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"

SUMMARY OF THE STRATEGIC ENVIRONMENTAL ASSESSMENT

November 2023

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SUMMARY OF THE STRATEGIC ENVIRONMENTAL ASSESSMENT

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2023

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1 MAIN OBJECTIVES AND TARGETS OF THE DEVELOPMENT PLAN

1.1 Title of the territorial planning document being prepared

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".

1.2 Planning basis

Government of the Republic of Lithuania (hereinafter, LTG) Resolution No 640 of 15 June 2022, "On starting preparation and setting planning objectives for the 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' ";

Planning works programme approved by the Minister of Energy of the Republic of Lithuania with Order No 1-233 of 18 July 2022, "On approval of the planning works programme for the 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' ".

1.3 Planning objectives

- To identify 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 onshore electricity transmission grid for links (hereinafter, Links) and related infrastructure.
- To ensure capabilities for transmission of electricity produced by 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 onshore electricity transmission grid, pursuing the strategic objectives of increasing the proportion of renewable energy in Lithuania's domestic energy production and in the final energy consumption balance and of reducing dependence on imports of fossil fuels.

1.4 Planning tasks

- to identify the territories necessary for installation of Links and related engineering infrastructure;
- to develop a conception for the development of engineering infrastructure. To develop not less than 2 alternatives (one of them should assess the possibilities for placement of the engineering infrastructure corridor (for the Links) adjacent to the corridor planned for the cross-border DC power link between Lithuania and Poland "Harmony Link"), taking into account the results of the analysis of the existing situation, the proposals of the planning organiser, the planning entities, and the public, and on the basis of geophysical surveys of the seabed, the purpose of which is to identify the features of the seabed topography (to prepare the seabed bathymetry and to identify the objects that may influence the location of the engineering infrastructure corridors), to be performed to the extent necessary for the preparation of the Plan and/or the Strategic Environmental Impact Assessment of the Plan;
- to assess alternatives to the conception in terms of national security and the natural, social and economic environment;
- in order to select the optimal alternative, to compare the conception's alternatives using cost-benefit analysis methods as well as other methods;

- in accordance with the Procedure for strategic environmental impact assessment of plans and programmes, approved by LTG Resolution No 967 of 18 August 2004, "On approval of the Procedure for strategic environmental impact assessment of plans and programmes", to perform the SEA of the conceptual alternatives of the Plan in accordance with the specified procedure and to specify optimal plan solutions;
- to identify easements necessary for the functioning of the engineering infrastructure;
- to identify protection zones for engineering infrastructure structures and/or territories, to specify special land use conditions;
- to identify areas where land is to be taken for public needs with reasonable justification;
- to identify areas (based on the project proposals) for the reconstruction of existing engineering infrastructure, the routes of which would cross the areas planned for the Links and related infrastructure;
- to identify areas for the conversion of forest land to other land uses and for the revision of maps of forest areas of national importance.

2 THE EXISTING STATE OF THE ENVIRONMENT AND THE ENVIRONMENTAL CHARACTERISTICS OF AREAS LIKELY TO BE AFFECTED.

2.1 The territory under consideration

The territory under consideration includes the exclusive economic zone (EEZ) of the Republic of Lithuania and a part of the territorial sea in the Baltic Sea, Palanga City Municipality, Kretinga District Municipality.

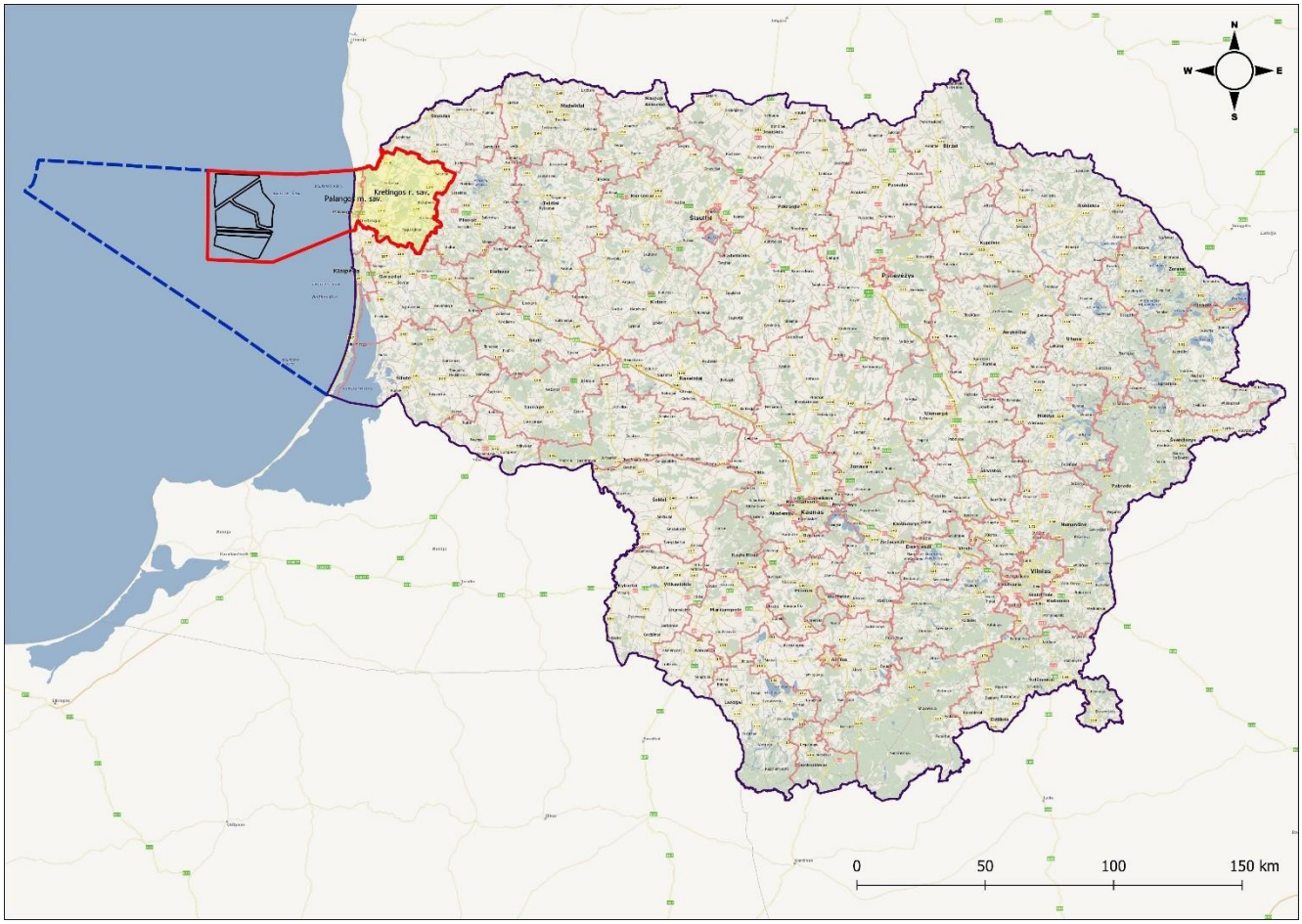

Figure 1. The territory under consideration

Conception alternatives under consideration

The conception of the engineering infrastructure development plan (EIDP) envisages alternatives A and B in the marine part and alternative C in the mainland part (see Figure 2).

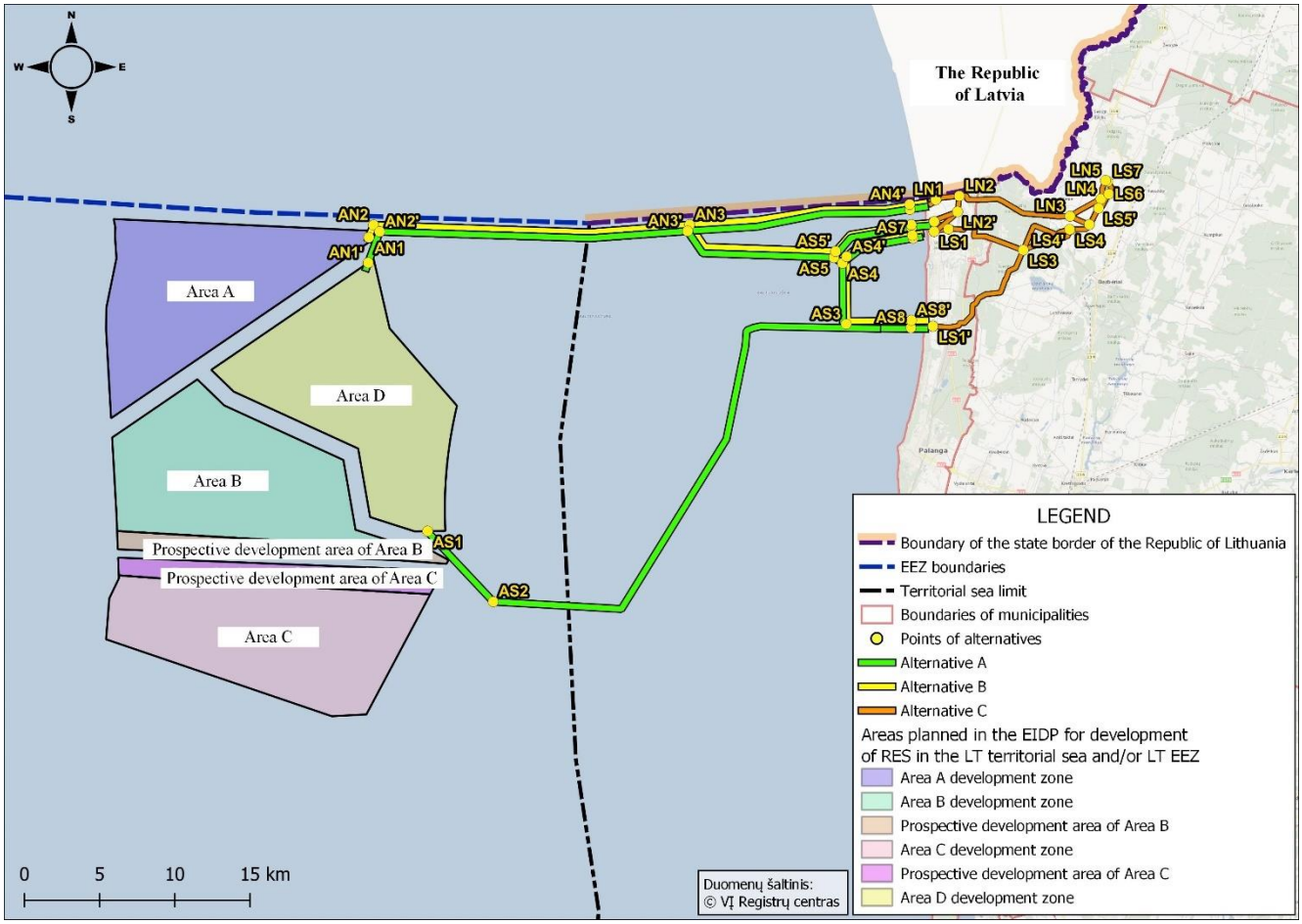

Figure 2. Alternatives for connection of offshore wind parks to onshore grids: A, B (marine part) and C (mainland part)

2.2 Description of the territory of the marine part

The conception of the development plan analyses the alternatives for the location of interconnections of two offshore wind parks (hereinafter, OWP) and other related infrastructure as envisaged in LTG resolutions[1,2] on the locations and capacities of power generation development. The planned „Area D“[3] and „Area A“ OWPs and the planned infrastructure corridors (transmission cable routes), as indicated in the EIDP, cover part of the Klaipėda-Ventspils Plateau and extend into the Gdańsk Basin.

2.2.1 Current use of the territory

International shipping routes to/from the ports of Klaipėda and Šventoji and Būtingė oil terminal pass through the maritime territory. A large part of the territory is occupied by port roadsteads and anchorages. Commercial fishing is carried out along the coast and in the open sea.

Two types of engineering infrastructure have been identified in the maritime territory: a pipeline complex with the Būtingė oil terminal SPM buoy (hereinafter, SPM) and submarine cables. The corridor of “Harmony Link”, the Lithuanian-Polish maritime HVDC cable, also crosses the planned area: on 1

[1] https://www.e-tar.lt/portal/lt/legalAct/a0c9fb80b6bc11eab9d9cd0c85e0b745/asr;

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

[3] „Area D“ corresponds to area “Phase I” listed in the Engineering infrastructure development plan for the development of renewable energy in the territorial sea of the Republic of Lithuania and/or the exclusive economic zone of the Republic of Lithuania in the Baltic Sea, approved by Order No 1-377 (T00088446) of the Minister of Energy of the Republic of Lithuania of 18 November 2022.

September 2021, by Resolution No 720[4], the Government of the Republic of Lithuania approved the engineering infrastructure development plan for the power system synchronisation project of special national importance "Construction of the Harmony Link interconnection and 330 kv switchyard Darbėnai", which includes the planned area for the Harmony Link interconnection.

Restricted areas in the planned area are associated with former minefields and sunken ships. Based on historical data sources about World War II munitions, a large part of the Baltic Sea belonging to the Republic of Lithuania has been identified as dangerous. Former minefields have been identified as potentially hazardous. Existing and potential zones have been identified where, even after clearance, the likelihood of finding unexploded ordnance remains. One such zone is crossed by the southern alternative of the Link cable corridor, which if selected would, prior to beginning design work, require detailed surveys of the seabed in a search for hazardous objects and, if necessary, removal (deactivation) of such hazardous objects.

A number of potential oil-bearing formations have been identified in the area under consideration and part of the area is reserved for sand mining (exclusively for beach replenishment).

Lithuania's Baltic Sea coastal area, as a coastal area, is classified as a recreational area with very high potential. The recreational resources of the coastal zone are protected by the Law on the Coastal Strip. In order to make the most of the potential of the Baltic Sea, it is necessary to develop water tourism in the Baltic Sea. The following forms of recreational activities can be identified as suitable for development: excursions at sea; recreational fishing; diving; sea sports; bird watching, etc.

2.2.2 Seabed, terrain, depths

The Klaipėda-Ventspils Plateau and the slopes descending towards the Gdańsk Deep occupy a large part of the seabed in the planned area. The Klaipėda-Ventspils Plateau starts from the Gulf of Riga and extends along the coast before turning southwest at about the latitude of Liepāja, intervening between the Gotland and Gdańsk deeps. There are also more pronounced elevations at the point of insertion. One of the most fragmented terrain areas is the southern part of the Klaipėda-Ventspils Plateau, reaching the coastal zone at Šventoji - Palanga and approaching the coast at Giruliai. There are many areas of different topography in this area. The relative heights of the individual formations here are usually 4-5 m and sometimes 6-8 m.

The topography of the coastline is complex. The zone of wave-swept sand on the submarine slope along the shoreline is narrow and fragmented by glacial terrain, with ridges rising in places 5-7 m above the midline of the seabed profile.

In the planned area, the sea depth varies from 55-60 m in the southwestern part, where there is a slope towards the Gdańsk Deep, on the Klaipėda-Ventspils Plateau the depths do not reach 30-40 m, and on the coastline, there is a well-defined dynamic zone of depths of up to 20 m with the presence of an established system of shallows. The 10-m isobath is 1.5 km to the north, and 4.5 km from shoreline at Palanga.

Detailed seabed surveys have been carried out in selected corridors of northern route alternatives. Seabed terrain and depths are detailed on a seabed depth (bathymetry) chart. In the corridors selected for surveying, the sea depth ranges from 0 (at the shoreline) to ~39 m in the deepest (central) part of the zone.

2.2.3 Hydrometeorological conditions

Wind Westerly winds, i.e. NW-W-SW, are the most frequent on the coast. According to generalised data, the average wind speed at sea (in the Lithuanian EEZ) increases with distance from the coast and varies from 7 to 10 m/s.

[4] Engineering infrastructure development plan for a project of special national importance, the electricity system synchronisation project “Construction of Harmony Link interconnection and 330 kV switching station Darbėnai”, approved by LTG Resolution No 720 of 1 September 2021. https://www.e-tar.lt/portal/lt/legalAct/876d697011ff11ec9f09e7df20500045

The Baltic Sea is dominated by wind-driven waves, so the wave regime is identical to the wind regime. The coastal area is dominated by westerly waves. In the open sea as well as on the coast, the largest waves are generated by prevailing westerly winds, and the average height of the prevailing SW-NE waves in the planned area can be 0.8-0.9 m or more.

Lithuanian waters are characterised by a "cyclonic" direction of Baltic Sea currents (counter-clockwise), forming a predominantly south-north transport of water masses along the coastline. Lithuania's part of the Baltic Sea is relatively shallow, so its thermal regime responds very quickly to seasonal changes in climatic conditions. The water cools the most in February (down to -0.5 °C) and warms the most in July-August (up to 28.2 °C).

Lithuania's part of the Baltic Sea does not have a stable ice cover. In the coastal area, a frontal ice sheet several metres to several kilometres wide forms in average and cold winters. It is usually made up of ice floes carried and crushed by wind and water currents close to the shore, which remain stable only in calm and cold weather. Ice cover can form up to 1.5 km from the shore.

2.2.4 Protected and Natura 2000 sites

The planned area includes protected areas and Natura 2000 sites. The alternatives under consideration cross the Klaipėda-Ventspils Plateau Biosphere Polygon, Natura 2000 SPA[5] and SAC[6] in the Klaipėda-Ventspils Plateau, Natura 2000 SPA in the Baltic Sea coastal area as well as the Baltic Sea Thalassological Reserve. Moreover, the alternatives border on the Natura 2000 SAC in the Baltic Sea coastal area.

2.2.5 Biodiversity

Seabed habitats

The number, abundance and biomass of demersal fauna species decreases with depth along the submarine slope in the Eastern Baltic. The greatest species diversity is encountered at depths down to 30 m. Deeper, at depths of 30-50 m, conditions are no longer suitable for shallow-water species, but are still unfavourable for deep-water organisms, the relicts of glacial periods. The latter, which are mostly mobile organisms capable of swimming freely in the demersal zone, are only regularly found at depths greater than 60 m, where the salinity is greater[7].

Fish. Baltic herring (*Clupea harengus membras*), Baltic cod (*Gadus morhua callarias*) and European flounder (*Platichthys flesus*) are some of the most abundant fish in Lithuania's economic zone, and are therefore heavily fished. Spawning of Baltic herring has been observed in the northern Lithuanian coastline on rocky bottoms with underwater vegetation, as well as at the Klaipėda harbour entrance breakwaters at depths of 2-5 m.

Both in the vicinity of Klaipėda State Seaport and from the port northwards to Šventoji, migratory and freshwater fish are abundant. Most species of migratory fish stay close to shore, usually to a depth of not more than 20 m, but salmon migrate over very long distances. Freshwater fish such as bream, zander, white bream, ide, common roach, common bleak, asp, European perch, ruffe and three-spined stickleback are mostly caught just off the coast.

Marine mammals Three species of seal live and breed in the Baltic Sea. Only one species, the grey seal, is included in the Lithuanian fauna list. This species is also listed in the Red Data Book of Lithuania. There are two distinct populations of harbour porpoises in the Baltic Sea. Seals are regularly found in the Lithuanian territorial sea, mostly registered during the cold season and arriving with migratory fish, but the exact number of animals is unknown.

[5] The Special Protected Areas (SPAs) are established in accordance with the EU Birds Directive

[6] The Special Areas of Conservation (SACs) are established according to the EU Habitats Directive.

[7] Daunys D., Šiaulys A., Zaiko A. 2012. Lietuvos Baltijos jūros aplinkos būklė: preliminarus vertinimas. Lietuvos Baltijos jūros aplinkos apsaugos valdymo stiprinimo dokumentų parengimas. Sudarytojai Olenin. S, Daunys D., Bučas M., Bagdanavičiūtė I. KU leidykla, Klaipėda.

Birds and bats More than 20 seabird species are regularly found along the Lithuanian seacoast and in part of Lithuania's territorial waters. Lithuania's part of the Baltic Sea is essential for wintering seabirds as well as migrating birds on their way to wintering or breeding grounds. In Lithuania, there are abundant concentrations of velvet scoter (*Melanitta fusca*), long-tailed duck (*Clangula hyemalis*), razorbill (*Alca torda*), common murre (*Uria aalgea*), red-throated diver (*Gavia stelatta*), great crested grebe (*Podiceps cristatus*) and other species in coastal waters as well as in the open sea. Geese, cranes, divers, sparrows and other birds migrate in large numbers over Lithuania's territorial waters.

During the autumn migration, intensive migration of bats occurs over the coast and the western part of the Lithuanian mainland up to ~70 km inland from the sea.

2.2.6 Landscape

According to the maritime area section of the comprehensive plan for the territory of the Republic of Lithuania (CPTRL), the marine natural framework, which is formed taking into account the features of aquatic landscapes, the distribution of the most valuable biodiversity areas, sedimentary and hydrodynamic conditions, is based on 3 geomorphologically distinct zones, characterised by the distinctive nature of the natural processes in each, the distribution and the sensitivity of the natural values, occupying a total of 38% of Lithuanian territorial waters:

1. The mainland coastline - the submarine slope and the shallow part of the sea (up to 20 m deep) - is an important zone of interaction between the sea and the land, with active hydrodynamic processes, and the location of the main natural values;
2. The Klaipėda-Ventspils Plateau, with relatively shallower sea depths in the more offshore parts of the sea area. The natural conditions here are favourable for the formation of valuable benthic habitats;
3. Gdańsk Deep - the deepest part of the planned area.

According to the morphological zoning of the landscape, the area under consideration falls within the area of Curonian-Western Samogitian coastal submarine plateaus of the Southeastern Baltic submarine plateau area (I) of the Eastern Baltic shallow sea segment (A).

2.2.7 Cultural heritage

According to available information on sunken ships (official sources - Lithuanian Maritime Safety Administration, Department of Cultural Heritage), several dozen sites of sunken objects have been mapped in the Lithuanian EEZ. Most of the wrecks are industrial ships, but the remains of wooden ships have also been discovered, which are of great scientific value. There are also several valuable underwater cultural landscape sites with natural relicts and tree remains, some of which are listed in the Register of Cultural Property. Cultural heritage sites are also found in the coastal strip.

A cultural heritage value falls within the planned area or its immediate vicinity: the site of the sunken ship "L-1" in the Baltic Sea (code 38466).

Information on existing and anticipated analogous activities in the surrounding area

In accordance with the approved Engineering infrastructure development plan for the development of renewable energy in the territorial sea[8], the Links are planned for the development of OWPs, in accordance with LTG resolutions[9,10]. Two other areas for the development of RES are planned for OWPs, so it is likely that the development of other OWPs will be sought in the other areas planned for the development of RES.

[8] Engineering infrastructure development plan for the development of renewable energy in the territorial sea of the Republic of Lithuania and/or the exclusive economic zone of the Republic of Lithuania in the Baltic Sea, approved by Order No 1-377 (T00088446) of the Minister of Energy of the Republic of Lithuania of 18 November 2022 https://www.e-tar.lt/portal/lt/legalAct/56c199a06a3611edbc04912defe897d1

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

[10] https://www.e-tar.lt/portal/lt/legalAct/a0c9fb80b6bc11eab9d9cd0c85e0b745/asr

The corridor of "Harmony Link", the Lithuanian-Polish maritime HVDC cable, also crosses the planned area.

2.3 Description of the mainland area

Taking into account the planned landfall points of the Links and the geographical location of the Darbėnai switchyard, the Links alternatives on the mainland are planned in the territory of Palanga City Municipality and Kretinga District Municipality, therefore an analysis of the territory of Klaipėda District Municipality has not been performed.

Palanga City Municipality stretches along the Baltic Sea coast from Palanga's southern suburbs to the Latvian border in the north. The A13 road (Klaipėda – Liepāja) passes through the municipality from south to north. Palanga City Municipality is located in the Coastal Lowland.

The area of Palanga City Municipality is 10,976 hectares. Of this area, the land area (excluding the Baltic Sea) is 7,950 hectares. The total area of urbanised and urbanisable territory envisaged by the 2008 comprehensive plan is 3,061 hectares. Of the total urbanised and potentially urbanisable area, 65% is already built up or planned for development according to lower-level territorial planning documents.

The planned alternatives cross low-density residential areas and green spaces being developed for extensive use, as well as forests of national importance. In the corrected Palanga City comprehensive plan, identifying the priority areas for municipal infrastructure development, these territories are marked as non-priority development territories and non-urbanisable territories.

The western part of Kretinga District Municipality is located in the Coastal Lowland, and the eastern part is located in the Western Samogitian Plateau. The railway Vilnius-Klaipėda passes through the territory of the municipality.

The territory of Kretinga District Municipality covers an area of 98,900 hectares. The largest part of its territory is agricultural land - 57%, followed by forestry land - 36 %. Agriculture and forestry remain the priority land-use activities in the district.

In the comprehensive plan, the territory of Kretinga District Municipality is divided into non-urbanised areas, urbanised areas, urbanising areas, and other areas. These territories are zoned by establishing separate functional zones. The functional zones are distinguished according to the predominant land use and the specific objectives of the territory use.

The planned alternatives are envisaged in the forest land and in the functional zones marked in the comprehensive plan for the City of Kretinga. In these zones there are possible territories for communication and engineering infrastructure sites, engineering network corridors, and energy supply infrastructure sites.

2.3.1 Engineering infrastructure

The structure of the transport network in Palanga City Municipality consists of a network of roads of national and local significance. There are no railways in the municipality, but a new railway is planned in Būtingė, which would lead to a prospective deep-water port. 3 national-level automobile tourism routes intersect in Palanga, cycle paths pass through the city. Palanga Airport is located in the central part of the municipality's territory, near the settlements of Kunigiškiai and Užkanavė. Šventoji State Seaport is located in the northern part, at the mouth of the Šventoji River where the river flows into the Baltic Sea. A well-developed public water supply system, centralised domestic wastewater management system, electricity distribution grid, and natural gas distribution pipeline system operate throughout the territory of the City of Palanga. In the northern part of Palanga City Municipality, close to the border with the Republic of Latvia, there are pipelines for the oil terminal which connect the marine pipeline with the oil tank farm in Būtingė. Moreover, in the northeastern part of the area, a section of the main

oil pipeline to the Mažeikiai oil refinery has been laid. This site is not connected to the engineering infrastructure serving the City of Palanga.

Transport infrastructure in the territory of Kretinga District Municipality consists of a network of main roads and roads of national, regional and local significance. The electricity distribution grid throughout Kretinga District Municipality is very well-developed, ensuring reliable and high-quality electricity supply to consumers. Two broad-gauge railway lines pass through Kretinga District Municipality. Kartena Aerodrome is also located in the municipality.

A centralised public water supply system and domestic wastewater management system, electricity distribution grid, well-developed network of roads, and natural gas transmission pipeline system operate in the territory of Kretinga District.

2.3.2 Surface and groundwater bodies

The rivers flowing through the planned area belong to the Šventoji river basin (Šventoji), the Lithuanian coastal river basin (Danė - Akmena), and the Nemunas small tributaries sub-basin (Minija).

2.3.3 Protected areas

Natura 2000 sites and other protected areas have been identified in the territory under consideration or in its vicinity. In the territory of the Palanga City Municipality, Special Areas of Conservation of Habitats (the Baltic Sea coast and the Baltic Šventoji River) and a Special Area of Conservation of Birds (the Baltic Sea coast) fall within the territory under consideration, as well as the Būtingė Geomorphological Reserve and the Būtingė Bird Marsh Ornithological Reserve.

In the territory of the Kretinga District Municipality, Special Areas of Conservation of Habitats (SAC) (the Baltic Šventoji River and the Sudėnai meadows as well as the Sudėnai Botanical-Zoological Reserve) fall within the territory under consideration.

2.3.4 Forests

Forests and forest land in Palanga, according to the city's land use, account for about 41% of the municipality’s area and about 90% of all protected areas. All of these forests are of national importance and belong to Class 2 special-purpose forests.

The area of forest land in Kretinga District Municipality accounts for 35% of the total territory of the District. Class 4 commercial forests predominate; a portion of them are state forests, the remainder are private forests.

The Links alternatives under consideration cross special-purpose, protective and commercial forests.

2.3.5 Landscape and the natural framework

The natural framework in Kretinga District Municipality consists of the regionally important Lagoon-side geoecological pathway, the Šventoji migration corridor of district importance, the migration corridors of local importance along small streams, which are the sites of intensive exchange of material, energy and natural information flows and migration of plant and animal species, as well as the internal stabilisation areas of district importance of Laukžemė and Darbėnai, as well as the internal stabilisation areas of local importance.

The natural framework in Palanga City Municipality consists of the regionally important Lagoon-side geoecological pathway, which covers the entire territory of the municipality, except for the already-urbanised and planned-to-be-urbanised territories, as well as migration corridors located in the valleys of the Šventoji, Rąžė and other territories, in which intensive exchange of materials, energy and natural information flows and migration of plant and animal species occur. The migration corridor in the valley of the Šventoji River is of regional importance.

2.3.6 Mineral deposits

Sand, gravel, peat and oil deposits predominate in Palanga City Municipality and Kretinga District Municipality.

The alternatives under consideration fall within the boundaries of the inferred mineral resource areas for the Šventoji oil deposits and the Vanagupė (Coast) peat deposits.

2.3.7 Cultural heritage

Among the cultural heritage sites, the territories of former manor sites and hillforts stand out as the most significant for the cultural landscape. The Kretinga Manor Complex is particularly significant.

Kretinga District has many archaeological heritage sites, sacred hills and groves, and stones. There are a significant number of heritage sites of historical respect, including old cemeteries, minor architectural objects, chapels.

The priority objects of immovable cultural heritage in the City of Palanga to be protected are the historical part of the city - the urbanised site, Palanga manor site, ancient settlements, villa complexes and predominant wooden architectural heritage areas in the central part of the city.

2.3.8 Recreation, tourism

Palanga is one of Lithuania's most important resorts, which is designated a national-level centre for recreational services.

Taking into account the geographical situation of Kretinga District Municipality, two main recreational objectives in the territory of the municipality can be formulated. The first is the exploration of the mainland part of the municipality and the use of its recreational resources, and the second is the use of the coastal area for the creation of a resort-like environment.

3 INFORMATION ON THE CHOICE OF ALTERNATIVES FOR LOCATION OF WIND PARK LINKS AND OTHER RELATED INFRASTRUCTURE.

3.1 Starting point of alternatives for the link conception, landfall and ending point

In the development plan conception, alternatives for the location of links among RES power plants, the two OWPs envisaged in LTG resolutions, and other related infrastructure are planned and analysed.

Taking into account the solutions of the approved EIDP, the alternatives of the Development Plan conception are envisaged in the comprehensive plan for the territory of the Republic of Lithuania (CPTRL) along the northern boundary of Lithuania's EEZ in the marked engineering infrastructure corridor and adjacent to the corridor of the planned "Harmony Link".

Taking into account the solutions of the approved EIDP, the features of horizontal directional drilling technology and the situation along the coast and the shore (existing and planned infrastructure, protected areas, cultural heritage, building density and so on), the report envisages four points of exit from the sea for the links of the OWPs.

Three locations are envisaged in the northern part of Palanga City Municipality: one near Būtingė another near the planned infrastructure corridor of the cross-border DC interconnection between Lithuania and Poland, "Harmony Link". A third site is planned in the southern part of the Harmony Link cable corridor and below the roadstead of the port of Šventoji. The fourth landfall is located approximately 6 km south of the third site (towards the City of Palanga), with the landfall planned opposite the Šventoji cultural heritage area.

The landfall points for the submarine cables are tentatively planned to be between 200 m and 350 m from the seashore.

The OWPs will be connected to the existing onshore electricity transmission grid system - 330 kV switchyard "Darbėnai" in Kretinga District Municipality, Darbėnai eldership, Žynelių k. 9. The links of both OWPs are planned in such a way that the link of one OWP would not interfere with the construction of the facilities for the connection of the other OWP.

3.2 Labelling of alternatives of the link conception

In the marine part, the alternatives considered for the connection of Area D of the OWP to the electricity transmission grid (see Figure 2) are labelled as alternatives A (alternatives A1-A7), and for the connection of Area A are labelled as alternatives B (alternatives B1-B4). In the mainland part, all alternatives are labelled as alternatives C (alternatives C1-C24).

In the marine part, seven options have been developed for alternative A of the corridor for links to the electricity transmission cables for one OWP (see Figure 3, Area D) and four options have been developed for alternative B of the corridor for links to the electricity transmission grid for the other OWP (Figure 3, Area A).

In the mainland part, twenty-four options for alternative C are considered.

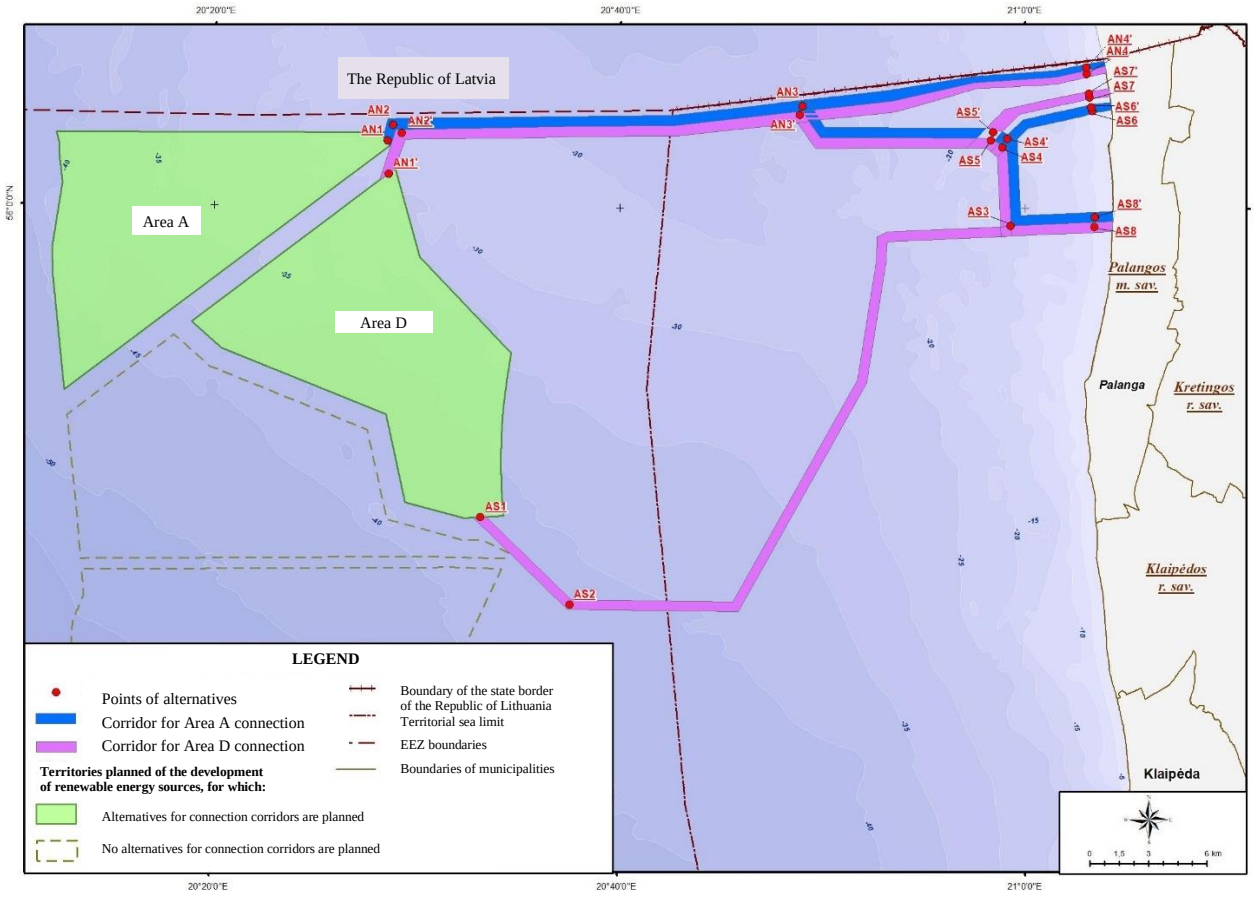

Figure 3.Preliminary alternatives for cable routes in the marine part

3.3 Technological solutions and widths for marine power line routes

220 kV AC power cables are planned to be laid from the OWPs. An infrastructure corridor of the required width will be created to connect each of the OWPs to the Lithuanian electricity transmission grid, allowing for the construction and operation of three electricity cables of 350 MW (or more) for each (the exact number and parameters of electricity cables will be determined by the OWP developer).

The minimum distances between marine electricity cables are highly dependent on the type of cable, the geophysical characteristics and terrain of the seabed, the technology used, to lay the cables, etc. It is envisaged that the cables will be buried not less than 1 m into the seabed. The method of cable embedding/protection will depend on factors such as fishing zones, shipping lanes, seabed geological characteristics, seabed terrain features, and depth. In intersections with cables on the seabed, protection may be provided by the use of rubble fill or by the use of a protective layer, i.e. protective panels, etc.

Taking into account the existing depths, the possible number of cables and the different laying technologies for the offshore cable, the estimated width of the cable corridor for connection of one OWP to the onshore grid will be 340 m (see Figure 4).

For the construction of cables in the Lithuanian coastal zone (from the sea onto the land), it is planned to use horizontal directional drilling (HDD) technology (see Figure 5). HDD technology is expected to also be used on the mainland, crossing the Šventoji River and its valley as well as linear infrastructure (oil pipelines and national roads), as required. The total length of the HDD tunnels (onshore and offshore) will depend on the equipment used and could be around 1.5 km or more.

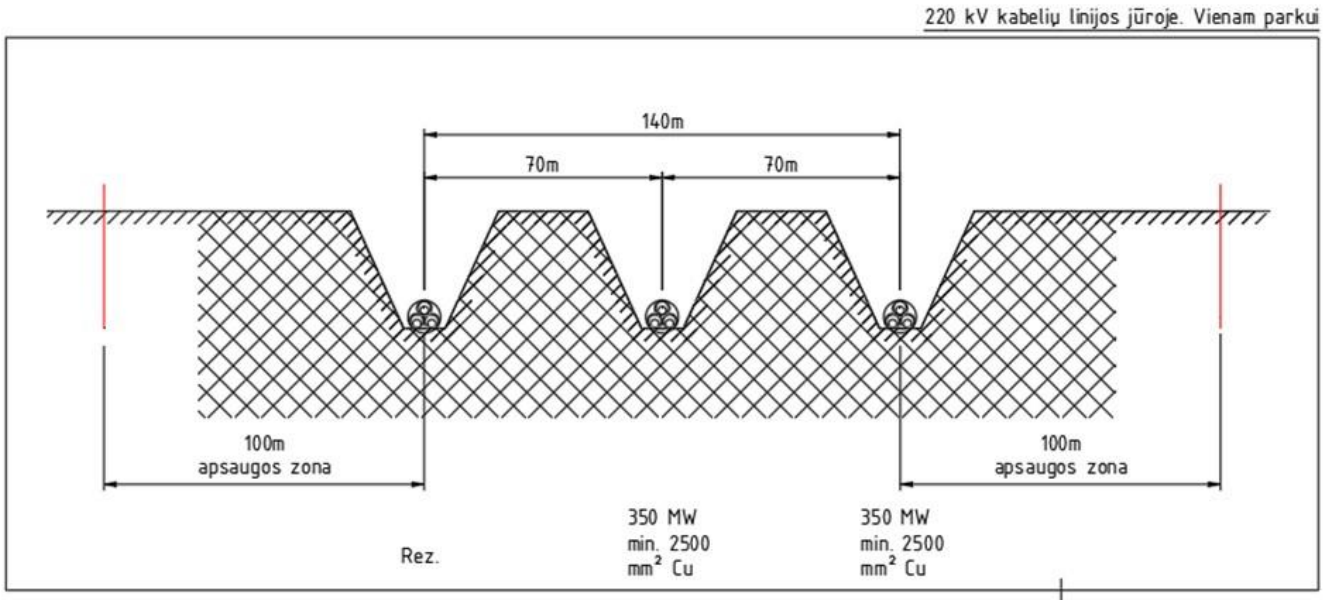

Figure 4. Preliminary profile of an offshore electricity cable corridor for one OWP[11]

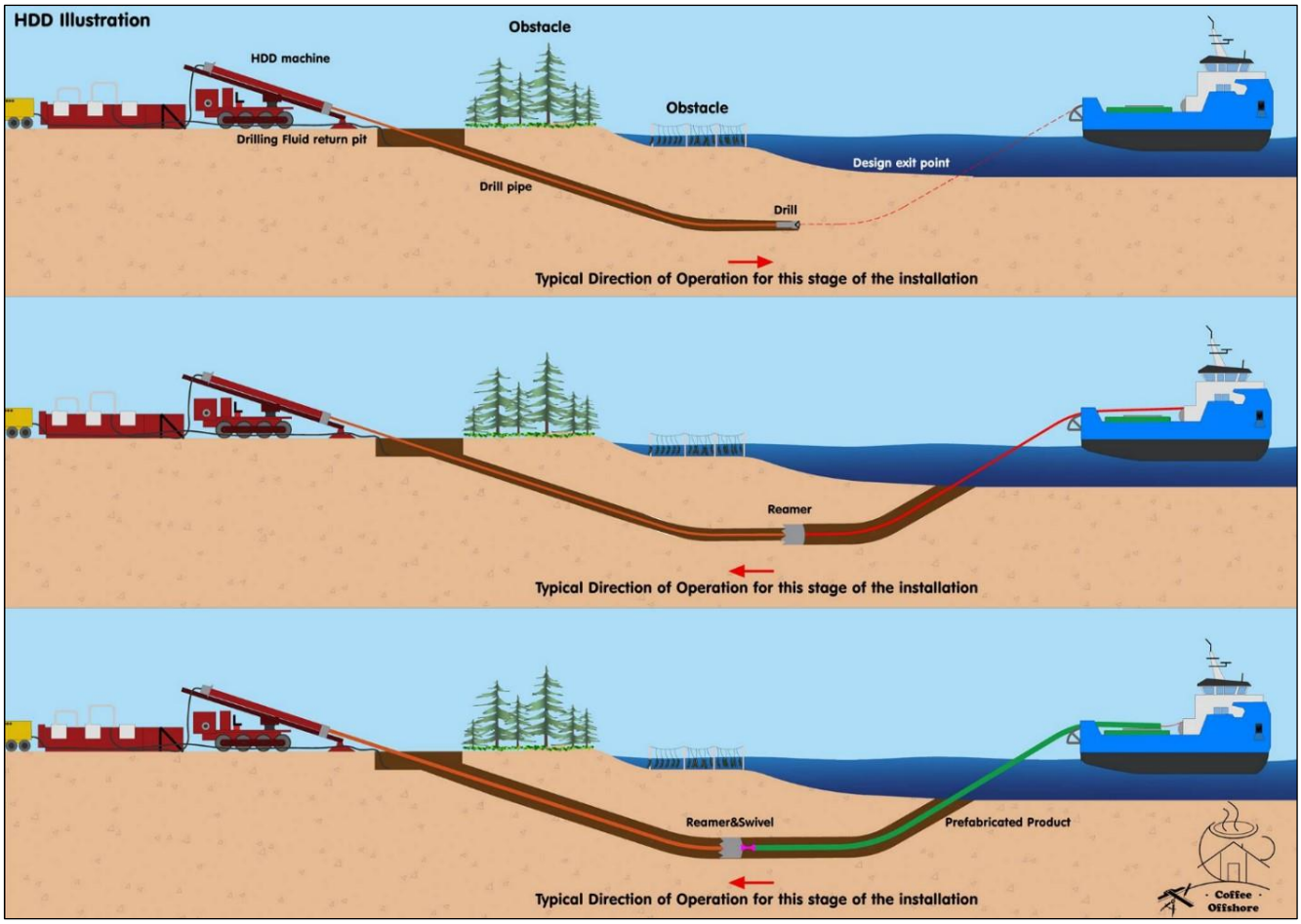

Figure 5. Horizontal directional drilling technology
(Source: https://www.linkedin.com/company/coffeeoffshore/)

[11] The exact number of cables will be determined by the OWP developer.

3.4 Technological solutions and widths for mainland power line routes

HDD technology is planned for cable-laying in the Lithuanian coastal zone (landfall). HDD cable-laying for one OWP requires a plot/area of approximately 140 m x 140 m. Preliminary possible areas for directional drilling sites occupy from 6.2 to 8.3 hectares (see Figures 6, 7, 8). The situation is considered where 3 submarine cables[12] are laid, with a distance of 20 m between them in the mainland part and 70 m in the marine part (at the 7 m isobath).

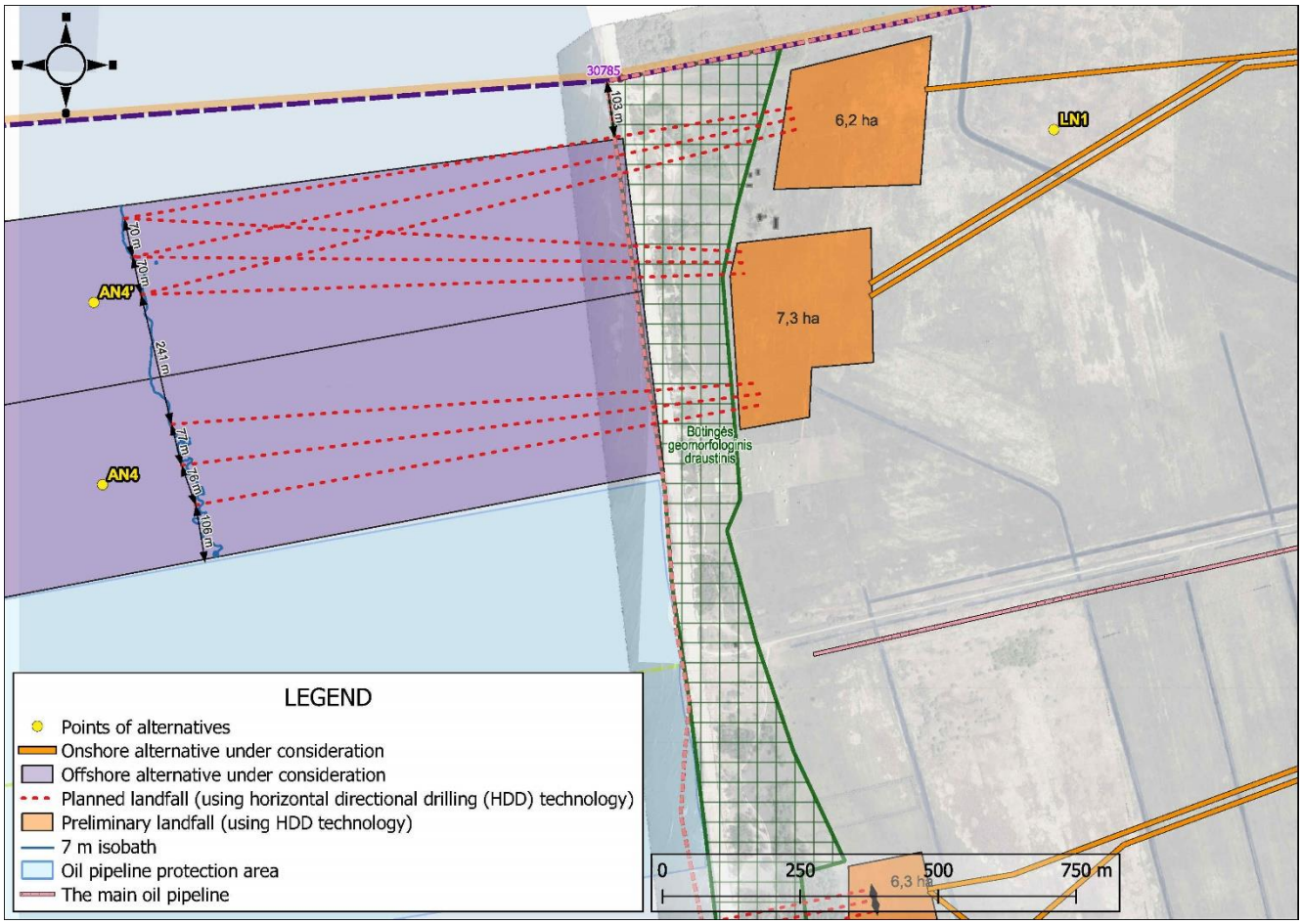

Figure 6. Diagram of planned landfalls between points AN4 (AN4') and LN1 (alternatives A1 and B1 in the marine part and C1, C2, C7, C8 in the mainland part)

[12] Note: The developer may choose a different number of cables.

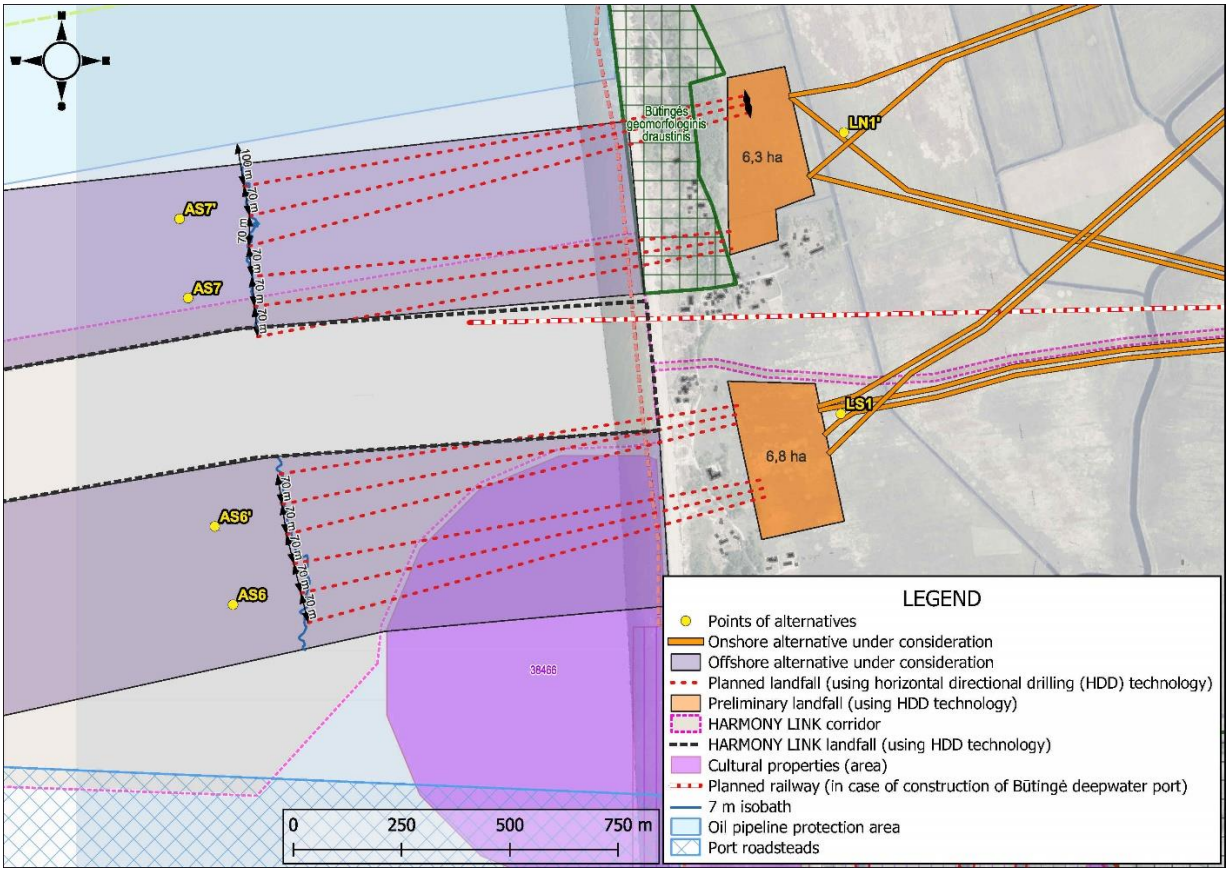

Figure 7. Diagram of planned landfalls between points AS7 (AS7‘) and LN1‘ (Alternatives A2, A7, B2 in the marine part and C3, C4, C9, C10, C13, C14, C15, C16 in the mainland part), and also points AS6 (AS6‘) - LS1 (Alternatives A3, A6, B3 in the marine part and C5, C6, C11, C12, C17, C18, C19, C20 in the mainland part)

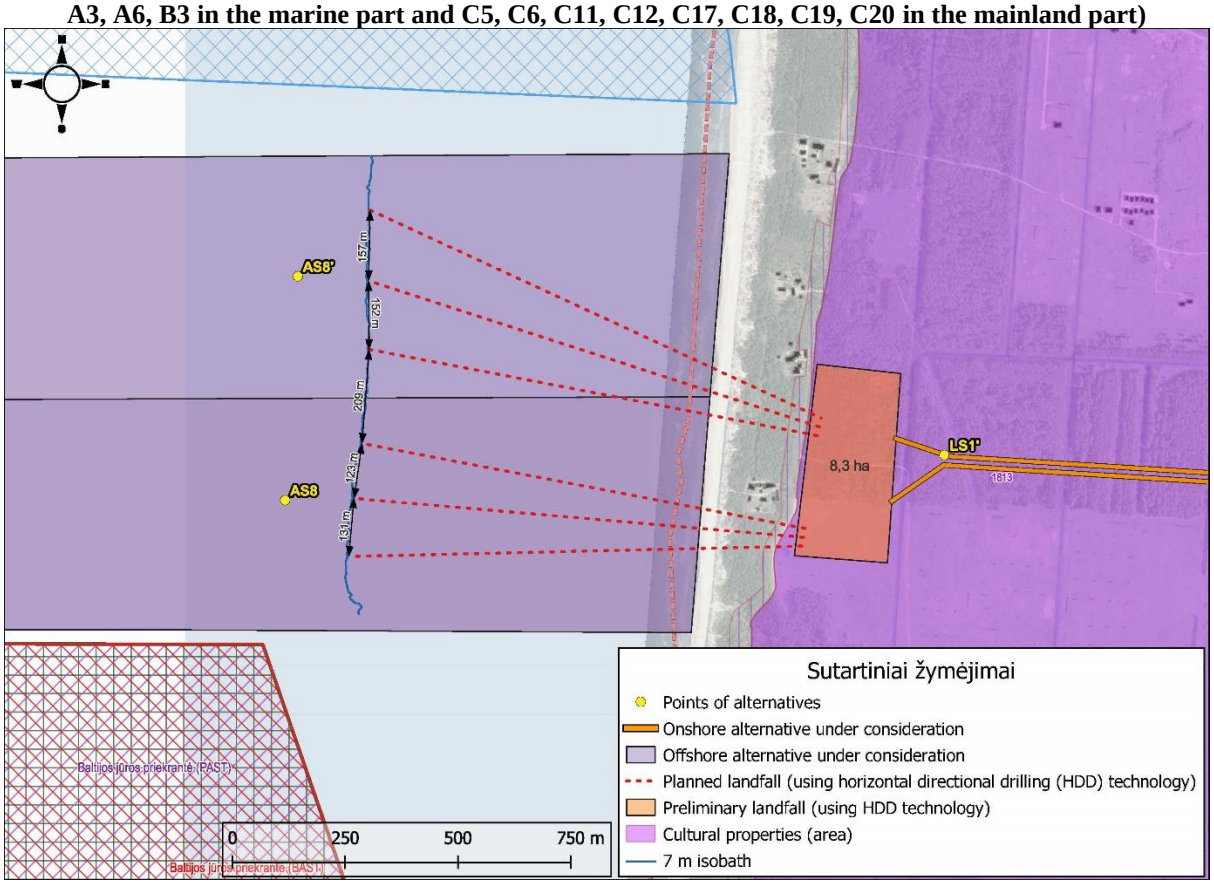

Figure 8. Diagram of planned landfalls between points AN8 (AN8‘) and LS1‘ (alternatives A4, A5 and B4 in the marine part and C21, C22, C23, C24 in the mainland part)

HDD technology will also be used to lay electricity cables across the Šventoji River and the A13 road (Klaipėda–Liepāja). Cables would most likely be installed by open trenching across other roads and other water bodies (rivers, streams, ditches).

It is planned that underground 220 kV AC electricity cables will be laid from the OWPs to the new mainland TS. Electricity will be conveyed from the new TS to the Darbėnai switchyard via a 330 kV AC underground cable line. The report assumes that the cable line will consist of four lines of 350 MW each, two of which will be operational and two of which will be standby. Each line will consist of three single-core cables.[13]

Taking into account the possible number of cable lines, the distance needed between cables and the required width of the service area, as well as the installation of the links required for the connection of the cables and the possible atypical conditions in which corridor widening will be required, the report assumes a width of 20 m for one OWP corridor, for the laying of 220 kV and 330 kV power cables (this assumption may be adjusted at the time of solutions finalisation of the territory planning document as well as during the technical design of connections).

3.5 Alternatives for the location of transformer substations and other necessary infrastructure

Taking into account the distance to the mainland, the existing technology and the prevailing practice worldwide, it is envisaged that 220 kV AC electricity will be supplied from the OWPs via submarine cables. On the mainland, the voltage will have to be raised to 330 kV in transformer substations and only then can it be conveyed to the transmission grid at the 330 kV switchyard "Darbėnai".

The diagram for connecting OWPs to the Darbėnai switchyard is presented in Figure 9.

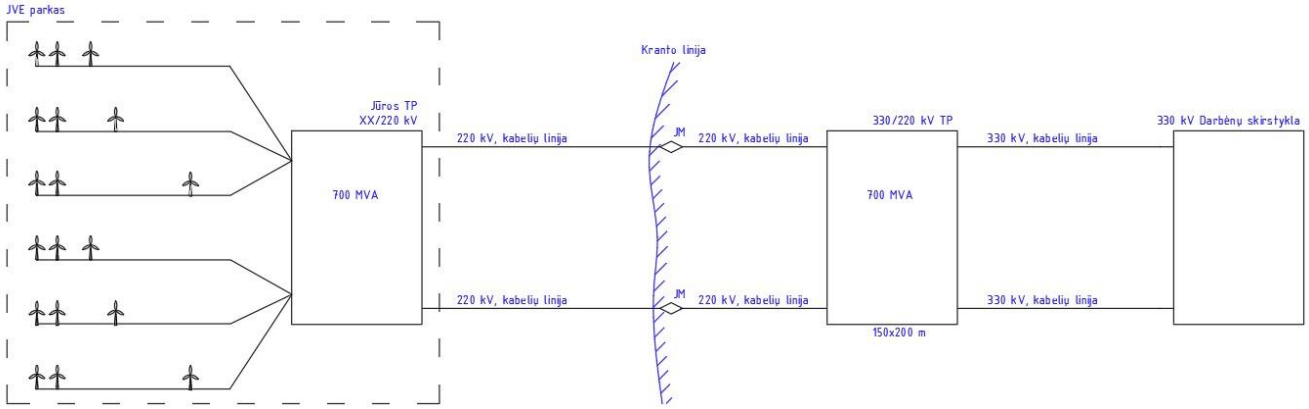

Figure 9. Diagram for connection of an OWP to the 330 kV switchyard "Darbėnai"

As separate OWPs may be operated by different managers, separate transformer substations with the necessary equipment will have to be planned for the connection of each of the two OWPs. It is preliminarily envisaged that a TS will occupy an area of ~3 hectares (~6 hectares would be required for both OWPs, taken together).

It should be noted that the exact areas required for the TS and other necessary engineering infrastructure and for access roads will depend on the specific location and the technical solutions to be chosen by the Developers. Areas are identified in this Development Plan where construction may be carried out.

[13] Note: The number and technical parameters of the cables will be chosen by the Developer. The 4-cable solution in the report was selected to optimise the width of the link corridor and to assess the potential costs of installing the link.

Potential areas are identified (see Figure 10) for the construction of the TS, taking into account the existing and forthcoming territorial planning documents, existing and planned infrastructure[14], protected areas[15], residential areas[16], cultural and natural heritage sites[17], water bodies[18], forests[19] and other factors limiting the construction of the TS.

[14] In addition to the engineering infrastructure itself (pipeline, wind and solar power plants, various structures), there are 50 m buffer zones from the pipeline and 168 m safety buffer zones from existing wind power plants up to 140 m in height. Note: When planning the TS area, the Developer should also take into account the special land use conditions from linear objects (e.g. roads and power lines).
[15] In protected areas, construction of TS is not allowed.
[16] Taking into account the potential noise impact during operation of the TS, 200 m zones around residential areas and homesteads have been identified.
[17] Construction of TS in natural or cultural heritage areas or their protection areas is not allowed (or in some cases, not desirable).
[18] Pursuant to the Law on Special Land Use Conditions, it is prohibited to drive or park motor vehicles closer than 25 m to the shore of a water body, which is why there are 25-m-wide strips around them.
[19] The level of restrictions on economic activities on forest land also depends on the group to which the forest is assigned.

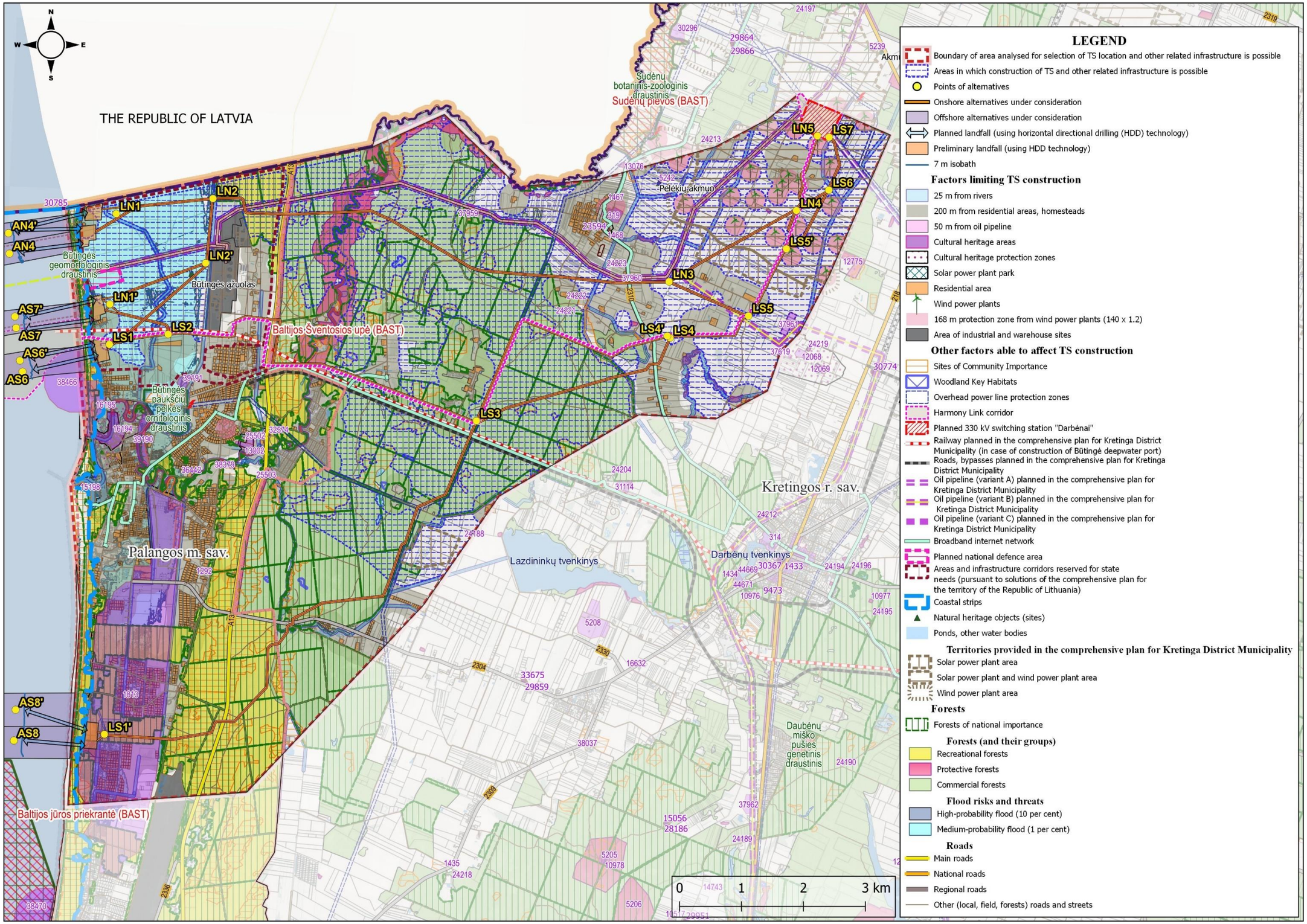

Figure 101. Identified areas in which construction of TS and other related infrastructure is possible

3.6 Alternatives considered for the location of marine infrastructure corridors

When planning the connection of the OWPs to the 330 kV switchyard "Darbėnai", the precise technical solutions are not known, so the widths of the marine power line corridors are chosen taking into account the power generation capacity[20,21] of the planned OWPs, the solutions approved in the EIDP (cables to the mainland part to be laid adjacent to the Harmony Link cable and/or along the northern infrastructure corridor), the existing cable and cable installation technologies, and the maximum likely number of cables (including standby cables).

Preliminary alternatives for the marine link corridors are shown in Figure 3.

Several key planning principles and technical specification requirements are taken into account when selecting alternatives for laying submarine cables:

- The minimum width of the planned infrastructure corridor for one OWP is 340 m (using 3 electricity cables for the connection);
- The seabed surveys are carried out so that for the selection of one OWP corridor, a route approximately 500 m wide is surveyed, and when aligning the two cable corridors, the maximum width of the survey route (where possible) would be 1000 m;
- The use of the routes for infrastructure corridors along with other existing marine cable corridors is to be maximised as proposed in the comprehensive plan of the Republic of Lithuania (CPTRL)[22];
- The possibility of laying cables adjacent to the corridor planned for the Harmony Link interconnection (HVDC cable) is to be evaluated;
- Cable routing in the planned RES development areas of the EIDP is to be avoided, using only the service/buffer zones of the planned OWPs;
- The number of possible crossings of other cables/pipelines is to be minimised;
- Known and potential underwater cultural heritage sites and other known obstacles and their safety zones are to be avoided;
- As connections for two potential OWPs are planned, the alternatives are also to be designed in such a way as to accommodate, within the technical and spatial limits, the adjacent power cable routes of both planned OWPs.

Taking into account the above principles, seven cable route corridor alternatives have been developed for connection of one OWP (Figure 3, Area D) and four corridor alternatives have been developed for the other OWP (Figure 3, Area A).

3.7 Alternatives considered for the location of mainland infrastructure corridors

For the connection of the OWPs to the 330 kV switchyard "Darbėnai", 220 kV (to the newly-installed TS) and 330 kV AC power line engineering infrastructure corridors are planned for the mainland. Two OWPs are planned to be connected to the 330 kV switchyard "Darbėnai", each with a maximum power capacity of 700 MW to be conveyed to the grid.

Preliminary alternatives for the routing of power lines on the mainland are shown in Figure 11.

[20] https://www.e-tar.lt/portal/lt/legalAct/a0c9fb80b6bc11eab9d9cd0c85e0b745/asr;
[21] https://www.e-tar.lt/portal/lt/legalAct/39556540c6ed11ed9978886e85107ab2
[22] https://www.e-tar.lt/portal/lt/legalAct/563c5570267011ecad73e69048767e8c .

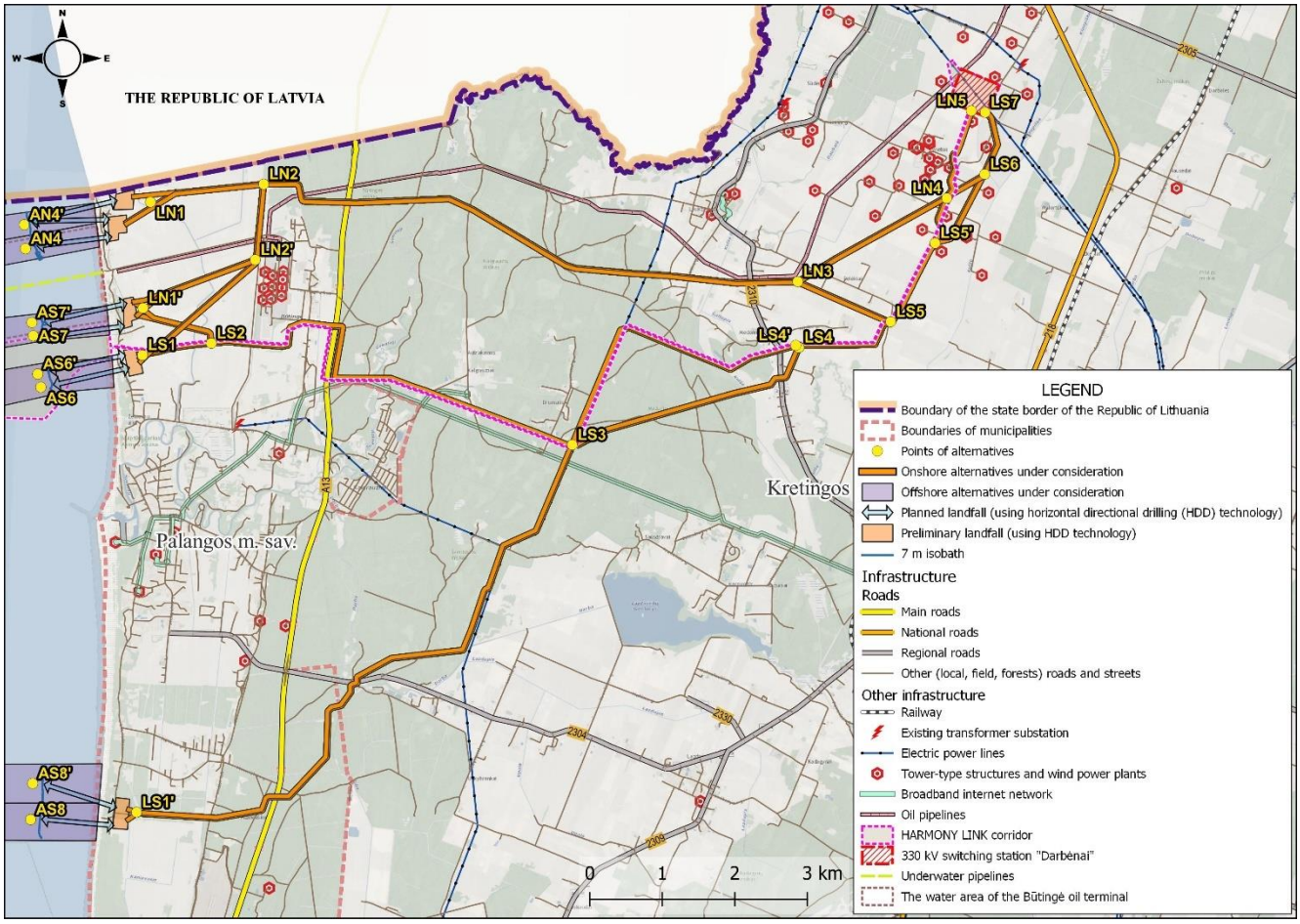

Figure 11. Conception alternatives in the mainland part

The planned engineering infrastructure corridors from the Baltic Sea coast to the Darbėnai 330 kV switchyard will cross the forest, rivers, streams and drainage ditches near the border of Palanga City Municipality and Kretinga District Municipality. Before laying the network in the forests, the forest land will have to be rezoned for other land uses in accordance with the procedure specified by law. When planning engineering infrastructure corridors, preference is given to forest land that is not overgrown with forest or that has thinning stands. In all cases, the group to which the forest is assigned is taken into account.

Alternatives for power line routes are planned seeking to avoid areas of cultural heritage value, protected areas or other naturally and socially sensitive areas. Where it is unavoidable to plan engineering infrastructure corridors through protected areas or other sensitive areas, the SEA report includes measures to avoid, mitigate or compensate for significant adverse effects.

The selection of alternatives takes into account existing and planned residential areas, i.e. seeking to maintain the greatest possible distance from existing settlements and individual homesteads, as well as newly-planned residential areas.

The selection of routes for the alternatives includes an assessment of the lengths of the planned power line routes, intersections with existing and planned engineering networks and communication facilities, and the number of land plots to be crossed.

The alternatives for the routes of the power lines from the submarine cable landfall points are planned taking into account the solutions of the Palanga City comprehensive plan, the solutions of the

Kretinga District Municipality comprehensive plan, other prepared and forthcoming territorial planning documents.

The landfall route of the submarine cables in the northern part of Palanga City Municipality (near Būtingė) would cross the Būtinge geomorphological reserve in a closed way (using HDD technology), and the reclaimed (meliorated) low-lying wetlands near Būtingė would also have to be crossed.

The southernmost landfall alternative will cross a registered cultural heritage site - the ancient settlement of Šventoji (1813), where archaeological research will be required.

The northernmost alternative for the power line routes, in accordance with the conditions set by AB Orlen Lietuva, envisages a distance of at least 50 m from the main oil pipeline (the protection zone of the main oil pipeline is 25 m to either side from the pipeline axis). The aim of this connection is to form the shortest possible connection alternative, which would be favourable to the natural and social environment and which would not affect the safety of the existing and planned[23] main pipelines due to stray currents.

Another route alternative is envisaged along the "Harmony Link" corridor. The route is chosen adjacent to the national road A13 (Klaipėda–Liepāja), then parallel to the continuation of Pylimo Street from Šventoji towards the town of Darbėnai. The Kretinga District Municipality comprehensive plan envisages the construction of an asphalt road at this location, the extension of the railway branch line from Darbėnai, and the construction of broadband internet access runs parallel to the existing street.

The alternatives for the power lines of the Darbėnai 330 kV switchyard feed into the existing wind park. The existing wind power plants are between 50 m and 140 m in height. In accordance with the legislation in force at that time, the detailed plans drawn up for the construction of the wind power plants provided for sanitary protection zones ranging from 38 m to 90 m.

The alternatives are chosen to minimise the impact on the operation of the power line and the wind power plants, and to ensure that all regulatory and safety requirements would be met. Power line corridors are selected taking into account the boundaries of existing land plots and existing field roads.

When planning an infrastructure corridor in forests within the protection zones of existing overhead lines, there are already cleared areas in the forests and there is an opportunity to take advantage of some of these clearings, thus reducing the forest area to be cut.

[23] The drawing of the engineering infrastructure of the comprehensive plan for the territory of Kretinga District Municipality envisages the development of the oil pipeline from the Mažeikiai refinery to the Būtingė terminal to be located to the north of the existing main oil pipeline. For the connection of the OWPs to the existing power transmission grid, the route is planned on the southern side of the existing main oil pipeline, thus not preventing the development of the oil pipeline and not affecting its safety due to stray currents.

4 CONSEQUENCES AND INTERACTIONS AMONG INFLUENCING FACTORS

4.1 Consequences for environmental components due to implementation of the alternatives under consideration

4.1.1 Consequences for public health of the alternatives under consideration

Marine part

The alternatives for the link cable route corridors in the marine part will have no public health consequences. Consequences have to be analysed in the landfall area and in the mainland part.

Mainland part

The residential and public areas closest to the Baltic Sea are located in Palanga City Municipality.

Underground electricity cables are planned to be installed away from residential areas. It is envisaged that the corridors of the planned electricity links will not cross residential areas. The underground electricity cables shall be shielded in order to provide physical protection against damage and to reduce electromagnetic radiation and electromagnetic field interference. The EMF intensity (strength) generated by underground electricity cables does not cause serious health problems and is not regulated in Lithuania (only EMF[24] from high voltage overhead power lines is regulated). The EMF intensity generated by underground electricity cables is too low to cause any consequences for human health.

No noise is generated and no air pollution is emitted when the cable is in operation. The cable heats up as the electric current flows, but the heat generated is not significant and is not hazardous to health.

The Development Plan and wind energy are part of green energy development, which has indirect positive consequences for human health due to the declining share of fossil fuel use in the electricity sector, as well as potential threats related to climate change.

No impact on public health due to electromagnetic fields, noise or other factors is expected during the operation of the links.

The related infrastructure, such as the proposed transformer substation or shunt reactors, will generate a certain level of noise, and the site for the related infrastructure will therefore need to be located by the developers of the OWPs in such a way that it does not exceed the permissible noise limits of the hygiene standard HN33:2011, or the noise requirements can be met by choosing less noisy equipment.

Having performed preliminary noise calculations, it is assessed that the excess noise zone of the typical equipment (power transformers and shunt reactors) may go around 200 m from the TS. It should be stressed that the noise emitted by the TS, and hence the excess noise zone, will depend to a large extent on: the specific technical equipment and the spectrum of noise emitted, the number of devices and their location within the area of the TS as well as the characteristics of the land cover and the terrain of the adjacent area. Other nearby industrial noise sources (e.g. wind farms) may also contribute to the excess noise zone. Detailed and accurate noise calculations and the necessary noise abatement measures must be carried out during the preparation of the technical/working design, knowing the location of the

[24] Note: The Lithuanian Hygiene Standard HN 104:2011 "Public protection from electromagnetic fields generated by power lines" (hereinafter "Hygiene Standard") establishes the permissible values of the electromagnetic field parameters applicable to overhead power lines of 330 kV and above and to the equipment belonging to the lines (hereinafter "power lines"), which are operated at the industrial frequency of 50 Hz and general requirements for electromagnetic field measurements indoors and in residential and public buildings, as well as in residential environments.

TS construction and the equipment to be installed. In this Development Plan, taking into account the noise emissions from typical equipment, the selection of potential sites for the construction of the TS will be based on a setback of 200 m from residential properties.

Temporary increases in dust and noise may occur during construction and must be mitigated by mitigation measures. Measures to reduce noise and dust during construction must be specified when drawing up the technical design, taking into account the characteristics of the area where the related infrastructure is to be installed, the technologies to be used and the distances to residential areas.

The implementation of the Development Plan may also have minor consequences in terms of potential psycho-emotional impacts on some residents due to the imposition of easements on land plots within or adjacent to the planned infrastructure corridor.

Indirect positive consequences for public health are associated with the use of clean renewable (wind) energy resources to replace polluting fossil fuels.

Consequences

No public health consequences are foreseen for the installation of link cables in the marine part.

The Development Plan will have both positive and negative consequences for public health, but these are considered to be insignificant.

4.1.2 Consequences for protected areas, forests and biodiversity due to implementation of the alternatives under consideration

Marine part

In the marine environment, it is important to take into account existing protected areas and Natura 2000 sites and the values they protect. One of the most important considerations when looking at the possible alternatives for cable routes and their consequences for protected values is the potential impact on benthic communities and protected bioreefs. Potential consequences for marine fauna are also related to potential disturbance during the construction period and the physical effects of the submarine cables.

The link corridors are planned in such a way to minimise the impact on areas of natural value or sensitivity, but the northern alternatives of the conception will unavoidably cross the Klaipėda-Ventspils Plateau SAC, SPA and the biosphere polygon, which have been designated for the protection of *reef habitats (1170)* and wintering waterbirds such as the velvet scoter (*Melanitta fusca*), razorbill (*Alca torda*) and long-tailed duck (*Clangula hyemalis*).

Potential consequences for benthic habitats and mitigation measures

The consequences for benthic habitats – associated flora and fauna – of the implementation of the Development Plan will depend on the technological solutions for cable-laying, which in turn will be selected during the technical design process, taking into account the depth, the distance to the shoreline, and the lithological characteristics of the seabed. The link cable corridors will cross the Natura 2000 SAC site and the reef habitat (1170), an EU priority area. The total area of habitat disturbed will depend on the cable-laying technology that is chosen and the width of the cable-laying work area. The maximum possible width of the cable trench at this stage is assessed to be 3 m.

Horizontal Directional Drilling (HDD) technology is to be used for the construction of cable lines in the coastal zone in the landfall section. Direct seabed disturbance is only possible in the northern part of the infralittoral reef.

Short-term localised insignificant consequences - an increase in turbidity - are expected during drilling. The extent of the turbidity will depend on the prevailing hydrometeorological conditions at the

time of drilling. The mitigation measure is to carry out the works in accordance with the hydrometeorological conditions, i.e. there will be less turbidity dispersion in calm weather.

As the cable-laying technology envisages the avoidance of boulders and obstacles, only negligible physical disturbance of the natural benthic habitat is likely.

Given the potential for recovery of benthic communities, implementation of the Development Plan is unlikely to have significant adverse consequences for benthic habitats and benthic organisms.

Potential consequences for ichthyofauna and mitigation measures

Potential adverse consequences for marine fish are associated with cable-laying operations, which can increase turbidity due to the laying of cable lines and/or the deepening of the seabed. During operation, adverse effects are possible due to disturbance caused by electromagnetic fields emitted by the cables.

Turbidity and increased sediment concentration in the water column can be caused by excavation works during cable installation (grounding). However, sedimentary materials are suspended in the water for a relatively short period of time and the extent of their distribution depends on the type of sediment and the currents. The impact is expected to be localised and temporary and is therefore not expected to have significant consequences for marine fish populations.

Alternating current flowing through cables on the seabed creates electromagnetic fields. It is thought that these fields may interfere with the migration of fish by interfering with the detection and sense of direction of the earth's magnetic lines, or by interfering with fish using changes in the electromagnetic field to detect food sources.

Most studies have shown that electromagnetic fields have minimal or no proven negative effects on fish under normal circumstances.

Potential consequences for birds and bats and mitigation measures

The most relevant impacts on seabirds during the implementation of the special plan are the result of potential disturbance caused by cable-laying vessels, which may force birds to move away from feeding/resting areas along shipping lanes.

The disturbances are expected to be limited to the cable-laying operations in the vicinity of vessels operating at sea, and are therefore considered to be short-term and localised. It should be noted that summer is the most favourable time for offshore work due to the calm hydrometeorological conditions, and therefore the impact on wintering birds is not relevant at such time.

When birds avoid certain objects at one distance or another, areas suitable for feeding or resting may be lost.

The installation of electricity transmission cables may have an impact on birds by affecting benthic communities suitable for sea ducks. Sea depths of 40 to 60 m may be said to be too deep for effective foraging by the velvet scoter and long-tailed duck. This change in benthic communities is therefore more relevant in the nearshore area. Due to the relatively small area of seabed disturbed by the cable-laying and the rapid recovery of the communities, this impact will not have significant adverse consequences for seabirds.

Potential consequences for marine mammals and mitigation measures

Due to the low numbers of marine mammals in the Lithuanian EEZ, the implementation of the Development Plan is not expected to have significant adverse consequences for marine mammal populations.

Potential sound impacts on mammals depend on the specific works, but increased vessel traffic and the start of noisy works in the OWP areas will result in the animals moving to adjacent areas, and therefore no significant adverse consequences are anticipated.

The sensitivity of marine mammals to artificial electromagnetic fields depends on the species-specific sensory threshold and the specific exposure. EMFs do not necessarily affect mammals, while more intense EMFs can have both positive and negative effects on the animal.

Mainland part

All conception alternatives unavoidably pass through the "Coastal strip" protected area at sea and on the coast[25]. Some of the alternatives cross the Būtingė Geomorphological Reserve along the coast[26]. The laying of the cable between the sea and the mainland will be carried out by means of directional drilling (HDD) without touching the coastal dunes, therefore no significant consequences for the"Coastal strip" protected area or the Būtingė Geomorphological Reserve are expected.

In the mainland part, the electricity cable across the Šventoji River (SAC "Baltic Šventoji River"), which was established for the protection of the European river lamprey and the thick-shelled river mussel, is planned to be installed by means of directional drilling (HDD technology). As a result, no consequences for the protected values (European river lamprey and thick-shelled river mussel) are envisaged.

In the mainland part, all conception alternatives will unavoidably cross certain habitat areas of EC importance even in case of optimal cable routing. The conception alternatives have also been selected taking into account the data from the Information System of Protected Species (SRIS) in an effort to move away from protected species sites.

No significant adverse consequences for these species are expected as a result of the implementation of the envisaged environmental measures.

Choosing alternatives for the location of the electricity link will unavoidably involve the cutting of forest. The corridors of the alternatives under consideration have been selected with the aim of minimising logging (including special purpose and protective forests). The conception alternatives have been selected to avoid crossing core forest habitats and to follow, where possible, quarter lines or overhead power line protection zones.

The conversion of forest land to other land uses and the cutting of forests will have to be compensated in accordance with the procedure specified by national legislation. In the case of construction works in the forest, a limitation of the construction period is envisaged, taking into account logging rules, the possible impact on protected species and birds during the breeding and rearing period.

[25] The objectives of the coastal strip are: 1) to preserve, through rational use, the Curonian Spit, a UNESCO World Heritage Site, the continental coastal landscape, the habitats of rare and endangered species of plants and animals, and other natural resources; 2) to ensure the balanced use of the coastal strip for the needs of the state and the public; 3) to ensure the implementation of measures for the protection of the landscape's natural and cultural values; and 4) to enable the general public to enjoy the recreational resources of the coastal strip. 1. The coastal strip consists of: 1) a land area not narrower than 100 m from the shoreline, which includes a dune ridge, a foredune, a cliff and a beach, stretching from the state border of the Republic of Latvia to the northern breakwater of the port of Klaipėda; 2) the Curonian Spit to the state border of the Russian Federation; 3) the territorial waters of the Republic of Lithuania of the Baltic Sea to the 20 m isobath. In the coastal zone it is prohibited: 1) to subdivide, partition land plots of private ownership granted before the date of entry into force of the Law on the Seaside Strip; 2) to destroy objects of natural and cultural heritage, to disrupt beaches, underwater shoreline, dune ridge, dunes, cliff slopes or to otherwise damage the relief, soil, vegetation and fauna; 3) to extract subsoil resources, excluding groundwater; 4) to drive motor vehicles, tractors and self-propelled machinery on the beach, dunes and underwater shoreline of the coastal strip, except when: (f) projects of national importance are being implemented.

[26] Objective of establishing the Reserve: to preserve a stretch of coastal dunes.

Consequences

The operation of the electricity links and related infrastructure will not have significant negative consequences in terms of destruction of habitats or species, creation of migration barriers, habitat fragmentation, changes in the hydrological regime etc. No significant adverse consequences for protected areas and sites, forests, habitats of EC importance, protected species and biodiversity are expected as a result of the implementation of the alternatives considered in the report, where environmental mitigation and compensation measures will be applied.

4.1.3 Consequences for water resources due to implementation of the alternatives under consideration

Marine part

During the laying of marine electricity transmission cables, a higher level of turbidity is expected only locally, i.e. at the cable-laying site. Therefore, the works will not lead to significant large-scale changes in turbidity and increases in suspended particulate matter compared to natural conditions in the Baltic Sea area under consideration.

The laying of electricity transmission cables and the stirring of seabed sediments can lead to secondary pollution of the water by chemicals (heavy metals, organic compounds) accumulated in finely dispersed (silty) sediments. The alternatives considered for the laying of the cable lines do not envisage works in potentially polluted areas of Lithuania's part of the Baltic Sea. No significant adverse consequences for water resources are expected due to secondary pollution and no mitigation measures are required.

Mainland part

The alternatives for the route of the electricity links have been chosen to bypass the groundwater aquifers, and no negative impacts, and therefore no consequences, are expected in this respect. No significant impact on the hydrological regime is expected given the extent of excavation works during cable-laying.

The cable will be laid across the Šventoji River in a closed way (using directional drilling or other technologies), so there will be no significant impacts.

In order to avoid significant adverse impacts on rivers and their ecosystems, and taking into account the potential impacts, measures are envisaged to avoid significant adverse consequences during construction.

Consequences

The conception alternatives are planned in marine areas dominated by glacial moraine deposits, fine to medium sand, pebbles, gravel and boulder fields, which do not have significant historical chemical contamination, and therefore no significant adverse consequences for water resources from secondary pollution are expected.

On land, no consequences for water resources are expected if the proper precautionary measures are taken.

4.1.4 Consequences for subsoil and mineral deposits of implementation of the alternatives under consideration

Marine part

Potential consequences for the seabed and sedimentation conditions during installation of engineering infrastructure

Given the structure of the seabed, the type and distribution of surface sediments, and the associated formation of valuable seabed communities, it is expected that impacts on the seabed are likely to be largely localised and relatively minor. In essence, adverse impacts are limited to partial disturbance of the seabed and secondary sedimentation at the cable route locations, and potential damage to valuable seabed habitats in the event of planned dredging during the project. Increased impacts are likely at locations where glacial outwash deposits are common.

It is recommended to avoid destroying the most valuable benthic habitats (as identified by state monitoring) when planning cable routes, or to carry out additional benthic surveys in the most valuable areas prior to trenching, in order to clarify the location of valuable benthic habitat, and to avoid disturbance of such habitat.

On the Lithuanian coast, the main sediment flux is in the 1-1.5 km nearshore zone, so laying cable routes through this dynamically active zone may have localised negative effects on the sand balance and thus on the stability of the shoreline/beaches.

The two main technological methods for laying high-voltage cables on the seabed are in a trench or by covering the cable directly on the seabed with massive concrete covers or a layer of sand or gravel. Depending on the geological conditions and the nature of the soil, trenches can be dug with special marine ploughs or by means of a compressed water jet. Due to the technologies used, in all cases the impact on the seabed is localised and minimal. The cable-covering technique is only used in specific conditions where trenching is not feasible or too expensive.

Moreover, in the coastal zone, when connecting the onshore and offshore segments of the route, the most common technology used is HDD, i.e. cables are not routed in open trenches but are pushed through a borehole in the deep layers, thus avoiding disturbance and damage to the most sensitive part of the route - the nearshore zone and the beaches.

Potential consequences for sand and oil exploration opportunities and extraction conditions

The cable routes cross one (see Figure 12) potential oil structure in places (the alternative at the maritime border with Latvia), but due to the localised nature of the location of the cable routes, there will be no serious obstacles to potential oil extraction in this area.

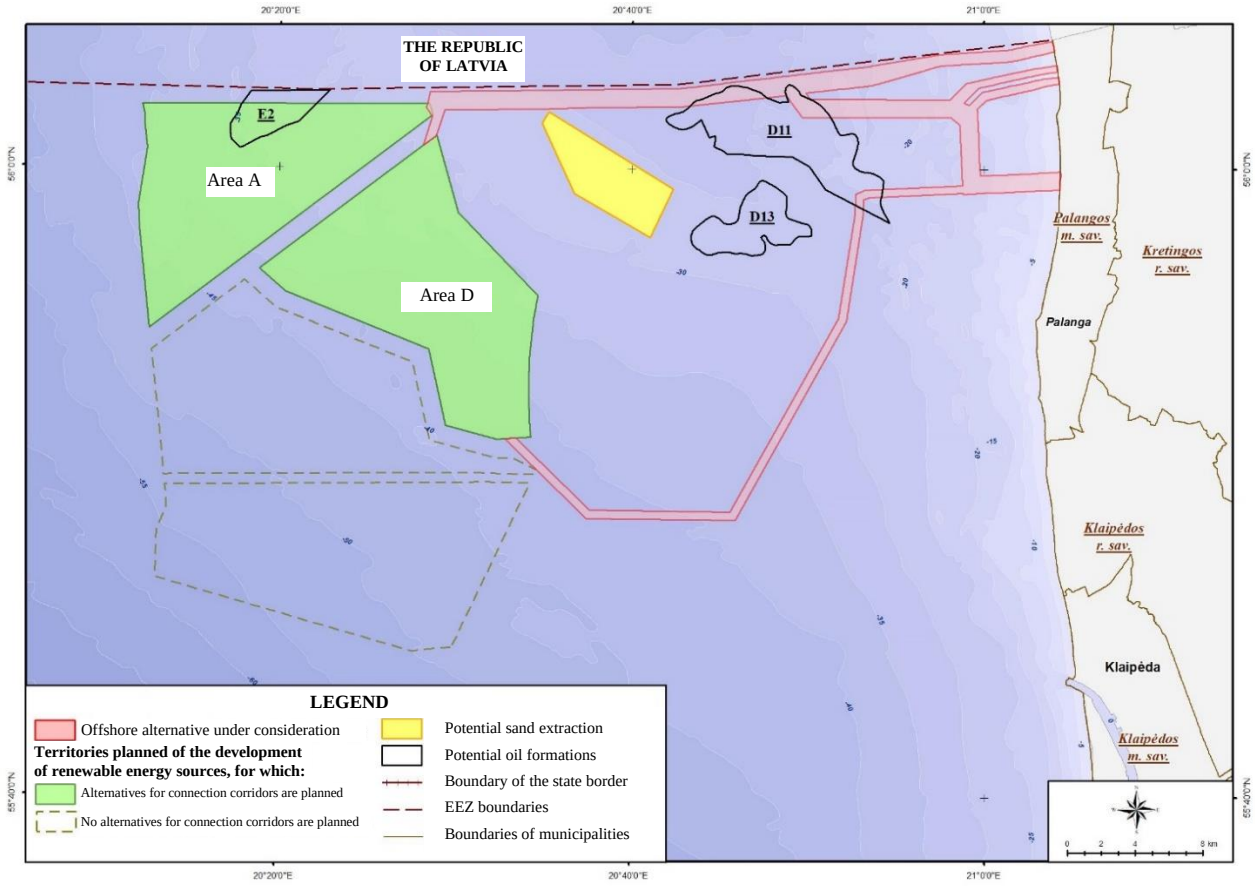

Figure 12. Area of potential oil formations and sand extraction

The sand and gravel resources of the Lithuanian EEZ have not been explored and are not included in the State Register of the Earth's Subsurface as a useful mineral resource. However, potential deposits of these resources have been identified through geological mapping of the seabed. The cable corridors under consideration do not cross any sand or other valuable mineral occurrence zones, and therefore no negative impacts on natural resources are expected.

Mainland part

In the mainland part, measured subsoil mineral deposits[27] are not crossed; only areas of indicated and inferred mineral deposits are crossed, where electricity links may be envisaged. The areas of mineral resources are larger than the planned link corridors, so there will be no significant adverse consequences for the extraction or prospecting of natural resources.

Consequences

In the marine part, the assessment of the consequences for the seabed and subsoil is only relevant in a preventive sense - not to interfere with/obstruct other potential extraction or exploration of strategic natural resources. The areas of mineral resources are larger than the planned link corridors, so there will be no significant adverse consequences for the extraction or prospecting of natural resources. No significant adverse consequences for the extraction or prospecting of mineral resources are expected as a result of the alternatives considered in the report.

[27] 'Deposit of subsoil resources' means an accumulation of minerals within the boundaries defined by direct exploration of the earth's subsurface, the quantity and quality of which have been explored and the extraction of which is, or is likely to be in the future, economically advantageous.

4.1.5 Consequences for the landscape and the natural framework due to implementation of the alternatives under consideration

Marine part

The implementation of the Development Plan's solutions relates to the use of the marine areas, but does not change the functional or visual structure of the seascape. In the marine part, the implementation of the electricity link will have no impact on the seascape. The HDD technology is to be used for the connection cables to the coastal area, i.e. the coastline, the sandy beaches and the dunes in the coastal area will not be openly excavated, therefore the relief and the landscape structure of these elements will not be altered and no negative consequences are expected.

Mainland part

The choice of alternatives for the location of the electricity link on the mainland will unavoidably lead to logging. All alternatives in the mainland part will cross natural framework areas. The planned electricity links are not expected to create a barrier to animal and plant migration and are expected to have little impact on natural and recreational resources and the geological balance of the landscape.

In the mainland part, low to moderate (depending on the alternatives under consideration) significant adverse consequences for the landscape and the natural framework are expected due to the potential cutting of forest. Compensation for logging and conversion of forest land to other land uses will be paid in accordance with the procedures specified by law.

The installation of transformer substations may have low to moderately significant consequences for the landscape and the natural framework, depending on the segment of the planned conception alternatives where they will be located.

Consequences

The implementation of the Development Plan's solutions is related to the use of the marine areas, but does not change the functional or visual structure of the seascape. In the marine part, the implementation of the electricity link will have no consequences for the landscape (seascape).

The choice of alternatives for the location of the electricity link on the mainland will unavoidably lead to cutting of the forest. In the case of alternatives C1-C20, the forest will cover 35.3-40.6% of the total length of the route, while in the case of alternatives C21-C24, it will cover as much as 64.8-65.3% of the total length of the route. The planned electricity links are not expected to create a barrier to animal and plant migration and are expected to have little impact on natural and recreational resources and the geological balance of the landscape. On the mainland, low to moderate (depending on the alternatives considered) significant negative impacts on the landscape and natural framework are expected due to the potential cutting of the forest.

4.1.6 Consequences for cultural heritage of implementation of the alternatives under consideration

Marine part

Most of the known wrecks in Lithuanian waters are industrial-type ships, but the remains of wooden ships have also been discovered, which are of great scientific value. Several valuable areas of underwater cultural landscape with natural relics and tree remains have also been found.

The site of the “L-1” shipwreck in the Baltic Sea, which is included in the Cultural Heritage Register, would be crossed by directional drilling (HDD), and therefore no adverse consequences for the site are expected.

Seabed surveys in the nearshore revealed one object of possible anthropogenic origin. Archaeological research has revealed that the object is a natural feature - a ridge of washed-out moraine - i.e. it has no cultural value, therefore no protection measures are envisaged.

In the marine part, based on the locations of registered cultural properties, known wreck sites and survey data, no negative consequences are expected from destruction of a property or loss of valuable properties.

Mainland part

The conception alternatives have been chosen in an effort to move away from valuable sites or objects, including cultural heritage, but due to the potential constraints at sea and on the coast, the conception alternatives considered in the scope of the SEA are the ones that cross the registered cultural heritage site of the ancient settlement of Šventoji (1813). Here, only extensive (both detailed and exploratory) archaeological investigations, the nature and extent of which will depend on the technical design of the link, can mitigate significant consequences.

Exploratory archaeological research is planned on the banks of the Kulšė and Šventoji rivers and in the territories of the Būtingė lagoon lake and coastal dunes, and at the Laukžemė burial ground II, in case of choosing the alternatives crossing these areas.

The results of this research will determine the need for and scope of further research, but should not alter the construction works of the link itself.

The construction of the electricity link will involve areas with terrain impacts larger than 1 hectare, which will require archaeological investigations under any alternative, the nature, extent and timing of which will depend on the technical design solutions.

Consequences

In the marine part, based on the locations of registered cultural properties, known shipwreck sites and survey data, no adverse consequences are expected from the destruction of a property or the loss of valuable properties. Alternatives A3, A6 and B3 cross the site of the "L-1" shipwreck (code 38466) in the Baltic Sea, and therefore have the potential to have a low-significance adverse impact, which is addressed through HDD when crossing the territory.

The southernmost alternatives C21 - C24 would have the greatest negative consequences on land, as they cross the protected archaeological site of the ancient settlement of Šventoji (1813). Here, only extensive (both detailed and exploratory) archaeological research can mitigate significant consequences, the nature and extent of which will depend on the technical design of the link. The archaeological research has led to the assessment of the cultural heritage consequences of these alternatives as being of little negative significance. The other alternatives will have no consequences for cultural heritage.

4.1.7 Consequences for the climate of implementation of the alternatives under consideration

Marine part

In terms of the indirect impact of alternative energy on air quality, it should be noted that wind energy is one of the types of renewable energy that reduces the use of fossil fuels and thus the emissions of CO2 and other pollutants into the air. The use of wind energy is important in reducing greenhouse gas emissions from the energy sector. In this context, the implementation of the solutions of the Development Plan for the OWP cable link will have indirect positive consequences for climate.

During the laying of the cables, there may be short-term, localised air pollution from exhaust produced by ship engines, which, due to the good dispersion conditions at sea, will not have significant

adverse consequences for the climate. Vessels in operation must comply with the requirements of international organisations (MARPOL).

Mainland part

The use of renewable energy reduces the use of fossil fuels and thus the emissions of CO_2 and other pollutants into the air. The installation of an electricity link to use renewable energy sources is particularly welcome in the context of climate impacts as a climate change mitigation measure. Comparing the alternatives with each other, it can be concluded that the best alternatives are those which are shortest and require the least cutting of the forest.

Consequences

The implementation of the Development Plan is expected to have significant positive consequences in terms of climate change and the reduction of air pollution in the energy sector at a regional scale. Assuming that the choice of a longer route, both offshore and onshore, requires higher fuel and other inputs, which will result in higher emissions into the air, the better alternatives are those that have a below-average length of the route.

4.1.8 Consequences for tangible assets and the socio-economic environment of implementation of the alternatives under consideration

Marine part

Potential consequences for economic and sectoral development processes

Development of the offshore renewable energy sector

The main objective of Lithuania's National Energy Independence Strategy in the field of Renewable Energy Sources (RES) is to further increase the share of RES in Lithuania's domestic energy production and in the final balance of energy consumption, thus reducing dependence on fossil fuel imports and increasing domestic electricity generation capacity. The implementation of this strategic objective aims to gradually increase the share of RES in the country's total final energy consumption: 30% by 2020, 45% by 2030 and 80% by 2050. Renewable energy will become the main source of energy in all sectors - electricity, heat and cooling and transport.

The approved EIDP allows for the installation and operation of OWPs in the Lithuanian waters of the Baltic Sea, for which the necessary links are planned in this Development Plan. The solutions of the Development Plan will ensure the transmission of the energy of the OWPs planned in the Area D and in Area A to the onshore electricity grids.

Consequences for shipping

The Lithuanian OWPs are planned in the framework of the Development Plan to be built away from the international navigation routes crossing Lithuanian waters. The link cables, running in the coastal direction, cross two heavily-used shipping routes: the navigation lines to/from the Port of Klaipėda and to/from the Būtingė Oil Terminal. The installation of the link cables will not have any impact on navigation along the existing international navigation routes.

The planning of cable route corridors must take into account port roadsteads in the area as well as established anchorages.

In the Būtingė Terminal tanker approach corridor, the link routes are planned in such a way that the cables do not fall within the tanker mooring area of the SPM buoy, and therefore will not cause any restrictions to the navigation of tankers at the Būtingė Terminal.

Adjustment of the boundaries of the Šventoji Port Roadstead is required in the sections of the link corridors that cross the northern edge of the Šventoji Port Roadstead..

Consequences for commercial and recreational fishing

Certain economic impacts on the fishing industry from implementation of the Development Plan may arise due to the resulting fishing restrictions on bottom and demersal trawls in the cable corridor. Restrictions on commercial fishing are likely to be in place during the laying of the cables, and after resumption of cod and plaice fishing when the OWPs start operation, restrictions on bottom and demersal trawling should be applied due to the risk of damage to the cables.

Based on 2021 fishery data, the conception alternatives do not overlap with areas of heavy trawling, so the laying of the cable will not have significant consequences for commercial fishing. It should be noted that fishing areas in the open sea are not allocated to individual companies. Therefore, even if there are restrictions on trawling in the corridor of the link cable, fishing opportunities allocated or acquired by auction can be used in adjacent areas.

Depending on the chosen landfall location, the link conception alternatives may cross fishing grounds where nearshore commercial and recreational fishing should be restricted during the laying of the link cables. The two main tools used for fishing in the grounds crossed by the alternatives are set gillnets and net traps. Traps in this area are generally set at depths of up to 7-8 m and nets at depths of up to 15 m. With HDD technology, operation of the cable will not impose restrictions on fishing using traps in the nearshore area, where depths are less than 7 m, and therefore there will be no, or only minimal, negative impacts. During operation of the link cables, restrictions on netting should be applied in the parts of the fishing grounds deeper than the 7 m isobath at the locations of the link cables.

Pursuant to Article 7(1) of the Law on Fisheries of the Republic of Lithuania, “Users of fishery resources shall have the right to: (...) be compensated for losses if the opportunity to fish is lost (including for a limited period of time) as a result of the economic activities of public authorities, state or municipal companies or bodies, including those carried out on their behalf (...)”. Clause 2 of the same Article states that “the procedure for the calculation of the incurred losses in marine waters and the rates shall be established by the Ministry of Agriculture.”

In the event of a claim by fishermen for compensation for the loss of fishing grounds in the Baltic Sea, the procedure for compensation is to be determined by the Ministry of Agriculture.

Consequences for the extraction of valuable seabed resources

Oil. According to the Lithuanian Geological Survey's information on prospective oil structures in Lithuanian waters, the Lithuanian EEZ may contain about 40-80 million tonnes of oil. The planned link alternatives cross the northern and southern edges of the potential oil structure D11 (Figure 4.2.1.6).

One of the objectives of the strategy for oil exploration and production in Lithuania is to "expand oil exploration and exploitation of new fields", but offshore oil exploration has not started. Despite the fact that potential oil structures lie in deep geological layers, during the planning process it is important to ensure that potential oil production infrastructure does not interfere with the infrastructure (cables and substations) of the OWPs.

In the future, if oil extraction is planned, oil wells will have to be planned outside the safety zone of the cable.

Sand and gravel. The sand and gravel resources of Lithuania’s EEZ have not been explored and are not included in the State Register of Geological Resources as a useful mineral resource. However, potential deposits of these resources have been identified through geological mapping of the seabed.

Consequences for the development of recreational areas

The most common marine tourism services offered to tourists in the Lithuanian seaside region are cruise ship tourism, inland waterway tourism and recreational fishing, and diving services at sea. In the Baltic Sea, the most attractive places for diving are the remains of sunken ships and excursions to fields of distinctive seabed elevations (moraine ridges). The most popular diving areas are located about 3 km away from the corridor of the planned southern link alternative.

The main areas used for recreation are the beaches, swimming areas, and dunes along the seashore. Directional drilling (HDD) technology will be used for the landfall of the link cables, so that recreational areas such as swimming areas, beaches, and dunes will not be disturbed.

Consequences for engineering infrastructure

Two types of engineering infrastructure facilities have been identified in the area under consideration - the pipeline complex with the SPM buoy of the Būtingė terminal and the existing and planned submarine cables.

Some alternatives contact the "Harmony Link" development corridor, where significant uncertainties create a risk of conflicts with other engineering infrastructure.

Mainland part

In the mainland part, in order to minimise the consequences for tangible assets and the social environment, efforts have been made to optimise the selection of power line corridors away from residential and recreational areas, with priority given to the routing of the lines through agricultural plots and through the existing communication and engineering infrastructure corridors.

Compensation for an easement in an engineering infrastructure corridor is paid in accordance with the procedure specified by the Government.

It is important to note that the connection of OWPs to the electricity transmission grid will significantly contribute to achieving the objectives of Lithuania's energy independence strategy.

Connecting the planned OWPs to the onshore grid can be expected to have positive consequences for the Lithuanian economy, through the development of industries involved in the offshore wind energy chain, through positive consequences for the electrical equipment, machinery, metal, construction, engineering services industries, and for the Klaipėda State Seaport's stevedoring companies and shipping companies.

Consequences

No significant negative consequences for tangible assets are expected as a result of implementation of the alternatives analysed in the report, while significant positive consequences for the socio-economic environment are expected as a result of implementation of the objectives of the Lithuanian Energy Independence Strategy and its impact on the Lithuanian economy.

4.2 Cross-border impact

Lithuanian waters are bordered by the territories of three neighbouring countries: the Russian Federation to the south, the Republic of Latvia to the north and the Kingdom of Sweden to the west.

The conception alternatives under consideration are envisaged in the context of the solutions of the approved EIDP[28], which envisages the directions of the OWPs links in the engineering infrastructure corridor* along the northern boundary of Lithuania's EEZ as well as adjacent to the planned "Harmony Link" interconnection corridor. During the preparation of the EIDP, cross-border consultations were held with the Republic of Latvia.

*The northern alternative of the link falls within the offshore engineering infrastructure corridor planned in the marine part of the supplement to the Comprehensive Plan of the territory of the Republic of Lithuania (CPTRL) approved in 2015[29]. The engineering infrastructure corridor is also approved in the Comprehensive Plan of the territory the Republic of Lithuania (CPTRL) "Lithuania 2030" approved on 29 September 2021[30]. During preparation of solutions of CPTRL, the SEA procedures were performed, including SEA procedures at the cross-border level[31]. The SEA has estimated that the conceptual solutions considered in the report will not have adverse effects on the natural, economic, social, and environmental components of neighbouring states. The development of offshore energy and energy links is of international importance and will have positive consequences for the energy independence of Lithuania and its neighbours, for the economy, for the connectivity of centres, and for social and cultural cooperation at both the national and the regional levels.

The distance from the nearest - northern alternative corridor to the boundary of the Exclusive Economic Zones of Lithuania and Latvia is more than 100 m and varies up to 300 m, depending on the existing restrictions on the use of the area. The planned HVAC[32] cables or their protection zones** will not cross the boundary of the Exclusive Economic Zones of Lithuania and Latvia.

**In accordance with the provisions of the Law on Special Conditions for Land Use of the Republic of Lithuania, protection zones of 100 m on both sides of the cables in the sea and 1 m in the mainland part are established.

Articles 137-139 of on Special Conditions for Land Use of the Republic of Lithuania define the protection regulations and zones for the protection of State border protection objects and facilities, which also extend up to 100 m. The Development Plan envisages that electricity cables will not be laid and related infrastructure will not be installed closer than 100 m to the Latvian-Lithuanian border, both offshore and on the mainland.

The Marine Territorial Plan of the Republic of Latvia was approved on 14 May 2019. The possibility of constructing OWPs E1 and E2 is envisaged in Latvian waters adjacent to the Lithuanian-Latvian EEZ boundary (Figure 13). In the southern part of Latvian waters, adjacent to the Lithuanian-Latvian EEZ boundary, there are designated areas for biodiversity research (B1), exploration of potential oil resources and potential shipping routes (T3).

[28] Engineering infrastructure development plan for the development of renewable energy in the territorial sea of the Republic of Lithuania and/or the exclusive economic zone of the Republic of Lithuania in the Baltic Sea, approved by Order No 1-377 (T00088446) of the Minister of Energy of the Republic of Lithuania of 18 November 2022.

[29] https://www.e-tar.lt/portal/lt/legalAct/acabfe0014e411e58569be21ff080a8c

[30] https://www.e-tar.lt/portal/lt/legalAct/563c5570267011ecad73e69048767e8c

[31] Strategic Environmental Assessment of the Comprehensive Plan of the Territory of the Republic of Lithuania. Report. 2019. Access online: https://www.bendrasisplanas.lt/wp-content/uploads/2019/12/LR-BP-SPAV-ataskaita-2019-11-06.pdf

[32] High Voltage Alternative Current.

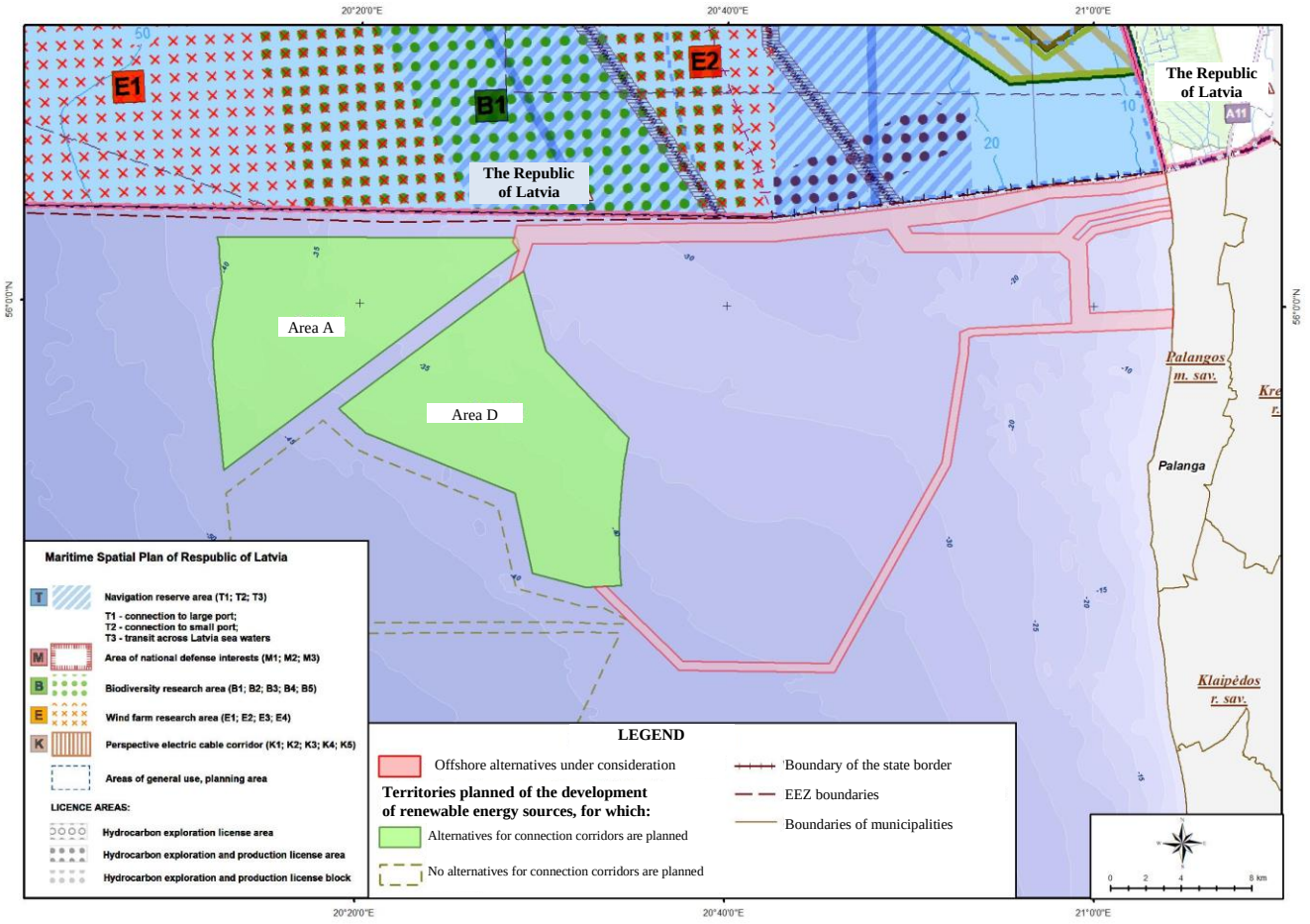

Figure 13. Location of the alternatives of the concept of the development plan in relation to the solutions of the Marine Spatial Plan of the Republic of Latvia.

An assessment of the possible consequences of implementation of the solutions of the Development Plan for the Republic of Latvia is shown in Table 1.

Table 1. Assessment of the possible consequences of implementation of the solutions of the Development Plan for the Republic of Latvia

Aspect	Assessment	Possible consequences	Mitigation measures
Shipping	Corridor alternatives of the link cross existing international shipping routes.	Implementation of the solutions of the Development Plan will not lead to any restrictions on shipping and therefore no consequences are envisaged.	Alternatives for HVAC cable corridors have been selected outside the boundaries of international seaport roadsteads and the safety zone of the Būtingė oil terminal pipeline. No cross-border measures are required.
Subsoil resources	The northern alternative of the Link corridors in Lithuanian waters crosses the edge of structure D11 and passes below the area of the structure for oil prospects marked in the solutions of the Latvian maritime territorial plan.	No restrictions on the extraction of oil resources due to the link cable as a linear object in Lithuania are envisaged for Republic of Latvia.	No consequences for potential oil resources are envisaged. No cross-border measures are required.

Aspect	Assessment	Possible consequences	Mitigation measures
Biodiversity: birds and bats	The northern alternative passes in the vicinity of the biodiversity research area (B1)[33] identified in the Latvian Marine Spatial Plan at a distance of 300 m.	Potential local disturbance of birds on the water during construction works.	Link cable construction works are preferably carried out in summer, when weather conditions are more favourable for offshore works and when there are no overwintering birds. No cross-border measures are required.
Solutions for the link cable connection to the onshore electrical transmission grid	Two directions have been chosen for the connection of the OWPs to the onshore 330 kV substation "Darbėnai"- the southern alternatives, aligned next to the "Harmony Link" HVDC interconnection corridor, and the northern alternatives, within the engineering infrastructure corridor on the Lithuanian-Latvian border planned in Comprehensive Plan of the territory the Republic of Lithuania (CPTRL).	No consequences are expected. The "Harmony Link" corridor interconnection is located away from the Lithuanian-Latvian marine border, and the Lithuanian-Latvian border engineering corridor is envisaged in the solutions of the CPTRL, for which an SEA and cross-border consultations were performed in 2014.	The Development Plan foresees that the cable corridors for the connection of the OWPs to the onshore electrical transmission grid and their protection zones would be constructed without leaving the marine borders of the Republic of Lithuania. No cross-border measures are required.

Consequences

The laying of the cables will not affect any activities carried out or planned to be carried out in the territory of the Republic of Latvia, including shipping, fishing, construction of renewable energy infrastructure or extraction of mineral resources.

No significant adverse consequences in a cross-border context are expected because of implementation of the alternatives considered in the report.

4.3 Consequences in terms of national security

Marine part

The national security requirements and restrictions apply only to the fixed infrastructure elements of the planned OWPs that are elevated above the water level. The provisions discussed below do not apply to the location of cable routes.

Part of the Baltic Sea area of the Republic of Lithuania has been identified as hazardous due to the possible presence of explosives or dumped chemical weapons from wartime. Former minefields have been identified as potentially dangerous. One of these areas is crossed by the southern link cable corridor alternatives (A5, A6, A7), which in the event they are chosen are subject to the prerequisite that detailed seabed surveys for hazardous objects be carried out prior to the commencement of design works and, if necessary, removal (deactivation) of the hazardous objects be performed.

[33] A Natura 2000 site for habitats (1170 REEFs) and overwintering birds (*Clangula hyemalis, Alca torda, Melanitta fusca*) is identified in Lithuania in the vicinity of B1, which will be crossed by the northern alternative.

Mainland part

In the mainland part, the planned area falls within the area where the design and construction of OWPs is prohibited and within the area where the construction of OWPs is subject to the condition that the renewable energy producer sign an agreement with the Lithuanian Armed Forces for a share of the investment and other costs.

The Development Plan envisages the linking of two OWPs to the onshore electricity transmission grid and related infrastructure. On the mainland, corridors for engineering infrastructure (underground cable routes) are planned for the connection of the OWPs to the onshore grid, as well as for a preliminary area for the construction of the TS and related infrastructure. The Plan itself is not for OWPs.

The planned infrastructure corridors do not fall within the protection zones of state border protection objects and installations. The planned engineering infrastructure corridors fall within the border area. In order to ensure the protection of the State border, a border legal regime is in force in the border area. The border legal regime ensures the protection of the State border in the border area and in the territorial sea, the rules governing the presence, activities and behaviour of persons, and the exercise of the rights of such persons.

The planned engineering infrastructure corridors fall within the protection zones A and D of Palanga International Airport. According to the provisions of Article 16 of the Law on Special Land Use Conditions, construction of structures and installations in the protection zones A and D may only be carried out after reaching agreement with the public body Transport Competence Agency. No TS and related infrastructure areas are planned in the protection zones of Palanga Airport.

Consequences

The implementation of the Development Plan will contribute to increasing energy independence and, at the same time, to Lithuania's national security. The national security consequences are assessed as moderately significantly positive.

Comparing the alternatives with each other, it can be seen that alternatives A5, A6, A cross areas with former minefields, and therefore, if such alternatives were selected, it would be required to carry out a detailed survey of the seabed in search of hazardous objects prior to the start of the design works and, if necessary, to carry out removal (deactivation) of the hazardous objects. These alternatives are assessed as the least favourable in terms of national security.

4.4 Cost analysis

The alternatives for the construction of the electricity cable considered in the scope of the project have been assessed using the principles of the cost analysis methodology set out in Annex 5 of Regulation (EU) No 347/2013 of the European Parliament and of the Council on “Energy system-wide cost-benefit analysis”. The analysis assesses the financial aspects of the cost of installing the electricity cables in order to compare the conception alternatives in economic terms.

The scope of the cost analysis is defined by the factors listed below.

- The cost analysis does not take into account the costs of installing and operating the OWPs. The installation and operation of the OWPs is not conditional on the choice of the alternatives evaluated in the analysis, i.e. these activities will be carried out regardless of the alternative chosen. For this reason, the installation and operation costs of the OWPs are not considered to be a relevant part of the scope of the cost analysis.

- The cost analysis does not take into account the costs of the installation and operation of the offshore and onshore substations or the expansion of the 330 kV substation “Darbėnai”, which

are similar for all alternatives and are not included in the cost assessment when comparing the conception alternatives.

- The lengths of the link alternatives considered in the cost analysis are calculated from the boundary of the OWPs to the 330 kV substation "Darbėnai". The lengths of the links within the OWPs are not assessed, as the locations of the offshore TS will be chosen by the park developers and the length of the link within the OWP boundaries is unknown[34].
- The calculations used in the analysis do not take into account the effect of inflation.
- The time horizon chosen for the analysis is 30 years.
- The cost analysis (as opposed to the selection of corridor widths) assesses the amount of cabling that is required, without taking into account spare cabling, i.e. it is estimated that 2 submarine and 2 onshore cables will be needed to connect one OWP.

The cost analysis of the alternatives under consideration leads to the following conclusions:

- The alternative with the lowest associated costs for the offshore connection of "Area D" is alternative A1 with an associated cost of €192.35 million.
- The alternative with the lowest associated costs for the offshore connection of "Area A" is Alternative B1, with associated costs of €185.17 million.
- The alternative with the lowest associated costs for the onshore part is alternative C1, with an associated cost of €102.84 million.
- The alternative with the second lowest associated costs for the onshore part is alternative C2 with an associated cost of €105.83 million.

Summarising the findings of the cost-benefit analysis, the shortest and most northerly localised conception alternatives are the most favourable in terms of cost, while the southernmost alternatives are the least favourable. The difference between the alternatives with the lowest and the highest associated costs is between 16.3% and 42.7%. The other alternatives in the middle will be marginally more expensive than the alternatives with the lowest associated costs, between 3.7% and 9.7%.

4.5 Multi-criteria analysis and identification of priority alternatives

In order to assess the impact of the Development Plan on the country's development and to compare the conception alternatives with each other, the Strategic Environmental Impact Assessment (SEA) is carried out from a sustainable development perspective. Sustainable development is based on three fundamental dimensions - economic growth, social well-being and environmental quality - ensuring a balanced development of all dimensions, without favouring any one of them to the detriment of the other two[35].

Assessment of conception alternatives in terms of the natural environment

Landscape and the natural framework The implementation of the Development Plan's solutions is related to the use of the marine areas, but does not change the functional or visual structure of the

[34] Assuming that the offshore TS will be located in the central part of the OWP, the length of the link within the OWP could be 9 - 12 km.

[35] A set of recommendations for the Sustainable Development Goals. "Create Lithuania" project "Towards a Sustainable Lithuania: Integrating the Sustainable Development Goals into State Strategic Documents" http://lrv.lt/uploads/main/documents/files/Darnaus%20vystymosi%20tiksl%C5%B3%20rekomendacij%C5%B3%20rinkinys(1).pdf

seascape. In the marine part, the implementation of the electricity link will not have any impact on the seascape.

The alternatives for the location of the electricity link on the mainland will unavoidably involve cutting of the forest. In the case of alternatives C1-C20, the forest will be 35.3-40.6% of the total length of the route, while in the case of alternatives C21-C24, it will be as much as 64.8-65.3%. The planned electricity links are not expected to create a barrier to animal and plant migration and are expected to have little impact on natural and recreational resources and the geological balance of the landscape. On the mainland, low to moderate (depending on the alternatives considered) significant negative impacts on the landscape and natural framework are expected due to the potential cutting of the forest belt.

Forests In the case of alternative C20, forest will be 35.3-40.6% of the total length of the route, and in the case of alternatives C21-C24, as much as 64.8-65.3%. Compensation for cutting and conversion of forest land to other land uses will be paid for (in accordance with the procedure specified by law).

It is assessed that on the mainland, low to moderate (depending on the alternatives considered) significant adverse consequences for forests are expected from the cutting of the forest belt. At sea, no consequences are expected.

Natural habitats of European Community importance The routes of the conception alternatives under consideration have been chosen in order to avoid disturbance of natural habitats of European Community importance. In the mainland part, low to moderate (depending on the areas of EC habitats to be crossed by the alternatives under consideration) significant adverse consequences for EC habitats are expected. At sea, no consequences are expected.

Biodiversity In the marine part, localised short-term adverse consequences of low significance for benthic communities during construction activities are possible.

In the mainland part, localised short-term adverse consequences of low significance during construction activities are possible due to disturbance to birds and local wildlife during the works. Alternatives C21-C24 may result in some consequences for butterflies identified in the SRIS (Information System of Protected Species).

The consequences for biodiversity, both marine and terrestrial, of implementation of the envisaged environmental measures are considered to be of low significance.

Areas protected by the Republic of Lithuania and NATURA 2000 In the maritime part, alternatives A1-A4 and B1-B4 cross the Klaipėda-Ventspils Plateau Biosphere Polygon (approx. 16 km long) and the Natura 2000 SAC Klaipėda-Ventspils Plateau (15.1 km). Alternatives A5, A6 and A7 cross the Klaipėda-Ventspils Plateau Biosphere Reserve (approx. 7.5 km) and the Natura 2000 SPA Klaipėda-Ventspils Plateau (approx. 7.5 km), and the Baltic Sea Thalassological Reserve (approx. 900 m). As the offshore works are expected to be carried out in the summer period, when there are no wintering birds at sea, no adverse consequences for birds are expected.

Preliminary estimates of the area of seabed disturbance within the SAC (reefs) do not exceed the threshold value of 2%, and therefore the consequences for protected areas and their protected values are assessed as being of low significance. No consequences for other protected areas to be crossed are envisaged as a result of implementation of the measures.

In the mainland, the conception alternatives cross the Būtingė Geomorphological Reserve and the SAC Baltic Šventoji River. The crossing of the protected areas is envisaged using directional drilling technology and therefore no consequences for the protected areas and their protected values are envisaged.

Soil and terrain The laying of a power link through a dynamically active nearshore sediment transport zone (1-1.5 km) may have some localised negative consequences for the sand balance and

hence the stability of the shoreline/beaches. The consequences are assessed as being of minor negative significance.

The terrain will not be altered during the construction of the onshore electricity link. Soil will be preserved and reclaimed during construction activities. No consequences are envisaged.

Groundwater and surface water bodies At sea, the conception alternatives are planned in areas dominated by glacial moraine deposits, fine to medium sand, gravel, pebbles, and boulder fields, which do not have significant, historically developed chemical contamination, and therefore no significant adverse consequences for water resources due to secondary pollution are expected.

On land, no consequences for water resources are envisaged if precautionary measures are taken.

Air pollution and climate change The implementation of the Development Plan is expected to have significant positive consequences in terms of climate change and the reduction of air pollution in the energy sector at a regional scale. The consequences of the shorter alternatives are assessed as significantly positive and those of the longer alternatives as moderately significantly positive.

Summary conclusion on the consequences for the natural environment

Implementation of the electricity link in the natural environment will have locally insignificant negative consequences for the natural environment, while on the other hand renewable energy will have positive consequences for climate change.

Assessment of conception alternatives in terms of the social environment

Social restrictions on economic activities (including fishing and agriculture) In the marine part, restrictions may be imposed on the setting of nets in nearshore fishing grounds at depths between 7 m and 20 m isobath. Alternatives A2-A3, A5-A6, B2-B3 fall within the development corridor of other engineering infrastructure ("Harmony Link"), where the risk of conflicts with other engineering infrastructure is high due to the high level of uncertainty. Alternatives A3, A7 and B3 cross the northern edge of the Sventoji Port Roadstead, which may require an adjustment of the boundaries of the Sventoji Port Roadstead in order to accommodate the link cables. The consequences of the restrictions on economic activities are assessed as moderate to low negative, depending on the alternatives.

Laying cables on land within the link corridor will lead to restrictions on forestry, agriculture and construction. Easements will be established for land within the infrastructure corridor, for which compensation will be paid in accordance with the procedures specified by the Government. The consequences of the resulting land restrictions are assessed as being of minor negative significance.

Cultural heritage In the marine part, based on the locations of registered cultural property, known wreck sites and survey data, no adverse consequences are expected from the destruction of property or the loss of valuable cultural properties. Alternatives A3, A6 and B3 cross the site of the "L-1" shipwreck (code 38466) in the Baltic Sea, and are therefore likely to have a low potential for significant adverse impacts, which are addressed by HDD.

The southernmost alternatives C21-C24 would have the greatest negative consequences on land, as they cross the protected archaeological site of the ancient settlement of Šventoji (1813). Here, only extensive archaeological research (both detailed and exploratory) can mitigate significant consequences, the nature and extent of which will depend on the technical design of the link. The archaeological research has led to the assessment of the cultural heritage consequences of these alternatives as being of low negative significance. The other alternatives will have no consequences for cultural heritage.

Exploitation of mineral resources In the marine part, the link alternatives cross the northern and southern edges of the potential oil structure D11, and in the future, the Development Plan will not preclude oil extraction. In the mainland part, there is no disturbance of subsoil resources - only areas of preliminary and prospective mineral exploration where electricity links may be envisaged.

It is assessed that there will be no consequences for offshore and onshore mineral extraction as a result of the Development Plan.

Recreation The landfall of the link cables will be made using directional drilling (HDD) technology, so that recreational areas such as swimming areas, beaches and dunes will not be damaged. All alternatives except A1 and B1 are located in active recreational/beach areas and are therefore assessed as having low or no significant adverse consequences (Alternatives A1 and B1). The onshore alternatives do not cross recreational areas. No consequences are envisaged.

Psycho-emotional, physical and chemical impacts on human health In the marine part, there are no expected public health consequences from the installation of the link cables. Implementation of the Development Plan may have minor consequences in terms of potential psycho-emotional effects on some residents due to the easements on the plots crossed by the cable and in the vicinity where the related infrastructure is to be installed.

National security Implementation of the Development Plan will contribute to increasing energy independence and, at the same time, to Lithuania's national security. The national security consequences are assessed as moderately significantly positive.

Comparing the alternatives with each other, it can be seen that alternatives A5, A6, A cross areas with former minefields, and therefore, if such alternatives were selected, it would be required to carry out a detailed survey of the seabed in search of hazardous objects prior to the start of the design works and, if necessary, to carry out removal (deactivation) of the hazardous objects. These alternatives are assessed as the least favourable in terms of national security.

Energy security, balancing the electricity transmission system In terms of achieving energy security and energy independence, all alternatives are assessed as having the potential to have significantly positive consequences.

Summary conclusion on the consequences for the social environment

The laying of cables in areas where certain activities take place will have negative consequences locally, but on the other hand, the Development Plan will contribute to the implementation of the Energy Independence Strategy and ensure the sustainable development of green energy in Lithuania..

Assessment of conception alternatives in terms of economics

Construction and operating costs The cost of installing and operating the link cables for a single OWP (excluding the cost of installing and operating the TS) will amount to €295-415 million. The costs of the shorter alternatives are assessed as moderately significant, while the costs of the longer alternatives are assessed as significantly negative.

Economic restrictions on economic activities (including shipping, fishing and agriculture) As in the social dimension, the resulting restrictions on economic activity will lead to a number of economic losses, which can be categorised according to their significance as low or moderate negative impacts.

Job creation and consequences for the Lithuanian economy The Development Plan and offshore wind energy will have positive (moderate) consequences for job creation, the development of certain industries and services, and thus for the Lithuanian economy.

Energy independence, the electricity market and synchronisation with the EU The development of green energy, to which implementation of the Development Plan also contributes, will have a significant positive impact on the electricity market and on the development of electricity trading through the synchronised Lithuanian and EU electricity grids.

Summary conclusion on the consequences for the economic environment

The cost of one link of an OWP, excluding the installation of the TS, will be > 300 million EUR, as well as the cost of minor restrictions on fishing and certain economic activities on land. On the other hand, the development of offshore RES will create many jobs, increase Lithuania's GDP, generate green energy, and create preconditions for the development of the green hydrogen industry.

Summary conclusion based on the assessment in terms of sustainable development:

- ***The preferred marine alternative is A1 for the connection of the Area D OWP;***
- ***The preferred marine alternative is B1 for the connection of the Area A OWP;***
- ***The preferred onshore alternatives are C1-C12.***

4.5.1 Assessment of areas where transformer substations and other related infrastructure can be built

The conception of the Development Plan identifies 3 zones (areas) where new TS development is possible (see Figure 14):

1. Coastal area
2. The forest area to be crossed by the planned link routes between the coastal area and the 330 kV substation "Darbėnai"
3. Agricultural areas adjacent to (within 5 km of) the 330 kV substation "Darbėnai".

The areas where the construction of TS and other related infrastructure is possible will be more precisely defined, taking into account the conception alternative approved by the Planning Organiser.

The solutions of territorial planning documents for projects of national importance are binding for territorial planning documents at the national level and below. In applying the solutions of the territorial planning documents for projects of national importance, the solutions of the territorial planning documents at the national level and at lower levels are valid insofar as they do not contradict the solutions of the territorial planning documents for projects of national importance.

After the Development Plan has been approved with the planned areas for the construction of TS and other related infrastructure, the developer will be required to prepare territorial planning documents for the construction of the TS and other related infrastructure (detailed plan or land plot formation and redevelopment project), changing the land use designation and determining the use, management and protection measures for the planned territory.

In accordance with Article 11 of the Republic of Lithuania Forestry Law, forest land may be converted to other land uses only in exceptional cases specified in this Law. One of the cases is the implementation of objects of national importance. The construction of such facilities or the formation of the relevant territories must also be envisaged in the comprehensive plans or in the territorial planning documents for projects of national importance, or in the special territorial planning documents for protected territories.

The conception diagram identifies areas where, if the Development Plan is approved, it would be possible to convert forest land to other uses to meet the objectives of the Development Plan, such as the construction of transformer substations and the provision of the necessary related infrastructure. Following the approval of the Development Plan, the project developer should plan for the conversion of forest land to other uses in the area where the construction of TS and other related infrastructure is possible, either in the comprehensive plans at the local level, or in the special territorial planning documents, or in the detailed plans, or in the land management projects. The approval of a territorial planning document planning the conversion of forest land to other land uses will require a revision of the national forest area scheme. Following the revision of the national forest area scheme, the

Government of the Republic of Lithuania will adopt a resolution on the removal of certain areas from the national forest areas.

Note: From an environmental and economic point of view, the construction of TS by cutting forest and converting forest land to other land uses is not the most appropriate solution and should only be proposed if it is not possible to locate the TS in non-forested areas.

The location of TS and other related infrastructure will be selected by the developer in the areas that will be approved in the Development Plan as areas where TS and other related infrastructure can be built.

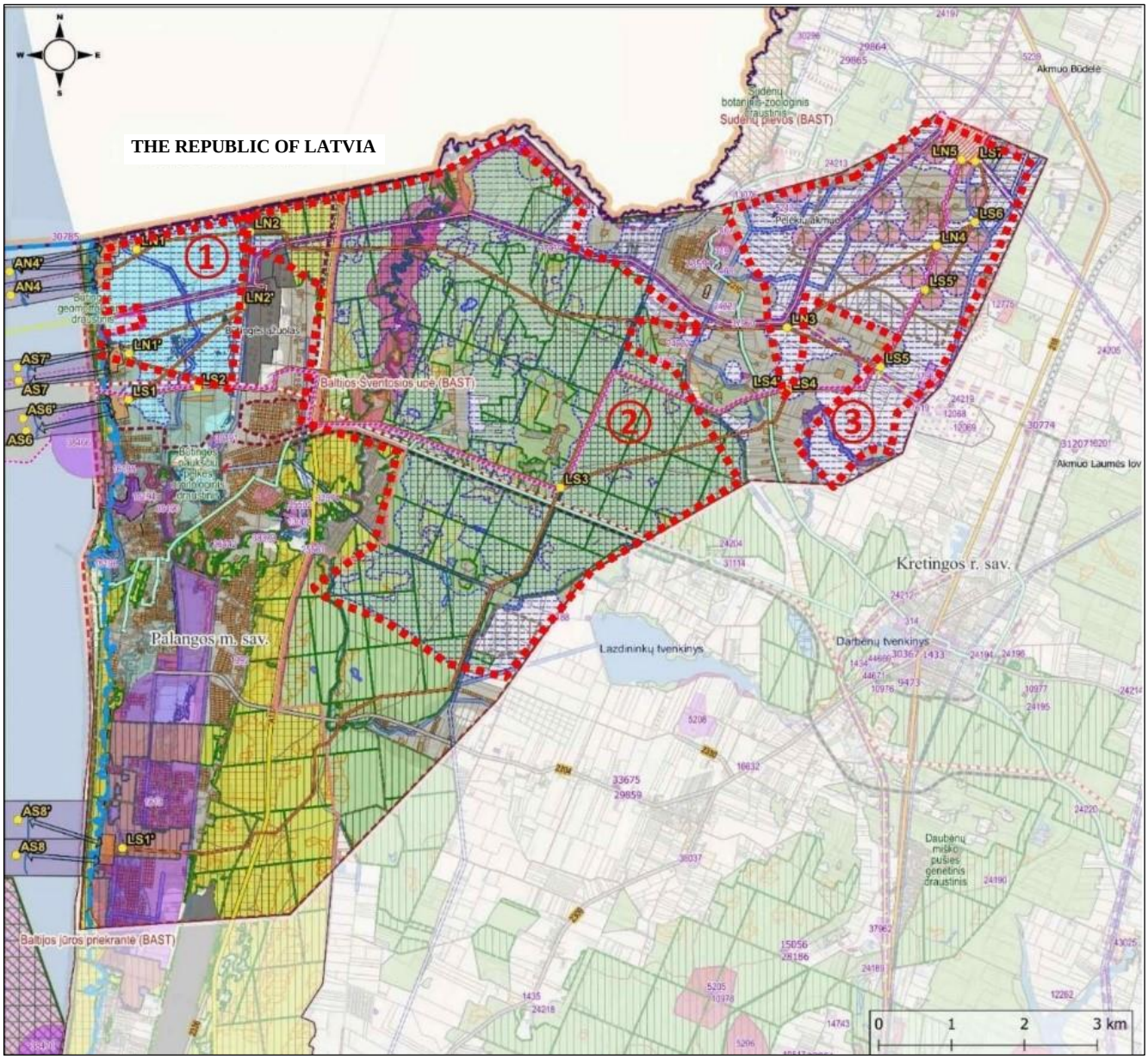

Figure 14. 3 zones have been identified in which transformer substations and other related infrastructure can be built

4.5.2 Measures to avoid, reduce or compensate for significant adverse environmental consequences arising from implementation of the Development Plan

Protected areas and the properties protected in them

Marine part

In order to minimise the consequences for wintering birds due to disturbance within the Klaipėda-Ventspils Plateau biosphere polygon, the recommended period for the construction of the link cables is April-November, when there are no wintering birds.

Where technologically feasible, boulders are to be bypassed (within the corridor), avoiding trenching in boulder areas:

- for the northern alternative, within the Klaipėda-Ventspils Plateau Biosphere Polygon;
- for the southern alternative, within the Baltic Sea Thalassological Reserve.

For implementation of offshore alternatives A4, A5 and B4, in the section AS3-AS8 (AS8'), adjacent to the Natura 2000 SAC in the nearshore part of the Baltic Sea for the protection of lamprey, the choice of the cable-laying technology is to be made by providing for the greatest possible (technologically feasible) burial depth of the cables. For example: maximum use of HDD technology and/or cable burial of not less than 3 m in the Baltic Sea coastal strip or other technological solutions to reduce EMFs, taking into account the technical parameters of the cables selected by the Developer. The measures will be specified during the preparation of the technical/working project.

Mainland part

HDD technology is applied to lay the cable through the following protected areas:

- Coastal strip
- Būtingė Geomorphological Reserve
- SAC “Baltic Šventoji River”

Biodiversity

Marine part

When planning the layout of cable routes, the destruction of the most valuable benthic habitats (identified by national monitoring results) is to be avoided as far as technically possible.

In order to minimise the impact on wintering birds due to disturbance within the Klaipėda-Ventspils Plateau biosphere polygon, it is recommended to carry out the construction of the link cables in the months of April-November, when there are no wintering birds.

Mainland part

Compensation for cutting of forest must be paid in accordance with the procedures specified by the Government.

In order to minimise the potential for significant negative consequences for forest nesting birds, it is necessary:

• to cease cutting of forest and extraction in all forest groups (except in group IV coppice forests and logging sites) from 15 March to 1 August.;

• where possible, to avoid carrying out noisy construction work in wooded areas during the peak bird nesting season, i.e. from 1 April to 1 July, thereby minimising the potential consequences of disturbing nesting birds, causing them to abandon nests and to lose their brood.

Before construction work, once an alternative has been chosen, the entire route to be laid must be checked by biodiversity experts for the presence of protected sensitive species. If protected sensitive species are found, mitigation measures are to be envisaged.

In the event that alternatives C1, C2, C7, C8 are chosen, in order not to harm the wood sandpiper (listed in the Lithuanian Red Data Book), the works are not to be carried out in the wet meadows of the reclaimed low-lying wetland near Būtinge (site 94536) during the breeding season, from 1 April to 15 July. The works may only be carried out if no nesting sites of the wood sandpiper or other protected birds (e.g. the critically endangered Eurasian curlew) have been identified by biodiversity experts in the vicinity of the planned link, and if it has been established that the birds are not expected to be significantly affected by the construction works.

In the event that alternatives C21-C24 are chosen:

• In wet coastal meadows, where, according to SRIS, breeding species of protected butterflies (rosy minor (*Mesoligia literosa*) and oblique striped (*Phibalapteryx virgata*)) have been found, the meadows are to be left to regenerate spontaneously from the damage caused by the cable-laying. In case of large areas of damage (e.g. in the HDD site area), native grass species are to be reseeded (to be selected by the biodiversity expert during the preparation of the technical/working project or during implementation).

• In the event the swamp violet (*Viola uliginosa*) is identified in the link corridor during construction, the plants are to be relocated and/or other measures as determined by biodiversity experts.

• After the cables have been laid, deep-rooted perennial herbaceous forage plants (to be selected by the biodiversity expert at the time of preparation or implementation of the technical/working project) must be sown in the work area to prevent soil erosion in areas of cultivated grasslands. The recommended (typical) composition of the seed mixture is: 30 % perennial ryegrass, 30 % red fescue, 30 % Chewing's fescue, 10 % common meadow-grass. The choice of the grass mixture may be varied, but it is important that deep-rooted herbaceous perennials predominate (such as: various bentgrasses, *Bromus inermis*, fescues, perennial ryegrass, reed canary grass, *Phleum*, *Poa trivialis*, annual meadow grass and common meadow grass). Mixtures may contain clover, but not more than 20 %. To protect grass seeds from being washed out of the soil by rain and from being eaten by birds, the soil must be rolled after sowing the grass mixtures.

Seabed, subsoil, soil

Marine part

In the nearshore zone, the use of directional drilling technology (HDD) is envisaged for the connection of the onshore and offshore segments, i.e. the cables are not routed in open trenches but are pushed through a borehole in the deep layers, thus avoiding the disturbance of the most sensitive area, the nearshore zone and the beach.

In order to preserve valuable benthic communities, it is recommended that cable trenching should be avoided as a precautionary measure in identified areas of valuable benthic biotopes, such as boulder and gravel deposits, where the state 1170 reef monitoring has identified high concentrations of the mussel *M. edulis trossulus*. This would prevent direct negative impacts on the quality and recovery of these communities.

In order to avoid excessive fragmentation of seabed sediments and the emergence of new lithological types due to secondary sedimentation in areas of disturbed soil, it is recommended to use environmentally friendly techniques during the excavation of cable trenches, which minimise the impact on the seabed, and to use as much as possible the original soil excavated from the trenches for the backfilling of the trenches (if allowed by the construction technology).

Mainland part

To minimise the negative impact on soil due to erosion:

• The fertile soil in the work area must be removed prior to the start of the excavation and the fertile soil must be restored (spread) in the work area at the end of the work. The work area is to be shallowly ploughed to restore soil fertility.

• In grassland areas, deep-rooted perennial herbaceous forage plants selected by the biodiversity expert are to be sown in the work area, to prevent soil erosion.

• In forest areas, the forest cover must be removed prior to excavation work and then returned to the work area after the work is completed.

• On steep slopes, organic or synthetic geogrids are to be used as required (the need is to be determined during the preparation of the technical/working design with topographical photographs) and seeding with deep-rooted perennial herbaceous vegetation is recommended throughout the work area.

• To protect the grass seeds from rain run-off and birds, the soil must be rolled (lightly compacted) after sowing the grass mixtures.

Construction waste must be disposed of to minimise potential chemical impact on the soil.

Construction work must be carried out only with vehicles and equipment in proper technical condition, thus avoiding possible chemical (emergency) pollution from vehicles and equipment.

Cultural heritage

Marine part

In order to avoid adverse consequences for the cultural heritage site of the wreck of the ship “L-1” in the Baltic Sea (38466), which is crossed by three of the link cable route alternatives under consideration, the site will be crossed by directional drilling (HDD).

Mainland part

In the event that alternatives C21-C24 are chosen, extensive archaeological research (both detailed and exploratory) will be required at the ancient settlement of Šventoji (1813), the nature and extent of which will depend on the technical design of the link.

In the event that one of the alternatives C1-C20 is selected, exploratory surveys are required at the design stage on the banks of the Kulšė and Šventoji rivers and at the Būtingė lagoon lake and coastal dunes.

Exploratory archaeological surveys would also be required at Laukžemė burial site II if conception alternatives C1–C12 were selected for development.

The construction of the electricity link will involve areas where the impact on the terrain will be greater than in a 1-hectare area, and therefore any alternative will require archaeological research, the nature, extent and timing of which will depend on the technical design (Heritage Management Regulation PTR 2.13.01:2022 “Management of Archaeological Heritage”, clauses 7.8 and 21.2).

Socio-economic environment

Marine part

The planning of cable route corridors must take into account port roadsteads and anchorages in the area.

The AN3-AS5' and AN3'-AS5 sections of the link corridors will be within the Būtingė Terminal tanker approach corridors, but the routes are planned in such a way that the cables do not fall within the

tanker mooring area of the SPM buoy, and will therefore not place any restrictions on the Būtingė Terminal tanker traffic.

The sections AS4-AS6 and AS4'-AS6' of the link corridors cross the northern edge of the Šventoji port roadstead, therefore the installation of the link cables in this section will require additional regulation of this area prohibiting anchoring in the cable safety zone and/or adjustment of the boundaries of the Šventoji port roadstead.

Conception alternatives may, depending on the location of the landfall, cross fishing grounds 26, 27, 28 and 29. In these areas, nearshore commercial and recreational fishing would be restricted during the construction of the link cables. During operation of the link cables, restrictions on net fishing should be applied in parts of the nearshore fishing grounds below the 7 m isobath due to the risk of damage to the cable by net anchors. Pursuant to Article 7(1) of the Law on Fisheries of the Republic of Lithuania, "Users of fishery resources shall have the right to: (...) be compensated for losses if the opportunity to fish is lost (including for a limited period of time) as a result of the economic activities of public authorities, state or municipal companies or bodies, including those carried out on their behalf (...)". Clause 2 of the same Article states that "the procedure for the calculation of the incurred losses in marine waters and the rates shall be established by the Ministry of Agriculture."

Despite the fact that potential oil structures lie in deep geological layers, it is important during the planning process to ensure that potential oil extraction infrastructure does not interfere with the infrastructure (cables and substations) of the OWP. In the future, if oil extraction is planned, oil wells will have to be planned outside the cable safety zone.

Part of the Baltic Sea area of the Republic of Lithuania has been identified as hazardous. Former minefields have been identified as potentially dangerous. One of these areas is crossed by the southern link cable corridor alternatives (A5, A6, A7), which in the event they are chosen are subject to the prerequisite that detailed seabed surveys for hazardous objects be carried out prior to the commencement of design works and, if necessary, removal (deactivation) of the hazardous objects be performed.

Mainland part

Land plots falling within the planned electricity link corridors are to be compensated for easements in accordance with the procedures specified by the Government.

It is recommended that construction and machinery storage sites be kept as far as possible from residences during planned construction.

During construction, the established surface water regime, in particular of small streams and drainage watercourses, is not to be disturbed, to avoid affecting the hydrochemical regime of the water resource.

In order to avoid the potential consequences of construction works on surface bodies of water, construction equipment sites and temporary access roads are not to be located within the shoreline protection strips of water bodies and within 25 m of the bank of a body of water.

When carrying out construction works in the protection strips and zones of bodies of water, it is necessary to comply with the requirements specified in Articles 99 and 100 of the Law on Special Land Use Conditions of the Republic of Lithuania.

5 CONCLUSIONS

Based on the analysis and detailed seabed surveys of the corridors for the selected electricity link alternatives, it can be concluded that:

- In terms of sea depths and seabed morphology, all the proposed alternatives (except A5, A6 and A7, which have not been studied in detail in the scope of this analysis) are quite similar, i.e. the cable-laying along all the selected routes will have to pass through potentially hard fields (moraine formations, fluvio-glacial coarse sands, pebbles and gravel, with abundant boulders), deposits of complex morainic ridges, and boulder fields. The critical isobath depths of 7 and 10 m from the shore are important for the choice of HDD technology for cable laying at the sea-land interface. From this perspective, alternatives A4, A5 and B4 would be the most appropriate, as the distance to shore from this depth reference would be the least[36];
- In terms of identified linear objects (existing telecommunication cables and the planned "Harmony Link" corridor), the northern alternatives A1 and B1 are the least complicated, as only two intersections with offshore cables would need to be planned. In contrast, the other alternatives would require from three (A2, B2 and A3, B3) to five (A4 and B4) intersections with existing and/or planned cables on the seabed. Alternatives A5, A6 and A7 would result in 1 (Alternative A5) or 3 (Alternative A6) or 4 (Alternative A7) intersections with submarine cables. According to the assessments that have been performed, the installation of electricity cables by directional drilling between points AS7(AS7') - LN1 in the case of marine alternatives A2, A7 and B2 would cross the "Harmony Link" corridor, and therefore only one of these conception alternatives is feasible for this section. The installation of the marine alternatives A3, A6 and B3 is not possible in the AS6 (AS6') - LS1 section until the "Harmony Link" line is installed and it can be ensured that the projects do not interfere with each other in the case of the directional drilling from the shore to the sea;
- Four of the seven (A1-A4) "Area D" development areas and all four of the Area A link alternatives (B1-B4) cross the Natura 2000 SAC Klaipėda-Ventspils Plateau, which protects 1170 reefs, as well as the Klaipėda-Ventspils Plateau biosphere polygon, one of the objectives of which is to preserve a valuable part of the Baltic Sea ecosystem in the Klaipėda-Ventspils Plateau, in particular in order to preserve areas of the natural marine habitat of European Community importance - the 1170 reefs - and to ensure a favourable protection status for the habitat. No significant alteration of the seabed is envisaged as a result of the planning for the installation of electricity cables across the reefs, no change in the hydrological regime or water chemistry is envisaged and no pollution is expected, i.e. the impact on the reefs will be localised and of a short duration;
- Three (A3, A6 and B3) of the marine alternatives under consideration cross the site of the "L-1" shipwreck (38466), which is listed in the Cultural Heritage Register. This area would be crossed by directional drilling. In the marine part, the link corridors would not touch other registered cultural heritage sites or wrecks;
- With regard to objects on the seabed, detailed surveys have shown a fairly even distribution of boulders in the eroded moraine fields, with no priority being given to any of the alternatives in the marine part;

[36] Distances to the shoreline for 7m/10m depth isobaths for offshore electrical links (distances at individual points):

- AN4 (AN4') [Alternatives A1 and B1]: 890 m / 1.25 km
- AS7 (AS7') [Alternatives A2, A7 and B2]: 900 m / 1.19 km
- AS6 (AS6') [Alternatives A3, A6 and B3]: 840 m / 1.23 km
- AS8 (AS8') [Alternatives A4, A5 and B4]: 760 m / 1 km

➢ In the mainland part, alternatives C1-C24 cross the national road A13 (Klaipėda–Liepāja), the 110 kV overhead ETL, and alternatives C1-C20 cross the Šventoji River (via HDD). Alternatives C1-C12 cross an oil pipeline. Alternatives C13 and C14 cross the corridor planned for the "Harmony Link" the most times (5 times). Alternatives C1, C2, C3, C4, C8 and C10 intersect the "Harmony Link" corridor 1 time each. It is assumed that the planned link corridors for the individual OWPs will not intersect with each other;

➢ In the mainland part, the southern alternatives (C21-C24) cross the registered cultural heritage site of Šventoji ancient settlement (1813), where archaeological research will be required along the entire ~1.35-km-long stretch. If valuable finds are discovered, more detailed archaeological research may be required, the nature, extent and timing of which will depend on the technical design of the project (archaeological research may additionally affect the project timeline);

➢ Alternatives C15 (93 plots) and C19 (91 plots) cross the largest number of land plots, alternative C22 (60 plots) crosses the smallest number of land plots;

➢ The shortest alternatives for the marine link, and thus the cheapest, are A1 and B1;

➢ Alternatives C21 to C24 are the least favourable due to the potential for increased negative impacts on biodiversity, landscape, cultural heritage and in terms of the cost of laying the electricity cables;

➢ The most favourable alternatives for the environmental components are C1 and C2;

➢ The shortest mainland alternatives C1 and C2;

➢ The most favourable areas and conditions for shore-to-sea directional drilling are found in alternatives C1 and C2.

Based on assessment from a sustainable development perspective:

- The preferred alternative for connecting the Area D OWP is A1;
- The preferred alternative for connecting the Area A OWP is B1;
- The preferred mainland alternatives are C1-C12;

In light of the above, the most favourable (preferred) conception alternatives of the Development Plan, which cohere to form a unified link, are:

- **For the connection of "Area D": A1-C1 or A1-C2;**
- **For the connection of "Area A": B1-C1 or B1-C2.**

Areas are identified in the Development Plan for the construction of transformer substations and other related infrastructure.

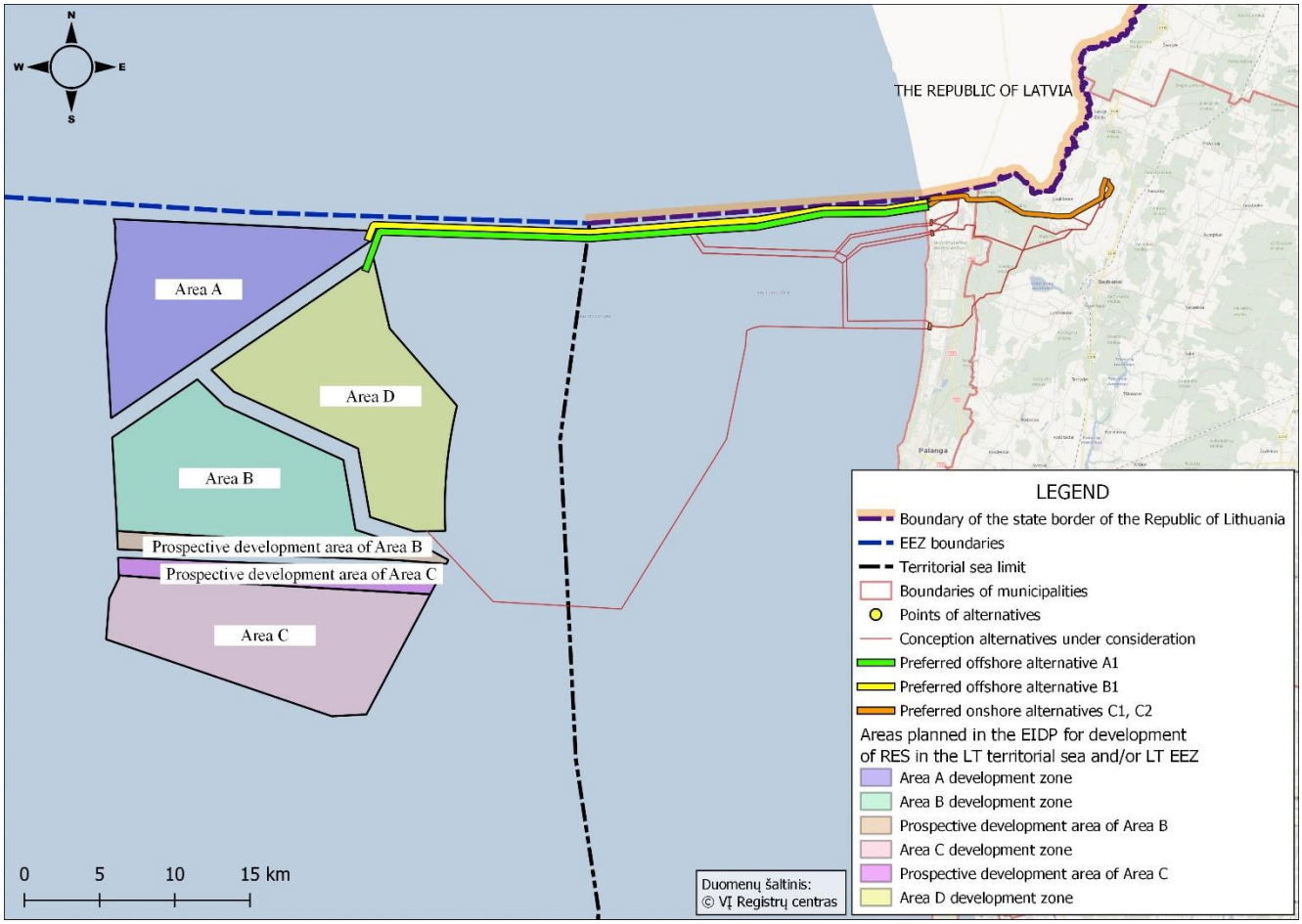

Figure 15. favourable (preferred) conception alternatives of Priority of the Development Plan identified in the SEA

6 GRAPHICAL ANNEXES

1 Drawings of concept alternatives of the mainland part and the marine part – 2 pages;

2 Drawing of localization of anticipated measures to avoid significant negative consequences – 1 page.

WEB GIS MAP can be found https://arcg.is/11aOL80

1 Drawings of concept alternatives of the mainland part and the marine part

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 vertingieji gyvenamųjų teritorijų plotai (PAST)
Klaipėdos vertingieji gyvenamųjų teritorijų plotai (PAST)
Klaipėdos vertingieji gyvenamųjų teritorijų plotai (PAST)
Baltijos jūros pakrantė (PAST)
Baltijos jūros pakrantė (PAST)
Nemirsetos kraštovaizdžio draustinis
Saipu kraštovaizdžio draustinis
Nemirsetos miškynas (PAST)
Karklės talasologinis draustinis
Pajūrio miškynai (PAST)
Pajūrio regioninis parkas
Karklės etnokultūrinis draustinis
Karklės-Pakrkle botaminis-zoologinis draustinis
Kuršių nerijos nacionalinis parkas
Kuršių nerijos nacionalinis parkas (PAST)
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 (using horizontal directional drilling (HDD) technology)

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.

Certificate	ARDYNAS	Gedimino g. 47, LT-44242 Kaunas Tel. (8 37) 323209 Faks. (8 37) 337257 El. p. ardynas@ardynas.lt	
TPV 0066	TPM	Zita Labanauskienė	
TPV 0065	TPM	Jolanta Paplauskienė	
TPV 0085	TPM	Olga Vaičienė	
	GIS spec.	Darius Šalūnas	
	GIS spec.	Kristina Vaitkevičė	

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

SITUATION SCHEME

0 25 50 75 km

THE REPUBLIC OF LATVIA

316000 318000 320000 322000 324000 326000 328000 330000 332000 334000 336000 338000

6222000 6220000 6218000 6216000 6214000 6212000 6210000 6208000

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 (using horizontal directional drilling (HDD) technology)
- Planned landfall (using HDD technology)
- 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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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 607 of 22 June 2020;
** Aproved by LTG Resolution No.171 of 15 March 2023.

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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 0065	TPM	Olga Vaičienė			
	GIS spec.	Darius Balčiūnas		Drawing title: MAINLAND PART DRAWING OF CONCEPT ALTERNATIVES SCALE 1: 20 000	Ed. 0
	GIS spec.	Kristina Vaitkevičė			
LT	Organizer of planning: Ministry of Energy of the Republic of Lithuania			Label: 2023-01-VP-K.B-02	PAGE 1 / of pgs 1

2 Drawing of localization of anticipated measures to avoid significant negative consequences

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 LOCALIZATION OF ANTICIPATED MEASURES TO AVOID SIGNIFICANT NEGATIVE CONSEQUENCES SCALE 1:50000

Environmental component	Measures to reduce for sagnificant adverse environmental consequences	Measures numbering in the drawing
Protected areas and the properties protected in them	***Marine part*** In order to minimise the consequences for wintering birds due to disturbance within the Klaipėda-Ventspils Plateau biosphere polygon, the recommended period for the construction of the link cables is April-November, when there are no wintering birds.	1
	Where technologically feasible, boulders are to be bypassed (within the corridor), avoiding trenching in boulder areas: • for the northern alternative, within the Klaipėda-Ventspils Plateau Biosphere Polygon; • for the southern alternative, within the Baltic Sea Thalassological Reserve.	2
	For implementation of offshore alternatives A4, A5 and B4, in the section AS3-AS8 (AS8'), adjacent to the Natura 2000 SACs in the nearshore part of the Baltic Sea for the protection of lamprey, the choice of the cable-laying technology is to be made by providing for the greatest possible (technologically feasible) burial depth of the cables. For example: maximum use of HDD technology and/or cable burial of not less than 3 m in the Baltic Sea coastal strip or other technological solutions to reduce EMFs, taking into account the technical parameters of the cables selected by the Developer. The measures will be specified during the preparation of the technical/working project.	3
	Mainland part HDD technology is applied to lay the cable through the following protected areas: • Coastal strip • Būtingė Geomorphological Reserve • SACs "Baltic Šventoji River".	4
Biodiversity	***Marine part*** When planning the layout of cable routes, the destruction of the most valuable benthic habitats (identified by national monitoring results) is to be avoided as far as technically possible.	-
	In order to minimise the impact on wintering birds due to disturbance within the Klaipėda-Ventspils Plateau biosphere polygon, it is recommended to carry out the construction of the link cables in the months of April-November, when there are no wintering birds.	1
	Mainland part Compensation for cutting of forest must be paid in accordance with the procedures specified by the Government. In order to minimise the potential for significant negative consequences for forest nesting birds, it is necessary: • to cease cutting of forest and extraction in all forest groups (except in group IV coppice forests and logging sites) from 15 March to 1 August; • where possible, to avoid carrying out noisy construction work in wooded areas during the peak bird nesting season, i.e. from 1 April to 1 July, thereby minimising the potential consequences of disturbing nesting birds, causing them to abandon nests and to lose their brood.	5
	Before construction work, once an alternative has been chosen, the entire route to be laid must be checked by biodiversity experts for the presence of protected sensitive species. If protected sensitive species are found, mitigation measures are to be envisaged.	-
	In the event that alternatives C1, C2, C7, C8 are chosen, in order not to harm the wood sandpiper (listed in the Lithuanian Red Data Book), the works are not to be carried out in the wet meadows of the reclaimed low-lying wetland near Būtinge (site 94536) during the breeding season, from 1 April to 15 July. The works may only be carried out if no nesting sites of the wood sandpiper or other protected birds (e. g. the critically endangered Eurasian curlew) have been identified by biodiversity experts in the vicinity of the planned link, and if it has been established that the birds are not expected to be significantly affected by the construction works.	6
	In the event that alternatives C21-C24 are chosen: • In wet coastal meadows, where, according to SRIS, breeding species of protected butterflies (rosy minor (Mesoligia literosa) and oblique striped (Phibalapteryx virgata)) have been found, the meadows are to be left to regenerate spontaneously from the damage caused by the cable-laying. In case of large areas of damage (e. g. in the HDD site area), native grass species are to be	7

Environmental component	Measures to reduce for sagnificant adverse environmental consequences	Measures numbering in the drawing
	reseeded (to be selected by the biodiversity expert during the preparation of the technical/working project or during implementation). • In the event the swamp violet (Viola uliginosa) is identified in the link corridor during construction, the plants are to be relocated and/or other measures as determined by biodiversity experts.	8
	After the cables have been laid, deep-rooted perennial herbaceous forage plants (to be selected by the biodiversity expert at the time of preparation or implementation of the technical/working project) must be sown in the work area to prevent soil erosion in areas of cultivated grasslands. The recommended (typical) composition of the seed mixture is: 30 % perennial ryegrass, 30 % red fescue, 30 % Chewing's fescue, 10 % common meadow-grass. The choice of the grass mixture may be varied, but it is important that deep-rooted herbaceous perennials predominate (such as: various bentgrasses, *Bromus inermis*, fescues, perennial ryegrass, reed canary grass, *Phleum*, *Poa trivialis*, annual meadow grass and common meadow grass). Mixtures may contain clover, but not more than 20 %. To protect grass seeds from being washed out of the soil by rain and from being eaten by birds, the soil must be rolled after sowing the grass mixtures.	-
Seabed, subsoil, soil	***Marine part*** In the nearshore zone, the use of directional drilling technology (HDD) is envisaged for the connection of the onshore and offshore segments, i.e. the cables are not routed in open trenches but are pushed through a borehole in the deep layers, thus avoiding the disturbance of the most sensitive area, the nearshore zone and the beach.	4
	In order to preserve valuable benthic communities, it is recommended that cable trenching should be avoided as a precautionary measure in identified areas of valuable benthic biotopes, such as boulder and gravel deposits, where the state 1170 reef monitoring has identified high concentrations of the mussel *M. edulis trossulus*. This would prevent direct negative impacts on the quality and recovery of these communities. In order to avoid excessive fragmentation of seabed sediments and the emergence of new lithological types due to secondary sedimentation in areas of disturbed soil, it is recommended to use environmentally friendly techniques during the excavation of cable trenches, which minimise the impact on the seabed, and to use as much as possible the original soil excavated from the trenches for the backfilling of the trenches (if allowed by the construction technology).	-
	Mainland part To minimise the negative impact on soil due to erosion: • The fertile soil in the work area must be removed prior to the start of the excavation and the fertile soil must be restored (spread) in the work area at the end of the work. The work area is to be shallowly ploughed to restore soil fertility. • In grassland areas, deep-rooted perennial herbaceous forage plants selected by the biodiversity expert are to be sown in the work area, to prevent soil erosion. • In forest areas, the forest cover must be removed prior to excavation work and then returned to the work area after the work is completed. • On steep slopes, organic or synthetic geogrids are to be used as required (the need is to be determined during the preparation of the technical/working design with topographical photographs) and seeding with deep-rooted perennial herbaceous vegetation is recommended throughout the work area. • To protect the grass seeds from rain run-off and birds, the soil must be rolled (lightly compacted) after sowing the grass mixtures. Construction waste must be disposed of to minimise potential chemical impact on the soil. Construction work must be carried out only with vehicles and equipment in proper technical condition, thus avoiding possible chemical (emergency) pollution from vehicles and equipment.	-
Cultural heritage	***Marine part*** In order to avoid adverse consequences for the cultural heritage site of the wreck of the ship "L-1" in the Baltic Sea (38466), which is crossed by three of the link cable route alternatives under consideration, the site will be crossed by directional drilling (HDD).	4
	Mainland part In the event that alternatives C21-C24 are chosen, extensive archaeological research (both detailed and exploratory) will be required at the ancient settlement of Šventoji (1813), the nature and extent of which will depend on the technical design of the link.	9

Environmental component	Measures to reduce for sagnificant adverse environmental consequences	Measures numbering in the drawing
	In the event that one of the alternatives C1-C20 is selected, exploratory surveys are required at the design stage on the banks of the Kulšė and Šventoji rivers and at the Būtingė lagoon lake and coastal dunes. Exploratory archaeological surveys would also be required at Laukžemė burial site II if conception alternatives C1–C12 were selected for development.	10
	The construction of the electricity link will involve areas where the impact on the terrain will be greater than in a 1-hectare area, and therefore any alternative will require archaeological research, the nature, extent and timing of which will depend on the technical design (Heritage Management Regulation PTR 2.13.01:2022 "Management of Archaeological Heritage", clauses 7.8 and 21.2).	-
Socio-economic environment	***Marine part*** The planning of cable route corridors must take into account port roadsteads and anchorages in the area. The AN3-AS5' and AN3'-AS5 sections of the link corridors will be within the Būtingė Terminal tanker approach corridors, but the routes are planned in such a way that the cables do not fall within the tanker mooring area of the SPM buoy, and will therefore not place any restrictions on the Būtingė Terminal tanker traffic.	-
	The sections AS4-AS6 and AS4'-AS6' of the link corridors cross the northern edge of the Šventoji port roadstead, therefore the installation of the link cables in this section will require additional regulation of this area prohibiting anchoring in the cable safety zone and/or adjustment of the boundaries of the Šventoji port roadstead.	11
	Conception alternatives may, depending on the location of the landfall, cross fishing grounds 26, 27, 28 and 29. In these areas, nearshore commercial and recreational fishing would be restricted during the construction of the link cables. During operation of the link cables, restrictions on net fishing should be applied in parts of the nearshore fishing grounds below the 7 m isobath due to the risk of damage to the cable by net anchors. Pursuant to Article 7(1) of the Law on Fisheries of the Republic of Lithuania, "Users of fishery resources shall have the right to: (...) be compensated for losses if the opportunity to fish is lost (including for a limited period of time) as a result of the economic activities of public authorities, state or municipal companies or bodies, including those carried out on their behalf (...)". Clause 2 of the same Article states that "the procedure for the calculation of the incurred losses in marine waters and the rates shall be established by the Ministry of Agriculture."	-
	Part of the Baltic Sea area of the Republic of Lithuania has been identified as hazardous. Former minefields have been identified as potentially dangerous. One of these areas is crossed by the southern link cable corridor alternatives (A5, A6, A7), which in the event they are chosen are subject to the prerequisite that detailed seabed surveys for hazardous objects be carried out prior to the commencement of design works and, if necessary, removal (deactivation) of the hazardous objects be performed.	12
	During the preparation of the technical project, it is necessary to obtain the LITGRID technical conditions and sign agreements on certain technical solutions in the places of the existing and planned (within the existing EPL protection zones and the Harmony Link corridor) infrastructure that will be covered by the offshore wind park infrastructure corridor.	13
	Mainland part Land plots falling within the planned electricity link corridors are to be compensated for easements in accordance with the procedures specified by the Government..	-
Weather	It is recommended that construction and machinery storage sites be kept as far as possible from residences during planned construction.	-
Water bodies	During construction, the established surface water regime, in particular of small streams and drainage watercourses, is not to be disturbed, to avoid affecting the hydrochemical regime of the water resource. In order to avoid the potential consequences of construction works on surface bodies of water, construction equipment sites and temporary access roads are not to be located within the shoreline protection strips of water bodies and within 25 m of the bank of a body of water. When carrying out construction works in the protection strips and zones of bodies of water, it is necessary to comply with the requirements specified in Articles 99 and 100 of the Law on Special Land Use Conditions of the Republic of Lithuania.	14

LEGEND

- Boundary of the state border of the Republic of Lithuania
- EEZ boundaries
- Territorial sea limit
- Boundaries of municipalities

Enviromental measures

- (1) Measures for birds at sea
- (2) Avoiding boulders
- (3) Measures for lamprey
- (4) Horizontal directional drilling (HDD)
- (5) Restrictions on work in forests
- (6) Measures for the wood sandpiper
- (7) Measures for protected butterflies
- (8) Measures for swamp violet
- (9) Detailed (including exploratory) archaeological research
- (10) Exploratory archaeological research
- (11) Anchoring restricitions/Adjustment of the port of Šventoji roadstead limits
- (12) Investigations and decontamination works of dangerous
- (13) LITGRID AB, fulfillment of technical conditions
- (14) Surface water protection measures

Planned territory and concept alternatives

- Alternatives under consideration (corridors)
- Planned landfall (using horizontal directional drilling (HDD) technology)
- Planned landfall (using (HDD) technology)
- Planned 330 kV switching station "Darbėnai"

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

- Potential renewable energy development area

Aprroved renewable energy development area

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

Engineering infrastructure at sea

- Būtingė oil terminal buoy
- Underwater pipelines
- Preliminary HARMONY LINK cable axis
- NORDBALT HVDC cable
- Other underwater cables
- Protection zones for cables and pipelines
- Infrastructure corridors
- Būtingė oil terminal water area
- HARMONY LINK corridor
- Port roadsteads
- Dangerous area (former minefields)

Engineering infrastructure in the mainland

- Electricity transmission grid
- Railways
- Main gas pipelines
- Oil pipelines

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
- Biosphere polygons
- Recreational diving areas
- Strict nature reserves
- Parks

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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: DRAWING OF LOCALIZATION OF ANTICIPATED MEASURES TO AVOID SIGNIFICANT NEGATIVE CONSEQUENCES SCALE 1:50000	Ed. 0
	GIS spec.	Kristina Vaitkevičė			
LT	Organiser of planning: Ministry of Energy of the Republic of Lithuania			Label: 2023-01-VP-K.B-03	PAGE 1 / OF PGS 1