of potential accidents and emergencies.

5.9.2. Scope of the EIA

Table 5.9.2. Overview of the information to be provided in the EIA Report.

Aspect to be considered	Information to be provided
Description of the current situation	Information on shipping lanes and external roadsteds of the port of Klaipėda, underwater infrastructure (cables, pipelines) in the vicinity of the OWF.
Potential significant impact during the OWF installation, operation, and decommissioning phases	Assessment of the potential impact of accidents and emergencies during the installation, operation and decommissioning of the OWF: • the risk of damage to infrastructure or facilities from natural or catastrophic meteorological and hydrological phenomena, including geological processes and phenomena, posing threats to human life, health, and biodiversity; • the expected adverse effects on the environment, human health, and maritime activities due to vulnerabilities in the OWF fleet during extreme events and potential emergencies, including those induced by climate change.
Assessment methods	Qualitative risk assessment using a risk matrix. The PEA risk analysis, forecasting and assessment of possible emergency situations, and planning of preventive measures will be carried out in compliance with: • Chapter II of the description of the procedure for assessing the impact of planned economic activities on the environment. Section[9];

	• the list of criteria for emergencies[35], indicators of natural, catastrophic meteorological and hydrological phenomena [36].
Measures to prevent, reduce, or compensate for major adverse effects on the environment	Following the assessment of the potential impact of accidents and emergencies during the construction and operation of the OWF: • taking the appropriate solutions to prevent emergencies and accidents, minimising their likelihood; • based on the results of the risk analysis, preventive measures and actions to mitigate the impact of emergency situations will be anticipated and recommended.
Graphical material	Map of the vicinities, including shipping lanes, outer roadstead, and underwater infrastructure network. Maps of potential threats to the OWF, if any identified during the risk analysis.

[35] Approved by Resolution of the Government of the Republic of Lithuania No. 1063 of 14 September 2015 "On Approval of the List of Criteria for Emergencies."

[36] Approved by Order of the Minister of Environment of the Republic of Lithuania No. D1-870 of 11 November 2011 "On Approval of the Indicators of Natural, Catastrophic Meteorological and Hydrological Phenomena."

6 MONITORING

The OWF in the Lithuanian Baltic Sea and its connection to the onshore power grid, along with related infrastructure, will have an inevitable impact on various environmental components. It is therefore important to conduct environmental monitoring.

The monitoring programme draft will be prepared during the EIA process covering the construction and operation phases. The monitoring programme is expected to include monitoring of the WTGs and TS construction impacts, as well as cabling impacts on the seabed, water quality, and biodiversity.

The rationale for monitoring diverse environmental components and the specific monitoring framework will be substantiated in the EIA Report.

7 INFORMATION OF THE POTENTIAL SIGNIFICANT TRANSBOUNDARY IMPACT

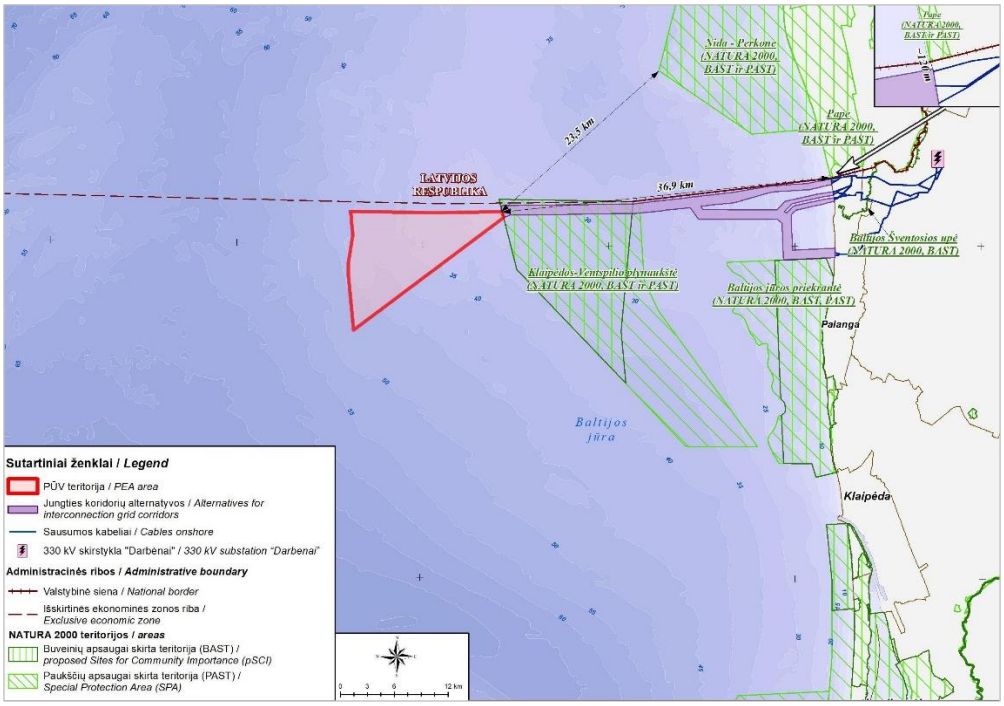
7.1 Potential transboundary impact

The Convention of the United Nations Economic Commission for Europe on Environmental Impact Assessment in a Transboundary Context (hereinafter – the Espoo Convention) mandates a transboundary EIA when the PEA is listed in Annex I of the Espoo Convention. Large installations utilising wind energy for energy production fall under Annex I, as per the second amendment of the Espoo Convention (Decision III/7 of 4 June 2004).

The coordination of the transboundary EIA process is delegated to the Ministry of Environment, as stipulated in the Paragraph 1 of the Resolution of the Government of the Republic of Lithuania No. 900 of 28 July 2000 “On Granting of Powers to the Ministry of Environment and its Subordinate Institutions”.

The OWF is approx. 0.9 km from the Latvian EEZ, 69 km from the Swedish EEZ and almost 36 km from the Russian EEZ. The anticipated transboundary impacts will be thoroughly assessed during the EIA (table 7.1.1).

Table 7.1.1. Main aspects of potential transboundary impact of the PEA.

Aspect / Environmental component	Description of potential impact
Natura 2000 areas	The Natura 2000 sites Nida-Perkonė and Pape, protected under the Birds and Habitats Directives, are located approximately 23.5 km and 36.9 km from the OWF area in the Baltic Sea marine and coastal zone of Latvia[37]. The distance from the northernmost section of the proposed onshore export cable corridor alternatives to the boundary of the Pape Natura 2000 SPA and SAC is approximately 120 metres (fig. 7.1.1). 
Fig. 7.1.1. Location of the nearest Natura 2000 sites on the Latvian side. The site consists of Lake Pape and Nida bog. Grasslands and fens with protected plant species surround the lake, which is an important resting place for many migratory birds and a rich breeding ground for the waterbirds. There are sightings of Eurasian bittern (*Botaurus stellaris*) and the Eurasian whimbrel (*Numenius phaeopus*). The lake is an important foraging area for

[37] https://natura2000.eea.europa.eu/

	many bat species, including the pond bat (*Myotis dasycneme*). Nida bog together with Pape Lake is included in the list of Latvian Ramsar sites. The Natura 2000 SPA and SAC Nida-Perkonė is important for the conservation of reef habitats (1170), the shad and 20 protected bird species – pochard (*Aythya ferina*), tufted duck (*Aythya fuligula*), goldeneye (*Bucephala clangula*), long-tailed duck (*Clangula hyemalis*), mute swan (*Cygnus olor*), coot (*Fulica atra*), black-throated diver (*Gavia arctica*), red-throated diver (*Gavia stellata*), white-tailed eagle (*Haliaeetus albicilla*), black-headed gull (*Larus ridibundus*), velvet scoter (*Melanitta fusca*), common scoter (*Melanitta nigra*), smew (*Mergus albellus*), goosander (*Mergus merganser*), red-breasted merganser (*Mergus serrator*), cormorant (*Phalacrocorax carbo*), Slavonian grebe (*Podiceps auritus*), great crested grebe (*Podiceps cristatus*), little grebe (*Tachybaptus ruficollis*). The potential impacts of PEA on the PAs and values will be assessed in an EIA Report.
Impact on birds	The OWF may potentially pose a challenge for migratory birds and bats in the Baltic Sea. Scientific studies indicate that various bird species, including geese, cranes, divers, passerines, and other species engage in intensive migration over Lithuanian marine waters.
Impact on bats	Bats may also migrate to wintering grounds over the Lithuanian Baltic Sea near the shore under suitable conditions, but the intensity of bat migration is notably lower at approx. 36.8 km from the shoreline compared to the shore or shoreline.
Impact on marine mammals	The impact of OWF on marine mammals is primarily associated with the noisy installation activities, particularly the impact noise generated during pile-driving. Researches show that marine mammals are occasionally observed in the PEA site, but there is a possibility of their presence in the OWF site. Mitigation measures will be implemented as needed to protect marine mammals during the OWF construction and decommissioning phases.
Shipping	The PEA site is outside the established international shipping routes, roadstead, or anchorage sites; and does not border them.
Visual impact	The PEA site is situated approx. 37 km from the shoreline of the Republic of Latvia, making the OWF challenging to observe from shared viewpoints. Consequently, a significant visual impact is unlikely. For the impact assessment purposes, the EIA Report includes visualisations of OWF, and impact assessment as seen from important receptors in Latvia (e.g., beaches).
Mineral Resources	The northern part of the PEA site overlaps with the boundaries of potential oil structures. The potential oil structures are also identified in the marine area of the Republic of Latvia. Given the proximity (0.9 km) to the sea border with Latvia, an assessment of the impact on Latvia's oil resources and their prospective extraction is necessary.
Fishing	According to the classification of the ICES, the Lithuanian marine territory falls within the 26th ICES fishing area (41H10, 40H10, 40G9 and 39H10), where fishing activities involve trawling and set nets. The PEA site falls within fishing polygons 41H10 and 40H10, designated for trawl fishing. The PEA site covers open-sea fishing areas not allocated to specific companies. Although foreign vessels are allowed to fish in these waters, recent data show limited fishing effort by foreign vessels. Between 2015 and 2018, nine Lithuanian-registered vessels and 14 fishing trawlers from neighbouring countries (Latvia and Russia) operated in the PEA site. Foreign vessels dominating the fishing effort from 2015 to 2017, with a share of total fishing effort between 52% and 87%). However, since 2018, the ratio of trawling efforts in the PEA site has shifted, with Lithuanian-registered trawlers accounting for 63–100% of the total fishing activity.

7.2 Transboundary Consultations

Pursuant to Article 3 of the Espoo Convention, the Ministry of Environment will formally notify Poland, Latvia, Estonia, Finland, Sweden, Denmark and Germany in writing regarding the PEA in Lithuania. Specifically, the installation and operation of the OWF in the marine territory of Lithuania, along with the associated EIA.

Upon receiving responses from foreign countries regarding their participation in transboundary consultations, the Ministry of Environment will communicate the expected progress and necessary procedures to the Drafter of the EIA documents.

If required, the EIA Programme will be revised to incorporate the comments received from foreign countries before its approval by the EPA.

The documents of transboundary consultations, including notifications sent by the Ministry of Environment and responses from neighbouring countries, will be submitted in annexes to the EIA Programme.

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ANNEXES

ANNEX 1

Annex 2

Applicable international environmental and social standards

Equator Principles (EP 4)

EP 4 refers to a risk management framework which is adopted to determine, assess and manage environmental and social risk arising from a particular project. The EP 4 (Equator Principles, 2020) are intended to serve as a tool for financial institutions to ensure that the projects that they finance are developed in a manner that is socially responsible and reflects sound environmental management practices.

The EP 4 risk management frameworks primarily refer to IFC PSs, with some additional requirements in relation to Human Rights Impacts (hereinafter – HRI). Further additional requirements of EP 4 include requirements in relation to Climate Change Risk Assessment (hereinafter – CCRA). The EP 4 Guidance Note (Equator Principles, 2022) states that:

- For Category A and, as appropriate, Category B projects. For these projects the CCRA is to include consideration of relevant climate-related 'Physical Risks' as defined by the Task Force on Climate-Related Financial Disclosure (hereinafter – TCFD).
- For all projects, in all locations, when combined Scope 1[38] and Scope 2[39] emissions are expected to be more than 100,000 tonnes of CO_2 equivalent annually. For these projects the CCRA is to include consideration of climate-related 'Transition Risks' (as defined by the TCFD). The CCRA must also include a completed alternatives analysis which evaluates lower GHG intensive alternatives.

Table 1. The EP 4 requirements comprise of the following ten voluntary environmental and social principles.

Equator Principle		Description and EIA Programme
1	Review and Categorisation	When a Project is proposed for financing, the EPFI will, as part of its internal environmental and social review and due diligence, categorise it based on the magnitude of its potential environmental and social risks and impacts. Such screening is based on the environmental and social categorisation process of the IFC. Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale and stage of the Project, and with the level of environmental and social risks and impacts. The categories are: • Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented; • Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and • Category C – Projects with minimal or no adverse environmental and social risks and/or impacts.
2	Environmental and Social Assessment	The EIA Report will ensure that the EIA will follow an appropriate assessment process to address the relevant environmental and social risks and scale of impacts of the proposed Project. The Assessment Documentation will propose measures to recognised, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to the environment, in a manner relevant and appropriate to the nature and scale of the proposed Project. The Assessment Documentation will be an adequate, accurate and objective evaluation and presentation of the environmental risks and impacts.

[38] GHGs released directly from a business: e.g., fuels, company vehicles, air conditioning. Source: Technical Guidance for Financial Institutions – Assessment of Greenhouse Gases

[39] Indirect GHGs released from the energy purchased by an organization: e.g., purchase of electricity. Source: Technical Guidance for Financial Institutions – Assessment of Greenhouse Gases

Equator Principle		Description and EIA Programme
3	Applicable Environmental and Social Standards	The Assessment process including the EIA Report will comply with relevant Lithuanian laws, regulations and permits that pertain to environmental and social issues as well as the international standards listed in section 1.1. It is currently expected that this will fulfil any requirements future EPFIs may have but it cannot be ruled out that the EPFIs may undertake additional due diligence against additional standards relevant to specific risks of the Project and apply additional requirements.
4	Environmental and Social Management System and Equator Principles Action Plan	The EPFI will require an Environmental and Social Management System (hereinafter – ESMS) to be prepared and maintained. Further, an Environmental and Social Management Plan (hereinafter – ESMP) must be prepared to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, an Equator Principles Action Plan (hereinafter – EPAP) will be prepared, outlining gaps and commitments to meet EPFI requirements in line with the applicable standards. The ESMS, ESMP and EPAP will be prepared at a later stage of the project development and is not included in the EIA Programme.
5	Stakeholder Engagement	The EPFI will require demonstration of an effective Stakeholder Engagement, as an ongoing process in a structured and culturally appropriate manner, with Affected Communities, Workers and, where relevant, Other Stakeholders.
6	Grievance Mechanism	The EPFI will require as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The ESMS will be prepared at a later stage of the development of the Project and is not included in the EIA Programme.
7	Independent Review	An Independent Environmental and Social Consultant will carry out an Independent Review of the Assessment process, including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation, to assist the EPFI's due diligence and determination of EP 4 compliance. The Independent Environmental and Social Consultant will also propose or opine on a suitable EPAP capable of bringing the Project into compliance with the EP 4 or indicate where there is a justified deviation from the applicable standards. An independent review will be undertaken a later stage of the development of the Project and is not included in the EIA Programme.
8	Covenants	For all Projects, where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the Project back into compliance. If the client fails to re-establish compliance within an agreed grace period, the EPFI reserves the right to exercise remedies, including calling an event of default, as considered appropriate. This will be undertaken at a later stage of the development of the Project and is not included in the EIA Programme.
9	Independent Monitoring and Reporting	In order to assess Project compliance with EP 4 after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI. This will be undertaken at a later stage of the development of the Project and is not included in the EIA Programme.

Equator Principle		Description and EIA Programme
10	Reporting and Transparency	The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online and that it includes a summary of Human Rights and climate change risks and impacts when relevant. • The client will report publicly, on an annual basis, GHG emission levels (combined Scope 1 and Scope 2 Emissions, and, if appropriate, the GHG efficiency ratio) during the operational phase for Projects emitting over 100,000 tonnes of CO_2 equivalent annually. • The EPFI will encourage the client to share commercially non-sensitive Project-specific biodiversity data with the Global Biodiversity Information Facility (GBIF) and relevant national and global data repositories, using formats and conditions to enable such data to be accessed and re-used in future decisions and research applications. Ignitis Renewables, the Developer of the OWF, will have a dedicated website where all the EIA-related documentation will be provided. For now, for already existing renewables projects, Ignitis Renewables website serves as a platform to upload non-technical summaries and other EIA-related information and make it publicly available.

International Finance Corporation Performance Standards

IFC PSs on Environmental and Social Sustainability.

Table 2. From January 2012, the PSs include (IFC, 2012).

Performance Standard		Description	EIA Programme
1	Assessment and Management of Environmental and Social Risks and Impacts	The objectives of PS1 are: • To identify and evaluate environmental and social risks and impacts of the project; • To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimised and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment; • To promote improved environmental and social performance of clients through the effective use of management systems; • To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately; • To promote and provide means for adequate engagement with Affected Communities throughout	The EIA Report will support[40] that the following requirements are met in the ESIA: ESMS – conducting of a process of environmental and social assessment and establish and maintain an ESMS appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts. The ESMS shall incorporate elements related to the following: a. Policy, defining the environmental and social objectives and principles; b. Identification of risks and impacts; c. Management programs; d. Organisational capacity and competency; e. Emergency preparedness and response; f. Stakeholder engagement; g. Monitoring and review: Establishment of procedures to monitor and measure the effectiveness of the management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements;

[40] Meaning that the EIA shall provide assessments and information/findings that shall enable the ESIA to meet these particular objectives.

Performance Standard		Description	EIA Programme
		the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.	h. External Communications and Grievance Mechanisms; i. Ongoing Reporting to Affected Communities.
2	Labor and Working Conditions	The objectives of PS2 are: • To promote the fair treatment, non-discrimination, and equal opportunity of workers. • To establish, maintain, and improve the worker-management relationship. • To promote compliance with national employment and labour laws. • To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. • To promote safe and healthy working conditions, and the health of workers. • To avoid the use of forced labour.	The EIA Report will support that the requirements related to: Working Conditions and Management of Worker Relationship, Protecting the Work Force, Occupational Health and Safety, Workers Engaged by Third Parties and to Supply Chain are met in the ESIA. Occupational Health and Safety are highly relevant for the EIA Programme due to its offshore survey programme. The EIA will be undertaken under a safe and healthy work environment, taking into account inherent risks in its particular sector and specific classes of hazards in the client's work areas, including physical, chemical, biological, and radiological hazards, and specific threats to women. The Developer will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimising, as far as reasonably practicable, the causes of hazards. The EIA will be conducted in a manner consistent with good international industry practice, as reflected in various internationally recognised sources including the WBG EHS Guidelines.
3	Resource Efficiency and Pollution Prevention	The objectives ofPS3 are: • To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities; • To promote more sustainable use of resources, including energy and water; • To reduce project related GHG emissions.	The EIA Report will support that the requirements related to Resource Efficiency and to Pollution Prevention are met in the ESIA.
4	Community Health, Safety, and Security	The objectives of PS4 are: • To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances; • To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a	The EIA Report will support that the requirements related to Community Health and Safety and to Security Personnel are met in the ESIA.

Performance Standard		Description	EIA Programme
		manner that avoids or minimises risks to the Affected Communities.	
5	Land Acquisition and Involuntary Resettlement	The objectives of PS5 are: • To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs; • To avoid forced eviction; • To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected; • To improve, or restore, the livelihoods and standards of living of displaced persons; • To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.	The EIA Report will support that, the requirements related to Land Acquisition and to Involuntary Resettlement, including physical and/or economic displacement, are met in the ESIA.
6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	PS6 recognises that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in PS6 have been guided by the Convention on Biological Diversity, which defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems." Ecosystem services are the benefits that people, including businesses, derive from ecosystems. Ecosystem services are organised into four types: (i) provisioning services, which are the products people obtain from ecosystems; (ii) regulating services, which are the benefits people obtain from the regulation of ecosystem processes; (iii) cultural services, which are	The EIA Report will support that the following requirements are met in the ESIA: • Protection and Conservation of Biodiversity: Habitat is defined as a terrestrial, freshwater, or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment. For the purposes of implementation of PS6, habitats are divided into modified, natural, and critical. Critical habitats are a subset of modified or natural habitats. For the protection and conservation of biodiversity, the mitigation hierarchy includes biodiversity offsets, which may be considered only after appropriate avoidance, minimisation, and restoration measures have been applied. A biodiversity offset should be designed and implemented to

Performance Standard		Description	EIA Programme
		the nonmaterial benefits people obtain from ecosystems; and (iv) supporting services, which are the natural processes that maintain the other services. Ecosystem services valued by humans are often underpinned by biodiversity. Impacts on biodiversity can therefore often adversely affect the delivery of ecosystem services. PS6 addresses how clients can sustainably manage and mitigate impacts on biodiversity and ecosystem services throughout the project's lifecycle. The objectives of PS6 are: • To protect and conserve biodiversity; • To maintain the benefits from ecosystem services; • To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities. The risks and impacts identification process as set out in PS1 should consider direct and indirect project related impacts on biodiversity and ecosystem services and identify any significant residual impacts. This process will consider relevant threats to biodiversity and ecosystem services, especially focusing on habitat loss, degradation and fragmentation, invasive alien species, overexploitation, hydrological changes, nutrient loading, and pollution.	achieve measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity; however, a net gain is required in Critical Habitats. The design of a biodiversity offset must adhere to the "like-for-like or better" principle and must be carried out in alignment with best available information and current practices. When a client is considering the development of an offset as part of the mitigation strategy, external experts with knowledge in offset design and implementation must be involved. The EIA Programme will support compliance with the Protection and Conservation of Biodiversity by considering; Modified Habitat, Natural Habitat, Legally Protected and Internationally Recognised Areas, and Invasive Alien Species. Management of Ecosystem Services: Where a project is likely to adversely impact ecosystem services, as determined by the risks and impacts identification process, the client will conduct a systematic review to identify priority ecosystem services. Priority ecosystem services are two-fold: (i) those services on which project operations are most likely to have an impact and, therefore, which result in adverse impacts to Affected Communities; and/or (ii) those services on which the project is directly dependent for its operations (e.g., water). When Affected Communities are likely to be impacted, they should participate in the determination of priority ecosystem services in accordance with the stakeholder engagement process as defined in PS1.
7	Indigenous Peoples	Not applicable.	
8	Cultural Heritage	The objectives of PS8 are: • To protect cultural heritage from the adverse impacts of project activities and support its preservation; • To promote the equitable sharing of benefits from the use of cultural heritage.	The EIA Report will support that the following requirements are met in the ESIA: • Protection of Cultural Heritage in Project Design and Execution: In addition to complying with applicable law on the protection of cultural heritage, including national law implementing the host country's obligations under the Convention

Performance Standard	Description	EIA Programme
		Concerning the Protection of the World Cultural and Natural Heritage, the client will identify and protect cultural heritage by ensuring that internationally recognised practices for the protection, field-based study, and documentation of cultural heritage are implemented. Project's Use of Cultural Heritage: Where a project proposes to use the cultural heritage, including knowledge, innovations, or practices of local communities for commercial purposes, the Developer will inform these communities of (i) their rights under national law; (ii) the scope and nature of the proposed commercial development; and (iii) the potential consequences of such development.

The World Bank Group Environmental, Health and Safety Guidelines

The WBG has developed the EHS Guidelines, which are technical reference documents with general and industry-specific examples of good international industry practice (GIIP) and are referred to in the WBG's E&S Framework and in IFC's PSs. Additionally, WBG/IFC has developed a range of guidance for specific environment, health, safety, and security (EHSS) issues associated with development and operation of projects and facilities. Those considered most relevant to the Project are listed below:

- WBG, 2007, General EHS Guidelines, April 2007.
- WBG, 2015, EHS Guidelines for Wind Energy, August 2015.
- WBG, 2007, EHS Guidelines for Electric Power Transmission and Distribution, April 2007.

The EIA Report will support that the above Guidelines are followed, especially considering the WBG EHS Guidelines. However, others may also be applicable in whole or part.

EU Taxonomy for Sustainable Activities

EU Taxonomy is a classification system for "environmentally sustainable" economic activities, underpinned by international and EU policies such as the European Green Deal (2020) and the Paris Agreement (2015), and related to other EU policies on non-financial disclosures. The EU Taxonomy Regulation was adopted in July 2020 and aims to translate the EU's climate and environmental objectives into criteria which enable assessment of the sustainability of economic activities as a transparency tool for investment purposes.

The EU Taxonomy Regulation recognises "environmentally sustainable" economic activities as those which make a substantial contribution to at least one of the EU's climate and environmental objectives, while simultaneously doing no significant harm to any of these objectives and meeting minimum social safeguards.

The EU climate and environmental objectives defined in the EU Taxonomy Regulation are as follows:

1. Climate change mitigation;
2. Climate change adaptation;
3. Sustainable use and protection of water and marine resources;
4. Transition to a circular economy;
5. Pollution prevention and control and
6. Protection and restoration of biodiversity and ecosystems.

The EC adopts the EU Taxonomy as a set of delegated acts under the Taxonomy Regulation. The Taxonomy Delegated Acts establish and maintain the criteria for activities to define what entails "substantial contribution" and what it means to "Do No Significant Harm" (hereinafter – DNSH); this is referred to as the technical screening criteria (hereinafter – TSC). The following Taxonomy Delegated Acts have been adopted to date:

- The Climate Delegated Act, adopted on 9 December 2021 and applicable since 1 January 2022; includes the TSC for climate change mitigation and climate change adaptation.
- Disclosures Delegated Act, adopted on 10 December 2021 and applicable since 1 January 2022; specifies the requirements for information to be disclosed by financial and non-financial undertakings regarding proportion of environmentally sustainable economic activities in that entity's business, investment or lending activities.
- Complementary Climate Delegated Act, adopted on 15 July 2022 and applicable as of January 2023; includes the TSC for specific nuclear and gas energy activities.
- Environmental Delegated Act, adopted on 27 June 2023; includes the TSC for sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, and protection and restoration of biodiversity and ecosystems.

DNSH: Technical Screening Criteria

For an economic activity to be considered taxonomy-aligned, the activity must not only make a substantial contribution to at least one of the environmental objectives but must do so while not causing significant harm to any of the other objectives. Table 3 sets out the TSC for each of the environmental objectives.

Table 3. TSC for each of the environmental objectives.

Substantial Contribution Assessment	
(1) Substantial contribution to climate change mitigation	The activity generates electricity from wind power, which is a qualifying activity listed under Annex 1, Section 4.3 in the Climate Delegated Act 2021.
Environmental Objective	DNSH TSC
(2) Climate change adaptation.	The activity must comply with the criteria set out in Appendix A to Annex 1 of the Climate Delegated Act 2021; this states that physical climate risks material to the activity have been identified by performing a robust climate risk and vulnerability assessment proportionate to the scale of the activity and its expected lifetime, including the following steps: a) Screening to identify which physical climate risks may affect the performance of the activity during is expected lifetime; b) Where the activity is assessed to be at risk from one or more of the physical climate risks, a climate risk and vulnerability assessment is undertaken to assess materiality of these risks on the economic activity and c) An assessment of adaptation solutions that can reduce the identified physical climate risk.
(3) Sustainable use and protection of water and marine resources	In case of construction of offshore wind, the activity does not hamper the achievement of GES as set out in MSFD, requiring that the appropriate measures are taken to prevent or mitigate impacts in relation to that Directive's Descriptor 11 (Noise/Energy), laid down in Annex I to MSFD, and as set out in Commission Decision (EU) 2017/848 in relation to the relevant criteria and methodological standards for that descriptor.
(4) Transition to a circular economy	The activity assesses availability of and, where feasible, uses equipment and components of high durability and recyclability and that are easy to dismantle and refurbish.
(5) Pollution prevention and control	The DNSH TSC under Annex 1, Section 4.3 of the Climate Delegated Act lists this item as "N/A".
(6) Protection and restoration of biodiversity and ecosystems	The activity complies with the criteria set out in Appendix D to the Annex 1 of the Climate Delegated Act 2021. In case of offshore wind, the activity does not hamper the achievement of GES as set out in MSFD, requiring that the appropriate measures are taken to prevent or mitigate impacts in relation to MSFD Descriptors 1 (biodiversity) and 6 (seabed integrity), laid down in Annex I to MSFD, and as set out in Decision (EU) 2017/848 in relation to the relevant criteria and methodological standards for those descriptors

ANNEX 1

The engineering infrastructure development plan of the project of special national importance "The Preparation of the Territories Necessary for the Connection of the Power Plants that Use Renewable Energy Sources, which are Proposed for the Development in Part (Parts) of Marine Territories of Lithuania's Territorial Sea and/or the Exclusive Economic Zone of the Republic of Lithuania in the Baltic Sea, to the Electricity Transmission Grids for the Engineering Infrastructure Development".

Concept drawing with the connection alternatives (offshore and onshore).

ENGINEERING INFRASTRUCTURE DEVELOPMENT PLAN FOR THE PROJECT OF SPECIAL NATIONAL IMPORTANCE "PREPARATION OF THE ENGINEERING INFRASTRUCTURE DEVELOPMENT PLAN FOR THE DEVELOPMENT OF THE TERRITORIES NECESSARY FOR THE CONNECTION OF THE RENEWABLE ENERGY POWER GENERATION UNITS PLANNED TO BE DEVELOPED IN THE PART(S) OF THE TERRITORIAL WATERS OF THE REPUBLIC OF LITHUANIA AND/OR THE EXCLUSIVE ECONOMIC ZONE OF THE REPUBLIC OF LITHUANIA IN THE BALTIC SEA TO THE ELECTRICITY TRANSMISSION GRID"

DRAWING OF CONCEPT ALTERNATIVES SCALE 1:100 000

240000 250000 260000 270000 280000 290000 300000 310000

6220000 6210000 6200000 6190000 6180000

N W E S

THE REPUBLIC OF LATVIA

Area A
Area B
Area C
Area D
Prospective development area of Area B
Prospective development area of Area C

AN1 AN1' AN2 AN2' AN3 AN3' AN4 AN4'
AS1 AS2 AS3 AS4 AS4' AS5 AS5' AS6 AS6' AS7 AS7' AS8 AS8'
LS1 LS1' LS2 LN1'

Klaipėdos vertingosios gyvenamosios teritorijos (BAST)
Klaipėdos vertingosios gyvenamosios teritorijos (PAST)
Klaipėdos vertingosios gyvenamosios teritorijos (PAST)
Baltijos jūros priekrantė (BAST)
Baltijos jūros priekrantė (PAST)
Nemirsetos kraštovaizdžio draustinis
Saipų-Pajūrio (BAST) kraštovaizdžio draustinis
Nemirsetos smiltynės (PAST)
Karklės-Talsos (BAST) kraštovaizdžio draustinis
Pajūrio regioninis parkas
Karklės etnokultūrinis draustinis
Karklės-Pajūrio botaninis-zoologinis draustinis
Kuršių nerijos nacionalinis parkas
Kuršių nerijos nacionalinis parkas (PAST)

LEGEND

- Boundary of the state of the border of the Republic of Lithuania
- EEZ boundaries
- Territorial sea limit
- Coastal strips

Planned territory

- Points of alternatives
- Offshore alternatives under consideration
- Onshore alternatives under consideration
- Planned landfall direction
- Planned landfall area

Engineering infrastructure

- Būtingė oil terminal buoy
- Būtingė oil terminal water area
- NORDBALT HDVC cable
- Underwater cable
- Underwater pipelines
- Protection zones for cables and pipelines
- HARMONY LINK corridor
- Infrastructure corridor at sea

Areas planned in the EIDP for development of RES in the LT territorial sea and/or LT EEZ

- Potential renewable energy development area
- Area A development zone
- Area B development zone
- Prospective development area of Area B
- Area C development zone
- Prospective development area of Area C
- Area D development zone

Protected areas

- Parks
- Special areas of conservation of habitats, Natura 2000 sites (SACs)
- Special protected areas for birds, Natura 2000 sites (SPAs)
- Reserves
- Biosphere polygons

Cultural heritage

- Cultural heritage (points)
- Cultural heritage (area)
- Cultural heritage protection zones

Mineral resources

- Potential sand deposits
- Potential oil structures (LGS data)

Shipping and fishing

- Fishing divisions
- Trawling routes
- Existing general use waterways
- Anchorage locations
- Port roadsteads
- Planned shipping corridor

Other

- Sunken ships
- Dangerous area (former minefields)
- Area where construction of wind farms is coordinated with the Lithuanian Armed Forces under seperate agreement
- 7 m isobath

In 16-02-2016 by order of the commander of the Lithuanian Armed forces No V-217 aproved territories:

- Area where construction of wind farms is coordinated with the Lithuanian Armed Forces under seperate agreement
- Area where design and construction works of wind farms are prohibited

Cartographic basis:
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Data sources:
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NOTE:
The locations and width of connection corridors can be revised during the concretization of the Development Plan solution.

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Organiser of planning: LT — **Ministry of Energy of the Republic of Lithuania**

Project title: Engineering Infrastructure Development Plan for the project of special national importance "Preparation of territories necessary for the connection of the renewable energy power generation units planned to be developed in the part(s) of the territorial waters of the Republic of Lithuania and/or the exclusive economic zone of the Republic of Lithuania in the Baltic Sea to the electricity transmission grid for development of engineering infrastructure".

Territory: **The exclusive economic zone of the Republic of Lithuania and a part of the territorial sea in the Baltic Sea, Palanga City Municipality, Kretinga District Municipality**

Drawing title: **MARINE PART DRAWING OF CONCEPT ALTERNATIVES SCALES 1: 100 000** — Ed. 0

Label: **2023-01-VP-K.B-01** — PAGE 1 of pgs 1

ENGINEERING INFRASTRUCTURE DEVELOPMENT PLAN FOR THE PROJECT OF SPECIAL NATIONAL IMPORTANCE "PREPARATION OF THE ENGINEERING INFRASTRUCTURE DEVELOPMENT PLAN FOR THE DEVELOPMENT OF THE TERRITORIES NECESSARY FOR THE CONNECTION OF THE RENEWABLE ENERGY POWER GENERATION UNITS PLANNED TO BE DEVELOPED IN THE PART(S) OF THE TERRITORIAL WATERS OF THE REPUBLIC OF LITHUANIA AND/OR THE EXCLUSIVE ECONOMIC ZONE OF THE REPUBLIC OF LITHUANIA IN THE BALTIC SEA TO THE ELECTRICITY TRANSMISSION GRID"

DRAWING OF CONCEPT ALTERNATIVES SCALE 1:20 000

LEGEND

Boundaries, zones
- Boundary of the state border of the Republic of Lithuania
- EEZ boundaries
- Boundaries of municipalities
- Boundaries of residential areas
- Areas of state border protection and protection objects
- Areas of influence of national defense objects
- Boundary of the state border protection zone
- Coastal strips

Planned territory
- Points of alternatives
- Offshore alternatives under consideration
- Onshore alternatives under consideration
- Planned landfall direction
- Planned landfall area
- Areas in which construction of TS and other related infrastructure is possible
- Boundary of area analysed for selection of TS location and other related infrastructure is possible

Engineering infrastructure

Roads
- Main roads
- National roads
- Regional roads
- Other (local, field, forests) roads and streets
- Roads protection zones

Railways
- Railway
- Railway protection zone boundary

Overhead power line
- Overhead power line
- Electric power line protection zones
- Existing transformer substations

Main oil pipelines
- Main oil pipeline
- Main oil pipeline protection zone

Other engineering infrastructure
- Wind power plants
- Railway planned in the comprehensive plan for Kretinga District Municipality (in case of construction of Būtingė deepwater port)
- Roads, bypasses planned in the comprehensive plan for Kretinga District Municipality
- Oil pipeline (variant A) planned in the comprehensive plan for Kretinga District Municipality
- Oil pipeline (variant B) planned in the comprehensive plan for Kretinga District Municipality
- Oil pipeline (variant C) planned in the comprehensive plan for Kretinga District Municipality
- Aerodrome protection zone
- HARMONY LINK corridor
- Planned 330 kV switching station "Darbėnai"
- Broadband internet network

Protected and ecologically significant areas and sites
- Special areas of conservation of habitats, Natura 2000 sites (SACs)
- Special protected areas for birds, Natura 2000 sites (SPAs)
- Reserves
- Sites of Community Importance
- Natural heritage objects (sites)

Cultural heritage
- Cultural heritage (points)
- Cultural heritage (area)
- Cultural heritage protection zones

Surface and groundwater bodies
- Rivers, reservoirs and ditches
- Lakes, reservoirs and ponds
- Water body protection strips
- Water body protection zones

Water extraction protection zones
- 1 strip
- 2 strip
- 3B strip
- 50 m strip

Forests
- Forest land
- Forests of national importance
- Woodland Key Habitats

Mineral resources according to the study
- Measured resources
- Indicated resources
- Inferred resources

Other
- Planned national defence area (in Palanga City Municipality comprehensive plan)
- Areas and infrastructure corridors reserved for state needs (pursuant to solutions of the comprehensive plan for the territory of the Republic of Lithuania)
- Buildings
- Cemetery
- Wetlands
- 7 m isobath

Territories provided in the comprehensive plan for Kretinga District Municipality
- Solar power plant area
- Solar power plants and wind power plant area
- Wind power plant area

Flood risks and threats
- High-probability flood (10 per cent)
- Medium-probability flood (1 per cent)

Plots of land according to purpose and/or method of use
- Residential area
- Territories of public purpose
- Common areas
- Recreational areas
- Forestry use land
- Areas of industrial and storage and commercial objects
- Territories of transportation and engineering communications service facilities
- Territories of corridors of communication and engineering networks
- Agricultural use land

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© Comprehensive plan of the City of Palanga, 2023.

NOTE:
1. In designated areas where the construction of transformer substations and other related infrastructure is possible, forest land can be converted to other land uses;
2. The locations and width of connection corridors and areas where the construction of transformer substations and other related infrastructure is possible can be revised during the concretization of the Development Plan solutions;
3. The development plan includes areas where the construction of transformer substations and/or other (exclusively related to offshore wind farms) infrastructure required to connect the two offshore wind farms*,** to the electricity transmission network on land is possible.
* Aproved by LTG Resolution No 697 of 22 June 2020;
** Aproved by LTG Resolution No 171 of 15 March 2023.

Certificate	ARDYNAS		Gedimino g. 47, LT- 44242 Kaunas Tel. (8 37) 323209 Faks. (8 37) 337257 El. p. ardynas@ardynas.lt	Project title: Engineering Infrastructure Development Plan for the project of special national importance "Preparation of territories necessary for the connection of the renewable energy power generation units planned to be developed in the part(s) of the territorial waters of the Republic of Lithuania and/or the exclusive economic zone of the Republic of Lithuania in the Baltic Sea to the electricity transmission grid for development of engineering infrastructure"		
TPV 0066	TPM	Zita Labanauskienė		Territory: The exclusive economic zone of the Republic of Lithuania and a part of the territorial sea in the Baltic Sea, Palanga City Municipality, Kretinga District Municipality		
TPV 0065	TPM	Jolanta Paplauskienė				
TPV 0085	TPM	Olga Vaičienė				
	GIS spec.	Darius Šaliūnas		Drawing title: MAINLAND PART DRAWING OF CONCEPT ALTERNATIVES SCALE 1: 20 000		Ed. 0
	GIS spec.	Kristina Vaitkevičė				
LT	Organiser of planning: Ministry of Energy of the Republic of Lithuania			Label: 2023-01-VP-K.B-02	PAGE 1	of pgs 1

ANNEX 2

Applicable international environmental and social standards

Equator Principles (EP 4)

EP 4 refers to a risk management framework which is adopted to determine, assess and manage environmental and social risk arising from a particular project. The EP 4 (Equator Principles, 2020) are intended to serve as a tool for financial institutions to ensure that the projects that they finance are developed in a manner that is socially responsible and reflects sound environmental management practices.

The EP 4 risk management frameworks primarily refer to IFC PSs, with some additional requirements in relation to Human Rights Impacts (hereinafter – HRI). Further additional requirements of EP 4 include requirements in relation to Climate Change Risk Assessment (hereinafter – CCRA). The EP 4 Guidance Note (Equator Principles, 2022) states that:

- For Category A and, as appropriate, Category B projects. For these projects the CCRA is to include consideration of relevant climate-related 'Physical Risks' as defined by the Task Force on Climate-Related Financial Disclosure (hereinafter – TCFD).
- For all projects, in all locations, when combined Scope 1[38] and Scope 2[39] emissions are expected to be more than 100,000 tonnes of CO_2 equivalent annually. For these projects the CCRA is to include consideration of climate-related 'Transition Risks' (as defined by the TCFD). The CCRA must also include a completed alternatives analysis which evaluates lower GHG intensive alternatives.

Table 1. The EP 4 requirements comprise of the following ten voluntary environmental and social principles.

Equator Principle		Description and EIA Programme
1	Review and Categorisation	When a Project is proposed for financing, the EPFI will, as part of its internal environmental and social review and due diligence, categorise it based on the magnitude of its potential environmental and social risks and impacts. Such screening is based on the environmental and social categorisation process of the IFC. Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale and stage of the Project, and with the level of environmental and social risks and impacts. The categories are: • Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented; • Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and • Category C – Projects with minimal or no adverse environmental and social risks and/or impacts.
2	Environmental and Social Assessment	The EIA Report will ensure that the EIA will follow an appropriate assessment process to address the relevant environmental and social risks and scale of impacts of the proposed Project. The Assessment Documentation will propose measures to recognised, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to the environment, in a manner relevant and appropriate to the nature and scale of the proposed Project. The Assessment Documentation will be an adequate, accurate and objective evaluation and presentation of the environmental risks and impacts.

[38] GHGs released directly from a business: e.g., fuels, company vehicles, air conditioning. Source: Technical Guidance for Financial Institutions – Assessment of Greenhouse Gases

[39] Indirect GHGs released from the energy purchased by an organization: e.g., purchase of electricity. Source: Technical Guidance for Financial Institutions – Assessment of Greenhouse Gases

Equator Principle		Description and EIA Programme
3	Applicable Environmental and Social Standards	The Assessment process including the EIA Report will comply with relevant Lithuanian laws, regulations and permits that pertain to environmental and social issues as well as the international standards listed in section 1.1. It is currently expected that this will fulfil any requirements future EPFIs may have but it cannot be ruled out that the EPFIs may undertake additional due diligence against additional standards relevant to specific risks of the Project and apply additional requirements.
4	Environmental and Social Management System and Equator Principles Action Plan	The EPFI will require an Environmental and Social Management System (hereinafter – ESMS) to be prepared and maintained. Further, an Environmental and Social Management Plan (hereinafter – ESMP) must be prepared to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, an Equator Principles Action Plan (hereinafter – EPAP) will be prepared, outlining gaps and commitments to meet EPFI requirements in line with the applicable standards. The ESMS, ESMP and EPAP will be prepared at a later stage of the project development and is not included in the EIA Programme.
5	Stakeholder Engagement	The EPFI will require demonstration of an effective Stakeholder Engagement, as an ongoing process in a structured and culturally appropriate manner, with Affected Communities, Workers and, where relevant, Other Stakeholders.
6	Grievance Mechanism	The EPFI will require as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The ESMS will be prepared at a later stage of the development of the Project and is not included in the EIA Programme.
7	Independent Review	An Independent Environmental and Social Consultant will carry out an Independent Review of the Assessment process, including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation, to assist the EPFI's due diligence and determination of EP 4 compliance. The Independent Environmental and Social Consultant will also propose or opine on a suitable EPAP capable of bringing the Project into compliance with the EP 4 or indicate where there is a justified deviation from the applicable standards. An independent review will be undertaken a later stage of the development of the Project and is not included in the EIA Programme.
8	Covenants	For all Projects, where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the Project back into compliance. If the client fails to re-establish compliance within an agreed grace period, the EPFI reserves the right to exercise remedies, including calling an event of default, as considered appropriate. This will be undertaken at a later stage of the development of the Project and is not included in the EIA Programme.
9	Independent Monitoring and Reporting	In order to assess Project compliance with EP 4 after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI. This will be undertaken at a later stage of the development of the Project and is not included in the EIA Programme.

Equator Principle		Description and EIA Programme
10	Reporting and Transparency	The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online and that it includes a summary of Human Rights and climate change risks and impacts when relevant. • The client will report publicly, on an annual basis, GHG emission levels (combined Scope 1 and Scope 2 Emissions, and, if appropriate, the GHG efficiency ratio) during the operational phase for Projects emitting over 100,000 tonnes of CO_2 equivalent annually. • The EPFI will encourage the client to share commercially non-sensitive Project-specific biodiversity data with the Global Biodiversity Information Facility (GBIF) and relevant national and global data repositories, using formats and conditions to enable such data to be accessed and re-used in future decisions and research applications. Ignitis Renewables, the Developer of the OWF, will have a dedicated website where all the EIA-related documentation will be provided. For now, for already existing renewables projects, Ignitis Renewables website serves as a platform to upload non-technical summaries and other EIA-related information and make it publicly available.

International Finance Corporation Performance Standards

IFC PSs on Environmental and Social Sustainability.

Table 2. From January 2012, the PSs include (IFC, 2012).

Performance Standard		Description	EIA Programme
1	Assessment and Management of Environmental and Social Risks and Impacts	The objectives of PS1 are: • To identify and evaluate environmental and social risks and impacts of the project; • To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimised and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment; • To promote improved environmental and social performance of clients through the effective use of management systems; • To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately; • To promote and provide means for adequate engagement with Affected Communities throughout	The EIA Report will support[40] that the following requirements are met in the ESIA: ESMS – conducting of a process of environmental and social assessment and establish and maintain an ESMS appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts. The ESMS shall incorporate elements related to the following: a. Policy, defining the environmental and social objectives and principles; b. Identification of risks and impacts; c. Management programs; d. Organisational capacity and competency; e. Emergency preparedness and response; f. Stakeholder engagement; g. Monitoring and review: Establishment of procedures to monitor and measure the effectiveness of the management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements;

[40] Meaning that the EIA shall provide assessments and information/findings that shall enable the ESIA to meet these particular objectives.

Performance Standard		Description	EIA Programme
		the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.	h. External Communications and Grievance Mechanisms; i. Ongoing Reporting to Affected Communities.
2	Labor and Working Conditions	The objectives of PS2 are: • To promote the fair treatment, non-discrimination, and equal opportunity of workers. • To establish, maintain, and improve the worker-management relationship. • To promote compliance with national employment and labour laws. • To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. • To promote safe and healthy working conditions, and the health of workers. • To avoid the use of forced labour.	The EIA Report will support that the requirements related to: Working Conditions and Management of Worker Relationship, Protecting the Work Force, Occupational Health and Safety, Workers Engaged by Third Parties and to Supply Chain are met in the ESIA. Occupational Health and Safety are highly relevant for the EIA Programme due to its offshore survey programme. The EIA will be undertaken under a safe and healthy work environment, taking into account inherent risks in its particular sector and specific classes of hazards in the client's work areas, including physical, chemical, biological, and radiological hazards, and specific threats to women. The Developer will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimising, as far as reasonably practicable, the causes of hazards. The EIA will be conducted in a manner consistent with good international industry practice, as reflected in various internationally recognised sources including the WBG EHS Guidelines.
3	Resource Efficiency and Pollution Prevention	The objectives ofPS3 are: • To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities; • To promote more sustainable use of resources, including energy and water; • To reduce project related GHG emissions.	The EIA Report will support that the requirements related to Resource Efficiency and to Pollution Prevention are met in the ESIA.
4	Community Health, Safety, and Security	The objectives of PS4 are: • To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances; • To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a	The EIA Report will support that the requirements related to Community Health and Safety and to Security Personnel are met in the ESIA.

Performance Standard		Description	EIA Programme
		manner that avoids or minimises risks to the Affected Communities.	
5	Land Acquisition and Involuntary Resettlement	The objectives of PS5 are: • To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs; • To avoid forced eviction; • To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected; • To improve, or restore, the livelihoods and standards of living of displaced persons; • To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.	The EIA Report will support that, the requirements related to Land Acquisition and to Involuntary Resettlement, including physical and/or economic displacement, are met in the ESIA.
6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	PS6 recognises that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in PS6 have been guided by the Convention on Biological Diversity, which defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems." Ecosystem services are the benefits that people, including businesses, derive from ecosystems. Ecosystem services are organised into four types: (i) provisioning services, which are the products people obtain from ecosystems; (ii) regulating services, which are the benefits people obtain from the regulation of ecosystem processes; (iii) cultural services, which are	The EIA Report will support that the following requirements are met in the ESIA: • Protection and Conservation of Biodiversity: Habitat is defined as a terrestrial, freshwater, or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment. For the purposes of implementation of PS6, habitats are divided into modified, natural, and critical. Critical habitats are a subset of modified or natural habitats. For the protection and conservation of biodiversity, the mitigation hierarchy includes biodiversity offsets, which may be considered only after appropriate avoidance, minimisation, and restoration measures have been applied. A biodiversity offset should be designed and implemented to

Performance Standard		Description	EIA Programme
		the nonmaterial benefits people obtain from ecosystems; and (iv) supporting services, which are the natural processes that maintain the other services. Ecosystem services valued by humans are often underpinned by biodiversity. Impacts on biodiversity can therefore often adversely affect the delivery of ecosystem services. PS6 addresses how clients can sustainably manage and mitigate impacts on biodiversity and ecosystem services throughout the project's lifecycle. The objectives of PS6 are: • To protect and conserve biodiversity; • To maintain the benefits from ecosystem services; • To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities. The risks and impacts identification process as set out in PS1 should consider direct and indirect project related impacts on biodiversity and ecosystem services and identify any significant residual impacts. This process will consider relevant threats to biodiversity and ecosystem services, especially focusing on habitat loss, degradation and fragmentation, invasive alien species, overexploitation, hydrological changes, nutrient loading, and pollution.	achieve measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity; however, a net gain is required in Critical Habitats. The design of a biodiversity offset must adhere to the "like-for-like or better" principle and must be carried out in alignment with best available information and current practices. When a client is considering the development of an offset as part of the mitigation strategy, external experts with knowledge in offset design and implementation must be involved. The EIA Programme will support compliance with the Protection and Conservation of Biodiversity by considering; Modified Habitat, Natural Habitat, Legally Protected and Internationally Recognised Areas, and Invasive Alien Species. Management of Ecosystem Services: Where a project is likely to adversely impact ecosystem services, as determined by the risks and impacts identification process, the client will conduct a systematic review to identify priority ecosystem services. Priority ecosystem services are two-fold: (i) those services on which project operations are most likely to have an impact and, therefore, which result in adverse impacts to Affected Communities; and/or (ii) those services on which the project is directly dependent for its operations (e.g., water). When Affected Communities are likely to be impacted, they should participate in the determination of priority ecosystem services in accordance with the stakeholder engagement process as defined in PS1.
7	Indigenous Peoples	Not applicable.	
8	Cultural Heritage	The objectives of PS8 are: • To protect cultural heritage from the adverse impacts of project activities and support its preservation; • To promote the equitable sharing of benefits from the use of cultural heritage.	The EIA Report will support that the following requirements are met in the ESIA: • Protection of Cultural Heritage in Project Design and Execution: In addition to complying with applicable law on the protection of cultural heritage, including national law implementing the host country's obligations under the Convention

Performance Standard	Description	EIA Programme
		Concerning the Protection of the World Cultural and Natural Heritage, the client will identify and protect cultural heritage by ensuring that internationally recognised practices for the protection, field-based study, and documentation of cultural heritage are implemented. Project's Use of Cultural Heritage: Where a project proposes to use the cultural heritage, including knowledge, innovations, or practices of local communities for commercial purposes, the Developer will inform these communities of (i) their rights under national law; (ii) the scope and nature of the proposed commercial development; and (iii) the potential consequences of such development.

The World Bank Group Environmental, Health and Safety Guidelines

The WBG has developed the EHS Guidelines, which are technical reference documents with general and industry-specific examples of good international industry practice (GIIP) and are referred to in the WBG's E&S Framework and in IFC's PSs. Additionally, WBG/IFC has developed a range of guidance for specific environment, health, safety, and security (EHSS) issues associated with development and operation of projects and facilities. Those considered most relevant to the Project are listed below:

- WBG, 2007, General EHS Guidelines, April 2007.
- WBG, 2015, EHS Guidelines for Wind Energy, August 2015.
- WBG, 2007, EHS Guidelines for Electric Power Transmission and Distribution, April 2007.

The EIA Report will support that the above Guidelines are followed, especially considering the WBG EHS Guidelines. However, others may also be applicable in whole or part.

EU Taxonomy for Sustainable Activities

EU Taxonomy is a classification system for "environmentally sustainable" economic activities, underpinned by international and EU policies such as the European Green Deal (2020) and the Paris Agreement (2015), and related to other EU policies on non-financial disclosures. The EU Taxonomy Regulation was adopted in July 2020 and aims to translate the EU's climate and environmental objectives into criteria which enable assessment of the sustainability of economic activities as a transparency tool for investment purposes.

The EU Taxonomy Regulation recognises "environmentally sustainable" economic activities as those which make a substantial contribution to at least one of the EU's climate and environmental objectives, while simultaneously doing no significant harm to any of these objectives and meeting minimum social safeguards.

The EU climate and environmental objectives defined in the EU Taxonomy Regulation are as follows:

1. Climate change mitigation;
2. Climate change adaptation;
3. Sustainable use and protection of water and marine resources;
4. Transition to a circular economy;
5. Pollution prevention and control and
6. Protection and restoration of biodiversity and ecosystems.

The EC adopts the EU Taxonomy as a set of delegated acts under the Taxonomy Regulation. The Taxonomy Delegated Acts establish and maintain the criteria for activities to define what entails "substantial contribution" and what it means to "Do No Significant Harm" (hereinafter – DNSH); this is referred to as the technical screening criteria (hereinafter – TSC). The following Taxonomy Delegated Acts have been adopted to date:

- The Climate Delegated Act, adopted on 9 December 2021 and applicable since 1 January 2022; includes the TSC for climate change mitigation and climate change adaptation.
- Disclosures Delegated Act, adopted on 10 December 2021 and applicable since 1 January 2022; specifies the requirements for information to be disclosed by financial and non-financial undertakings regarding proportion of environmentally sustainable economic activities in that entity's business, investment or lending activities.
- Complementary Climate Delegated Act, adopted on 15 July 2022 and applicable as of January 2023; includes the TSC for specific nuclear and gas energy activities.
- Environmental Delegated Act, adopted on 27 June 2023; includes the TSC for sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, and protection and restoration of biodiversity and ecosystems.

DNSH: Technical Screening Criteria

For an economic activity to be considered taxonomy-aligned, the activity must not only make a substantial contribution to at least one of the environmental objectives but must do so while not causing significant harm to any of the other objectives. Table 3 sets out the TSC for each of the environmental objectives.

Table 3. TSC for each of the environmental objectives.

Substantial Contribution Assessment	
(1) Substantial contribution to climate change mitigation	The activity generates electricity from wind power, which is a qualifying activity listed under Annex 1, Section 4.3 in the Climate Delegated Act 2021.
Environmental Objective	DNSH TSC
(2) Climate change adaptation.	The activity must comply with the criteria set out in Appendix A to Annex 1 of the Climate Delegated Act 2021; this states that physical climate risks material to the activity have been identified by performing a robust climate risk and vulnerability assessment proportionate to the scale of the activity and its expected lifetime, including the following steps: a) Screening to identify which physical climate risks may affect the performance of the activity during is expected lifetime; b) Where the activity is assessed to be at risk from one or more of the physical climate risks, a climate risk and vulnerability assessment is undertaken to assess materiality of these risks on the economic activity and c) An assessment of adaptation solutions that can reduce the identified physical climate risk.
(3) Sustainable use and protection of water and marine resources	In case of construction of offshore wind, the activity does not hamper the achievement of GES as set out in MSFD, requiring that the appropriate measures are taken to prevent or mitigate impacts in relation to that Directive's Descriptor 11 (Noise/Energy), laid down in Annex I to MSFD, and as set out in Commission Decision (EU) 2017/848 in relation to the relevant criteria and methodological standards for that descriptor.
(4) Transition to a circular economy	The activity assesses availability of and, where feasible, uses equipment and components of high durability and recyclability and that are easy to dismantle and refurbish.
(5) Pollution prevention and control	The DNSH TSC under Annex 1, Section 4.3 of the Climate Delegated Act lists this item as "N/A".
(6) Protection and restoration of biodiversity and ecosystems	The activity complies with the criteria set out in Appendix D to the Annex 1 of the Climate Delegated Act 2021. In case of offshore wind, the activity does not hamper the achievement of GES as set out in MSFD, requiring that the appropriate measures are taken to prevent or mitigate impacts in relation to MSFD Descriptors 1 (biodiversity) and 6 (seabed integrity), laid down in Annex I to MSFD, and as set out in Decision (EU) 2017/848 in relation to the relevant criteria and methodological standards for those descriptors.