

| No. | NKP, Unique Code | Brief description of protected assets | Minimum distance to the PŪV area, km |
|-----|------------------------------------|--|--------------------------------------|
| | | | Visual protection zone. |
| 3 | Smeltė Elementary School (33607) | Address: Klaipėda City Municipality, Klaipėda City, Nemuno St. 145. Registered: 2010-01-18. Status: Entered in the register (registered), individual object (state-owned). Level of significance: Local. Nature of valuable features: Architectural (determining significance, important), Historical (determining significance, important). Style: A Historicist-style building characterized by elements of Romanticism and Neo-Gothic, details typical of suburban architecture, materiality, scale, and proportions. Year: 1905. Area area: 0.2393 ha. | 0.74 in the NW direction |
| 4 | King Wilhelm Canal Complex (25965) | Address: Klaipėda District Municipality. Registered: 09/04/2001. Status: State-protected. Significance level: National. Nature of valuable features: Architectural (determining significance: rare); Engineering (determining significance: unique); Historical (determining significance: important); Greenery (determining significance: typical). Age: built in 1863–1873. Area of the territory: KVR object – 161.2783 ha. Visual protection zone: 2.2396 ha | 0.553 in the R direction |

Group II of cultural heritage assets consists of underwater cultural heritage assets listed in the Register of Cultural Assets and assets discovered during underwater archaeological surveys conducted as part of this EIA. According to the Cultural Heritage Register, there are no objects registered in the Register of Underwater Immovable Cultural Heritage Assets within the PŪV territory.

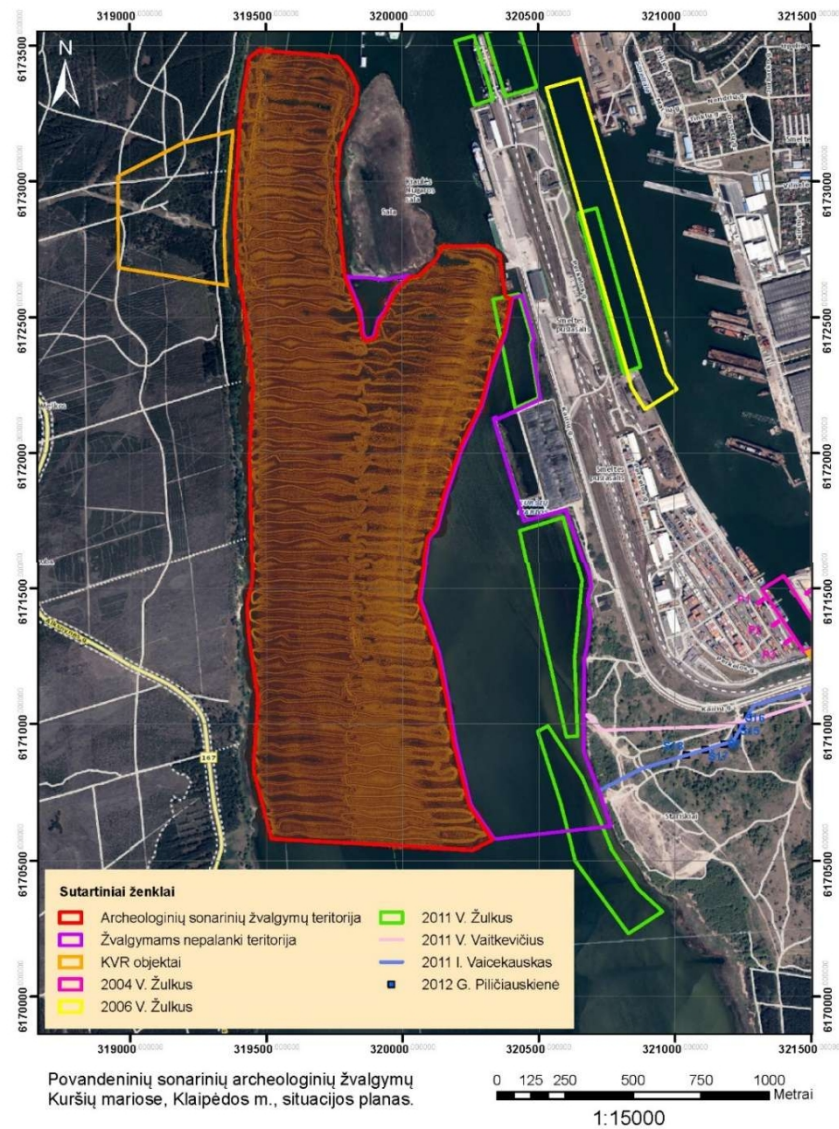
From June to September 2016, a search for objects using side-scan sonar and non-invasive underwater exploratory archaeological surveys was conducted south of the project area [19]. The work was carried out by the Underwater Research Center of the Institute of Baltic Region History and Archaeology at Klaipėda University (KU BRIAI PTC), with Prof. Vladas Žulkus leading the research team. The surveys were conducted in the water area of the planned southern gate of the KVJU in the northern part of the Curonian Lagoon (Fig. 4.11.1.2) and in the vicinity of the reconstruction (construction) of the northern and southern breakwaters of the KVJU sea gate. During the underwater surveys conducted in the planned southern gate water area in the northern part of the Curonian Lagoon, 6 objects were detected (5 objects (MV-1–MV-5) using side-scan sonar and one (MR-1) near the eastern shore, near the Kairiai training ground, during diving operations (Fig. 4.11.1.2). All objects, except for one, which was a tree trunk, were man-made objects—abandoned nets. The surveys established that none of the objects found underwater in the Curonian Lagoon have historical or cultural value.



4.11.1.2 Fig. Location of underwater surveys conducted in 2016 in the planned southern gate water area of the Curonian Lagoon [19]

As part of this EIA, underwater archaeological surveys were conducted in May–June 2023 within the project area in the northern part of the Curonian Lagoon near the Smeltė Peninsula (Fig. 4.11.1.3) (Textual Appendix 6). The underwater archaeological surveys were conducted in several stages. In the first stage, an assessment of the likelihood of the presence of valuable archaeological features was performed; in the second

, the seabed was scanned using side-scan sonar at the planned work sites, and objects of anthropogenic origin were identified in the sonar images. The work was carried out by the Underwater Research Center of the Institute of Baltic Region History and Archaeology at Klaipėda University (KU BRIAI PTC).

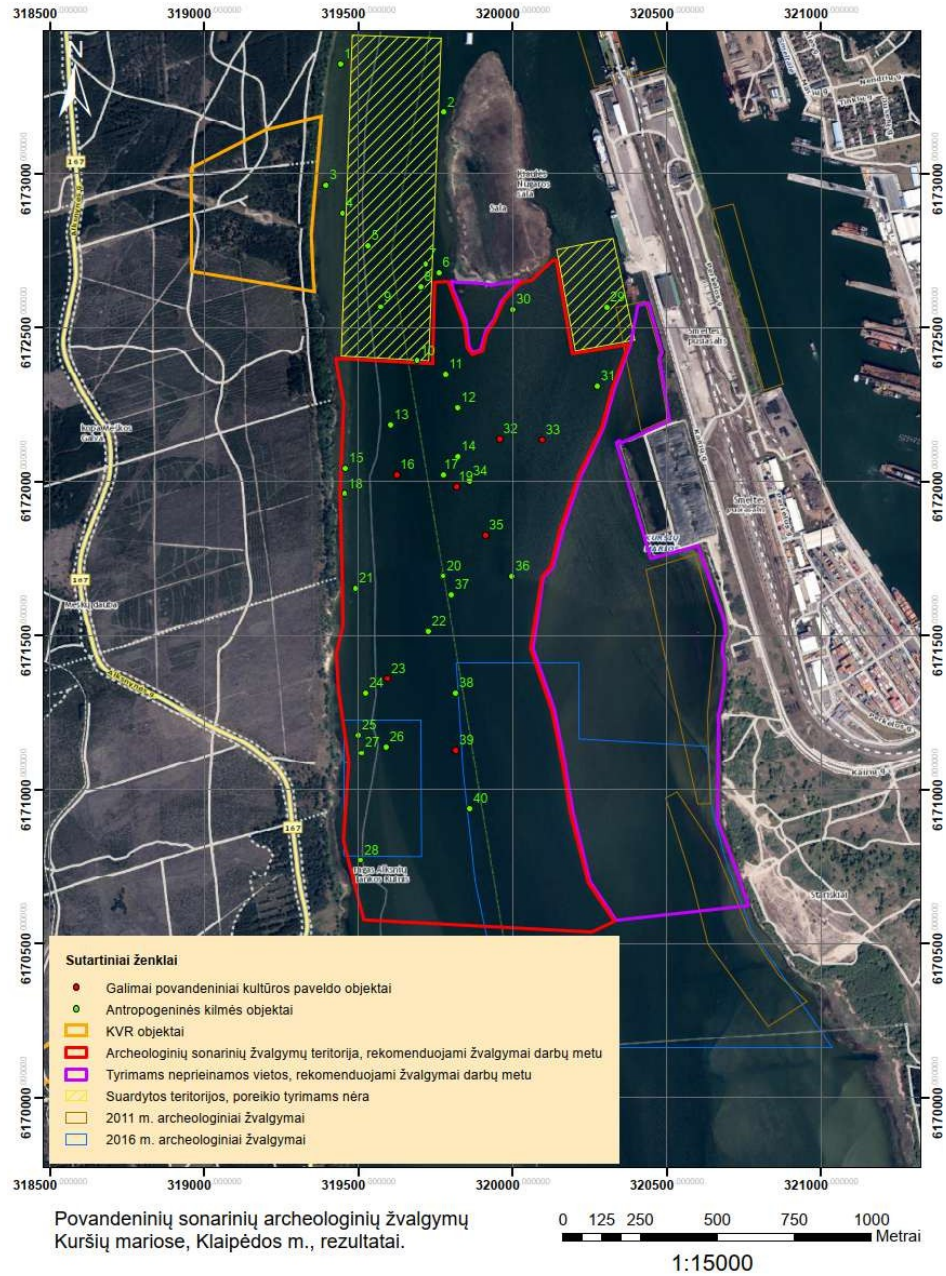


4.11.1.3 Fig. Locations of underwater sonar archaeological surveys conducted in 2023 and sites of previous surveys

During the archaeological surveys, a 1.9 km² area was surveyed using side-scan sonar, in which 40 objects of anthropogenic origin (Nos. 1–40) were recorded at depths of 2–9 m (Fig. 4.11.1.4, Textual Appendix 6):

- 5 – possible watercraft (boats, ship parts),
- 2 – presumed elements of a relict shoreline (wooden posts (vertical timber), stumps), 17 – linear objects (concrete anchors, cables, wires),
- 4 – natural features (bottom formations, stones (moraine)?) 4 – possible logs (elongated objects),

- 2 – unidentified objects,
- 4 – tires,
- 2 – rectangular structures (pontoons?).


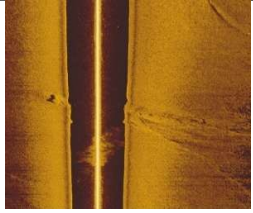
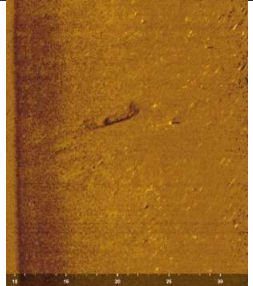
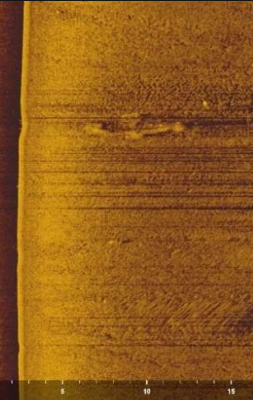
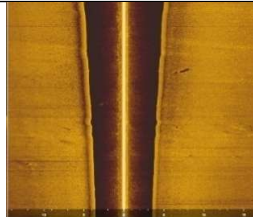


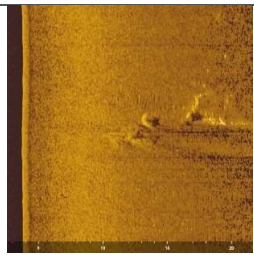
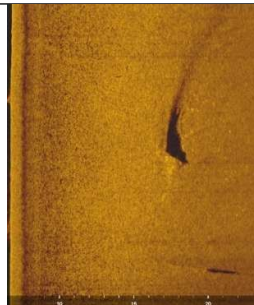
4.11.1.4 Fig. Diagram of the results of underwater sonar archaeological surveys conducted in 2023

The most significant underwater objects recorded, which may have archaeological and historical value, are Nos. 16, 19, 23, 32, 39—presumed remains of watercraft (boats, ship parts), as well as presumed

relic shore formations (Nos. 33, 35). The objects are located in the central and southern parts of the surveyed PŪV area at depths of 2.5–8 m (Table 4.11.1.2 and Fig. 4.11.1.4).

Table 4.11.1.2. Selected objects of anthropogenic origin and presumed relict shoreline elements

| No. | Coordinates (WGS84) | Depth | Interpretation | Photo |
|-----|---------------------------|-------|--------------------------------|---|
| 16 | 55°38.979', 21°08.061' | 8 | Boat |  |
| 19 | 55°38.948', 21°08.201' | 4.3 | Valtis |  |
| 23 | 55°38.617', 21°08.057' | 8.4 | Valtis |  |
| 32 | 55°39.040', 21°08.372' | 2.5 | Valtis |  |
| 33 | 55°39.042', 21°08.509' | 4.9 | Log and stakes (relict shore?) |  |

| | | | | |
|----|---------------------------|-----|---------------------|---|
| 35 | 55°38.858', 21°08.302' | 3.6 | Unidentified object |  |
| 39 | 55°38.497', 21°08.226' | 6.7 | Boat |  |

Group III of NCP values

According to the retrospective description of the Curonian Spit's Outstanding Universal Value (hereinafter OUV)³, the Curonian Spit is included in the UNESCO World Cultural Heritage List (hereinafter WCHL) under Criterion "V" – "The Curonian Spit is an exceptional example of a sand dune landscape, the survival of which is constantly threatened by natural forces (wind, tides). After being nearly destroyed by disastrous human intervention, the spit was restored through massive conservation and reinforcement efforts that began in the 19th century and continue to this day."

4.11.2 Significant impact anticipated

During construction work on the PŪV sites

Impact on Group I NCP values

The Group I cultural heritage sites closest to the project area would be the Alksnynė defensive complex (code 30540), the Alksnynė farmstead building complex (2070), and the territory of the King Wilhelm Canal structure complex (Fig. 4.11.1.1, Graphical Appendices 1 and 3).

During the EIA [19] conducted as early as 2019, it was planned to install underwater retaining walls near the Alksnynė defensive complex (code 30540) to ensure the stability of the underwater slope while deepening and widening the inner navigation channel. The underwater retaining wall would be installed within the KVJU boundaries at a distance of approximately 0.2 km from the NKP territory, with the top of the wall at a depth of about 1 m. Installation of the retaining wall is planned from the strait side, away from watercraft. The process of driving the wall (possible vibration effects) will not have a negative impact on the structures of the defensive complex, which are specifically designed to withstand significantly greater impacts—air raids and artillery fire.

Directly above the territory of the Alksnynė defense complex (code 30540), the 110 kV EEPOL Marios–Juodkrantė power line is currently in place, and EEPOL towers No. 20 and No. 21 are located within the complex's territory (Fig. 4.11.2.1). Upon implementation of the "secondary" solutions of the PŪV (dismantling the existing 110 kV EEPOL section and towers), the impact on the KPV complex territory would be direct and positive.

³ Retrospective Curonian Spit of the global value Description. Interactive access online: http://www.unesco.lt/images/Kuri_nerijos_IVV_LT.pdf



4.11.2.1 Fig. Existing 110 kV EEPOL section within the territory of the Alksnynė defensive complex (code 30540)

The aforementioned project solutions (laying of a new underground power cable) also fall within the visual protection zone of the Alksnynė farmstead building complex (2070). For all PŪV alternatives, these solutions are analogous, and their impact on the NKP value would be temporary and insignificant (only during construction work). Once the power cable is laid and the trench backfilled, there would be no visual impact affecting the visibility of the KPV object.

The territory of the King William Canal complex (25965) is more than 0.55 km from the PŪV site, and the PŪV solutions will have no impact on it (Fig. 4.11.2.1).

In summary, it can be stated that no significant negative impact on Group I cultural heritage values is anticipated for any of the PŪV alternatives.

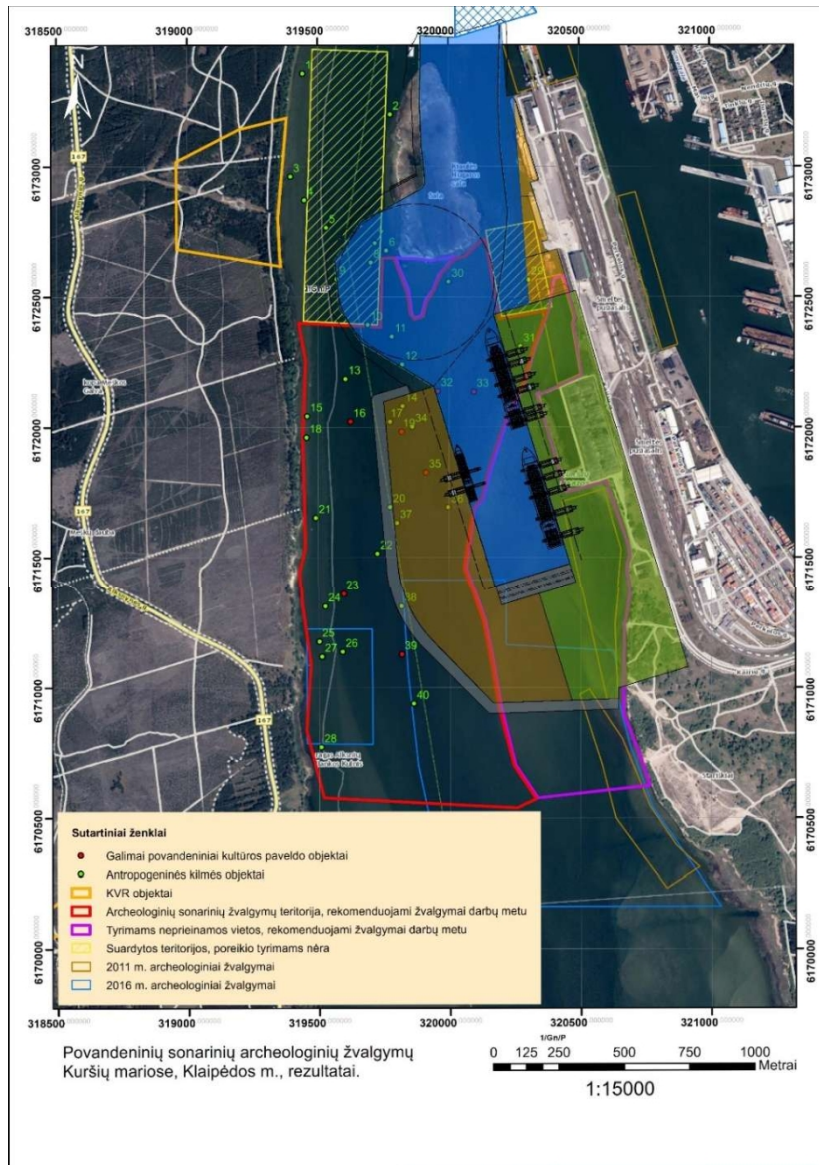
Impact on Group II cultural heritage values

Underwater archaeological sonar surveys (Textual Appendix 6) have established that:

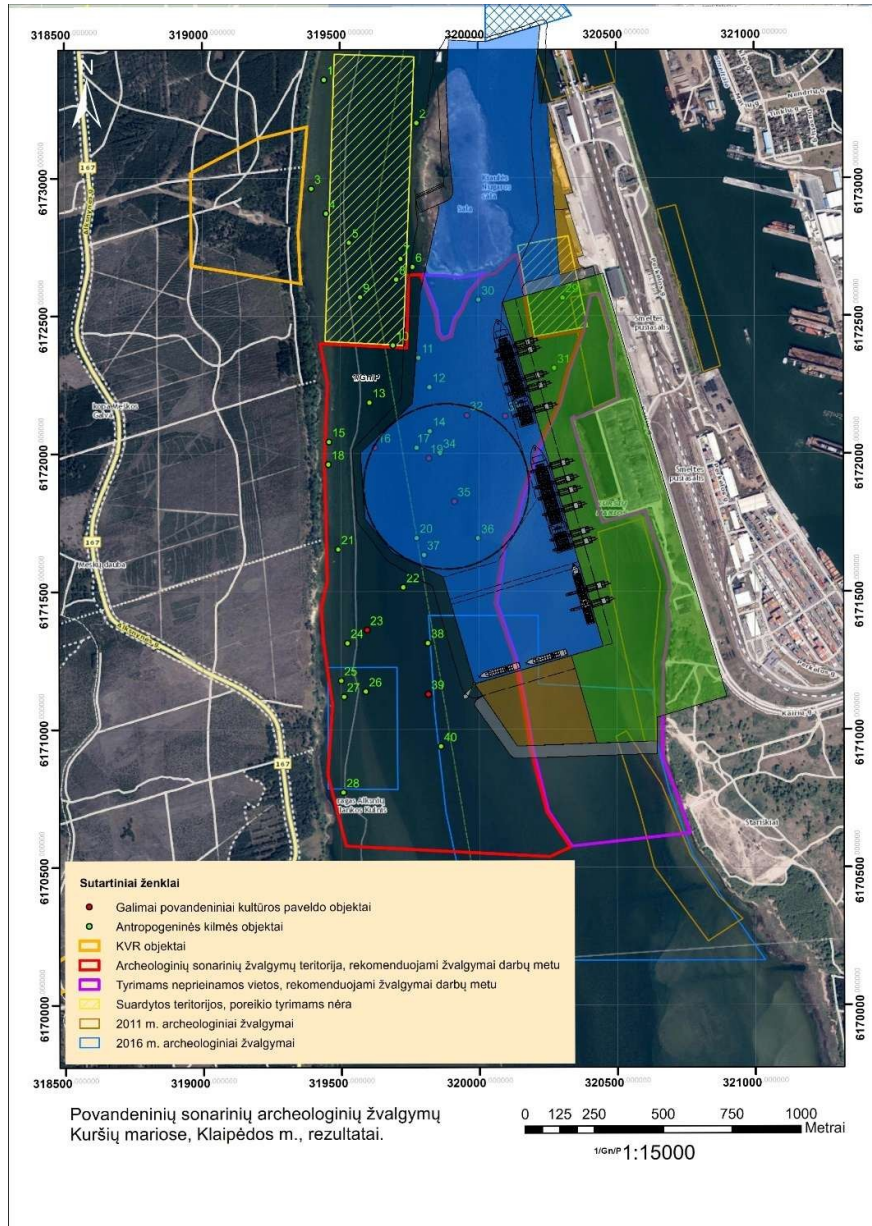
- there are no registered protected cultural heritage sites in the surveyed EIA area;
- no archaeological or historical assets or objects were recorded during the side-scan sonar surveys conducted in 2011 and 2016 in part of the project area (Fig. 4.11.2.2);
- In 2023, during underwater archaeological sonar surveys in the PŪV area, the remains of potentially sunken anthropogenic objects and tree trunks or poles representing a presumed relic shoreline were identified (Table 4.11.1.2), which may be significant for scientific research (Fig. 4.11.2.3).
- Due to unfavorable weather conditions and poor visibility (up to 10 cm) in the Curonian Lagoon, the anthropogenic objects recorded by sonar during the 2023 underwater archaeological surveys could not be identified.
- The solutions for PŪV alternatives 2A, 3A, and 4A may impact (potentially destroy) the identified underwater objects, which may be important for scientific knowledge; therefore, it is proposed to apply measures to mitigate potential impacts (see Section 4.11.3),

The following would fall within the direct work zone: In the case of Alternative 2A—4 identified underwater objects that may be important for scientific knowledge (19, 32, 33, 35); in the case of Alternative 3A—5 objects

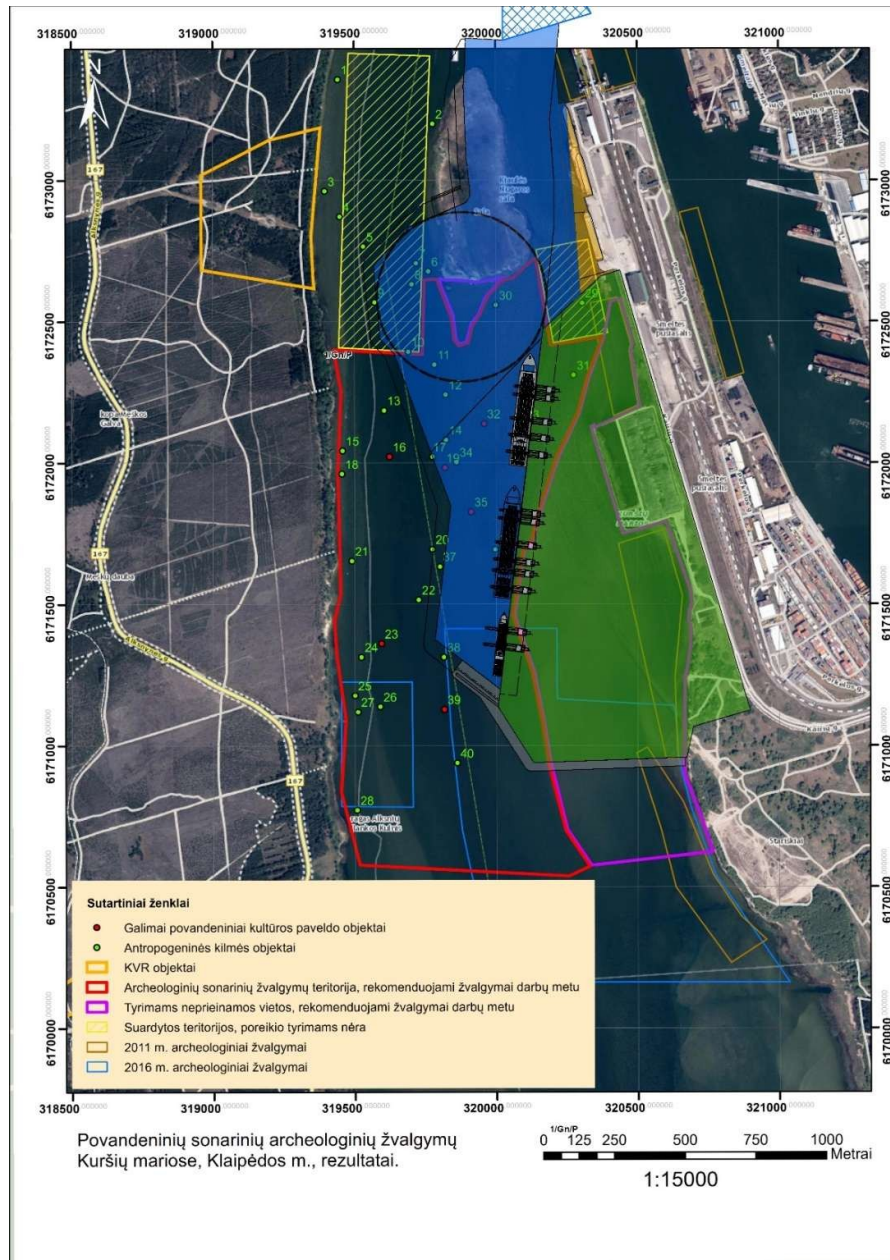
(16, 19, 32, 33, 35), and for Alternative 4A – 4 objects (19, 32, 33, 35) (Figs. 4.11.2.2–4.11.2.4).



4.11.2.2 e.g., underwater objects within the direct work zone in the case of Alternative 2A that may be important for scientific research



4.11.2.3 Fig. Under Alternative 3A, underwater objects within the direct work zone that may be important for scientific knowledge



4.11.2.4 Fig. Under Alternative 4A, underwater objects within the direct work zone that may be important for scientific knowledge

Impact on Group III NCP values

It is likely that by the time the PŪV solutions are implemented, the solutions for the southern port entrance planned as early as 2019 will already have been implemented, i.e., a new complex of hydraulic structures will have been built, including the construction of southern and northern protective dikes, a marina for small and recreational vessels, a shoreline protection dike near Alksnynė, and an underwater retaining wall will be installed from PK83 to Alksnynė to prevent and ensure long-term protection against and stability of the Curonian Spit's shoreline erosion.

During the implementation of the main solutions of the PŪV, there would be no direct contact with the Curonian Spit in the case of any PŪV alternative. When implementing the "secondary" solutions of the PŪV (dismantling the 110 kV

EEPOL Marios–Juodkrantė section and laying a new 110 kV underground power cable line), there would be a short-term and temporary, minor impact on the environment (on certain natural elements—soil, subsoil, biodiversity, and landscape), as described in Sections 4.4, 4.5, 4.7, and 4.9.

In summary, it can be stated that during the implementation of the PŪV solutions/construction works (dredging of water bodies, formation of new land, slope stabilization works, soil transport, etc.), no significant negative impact is anticipated on the Curonian Spit itself—as a UNESCO World Cultural Heritage site—under any of the PŪV alternatives.

During the operation of the PŪV facilities

Impact on Group I NCP assets

For all PŪV alternatives 2A, 3A, and 4A, there would be no significant negative impact on Group I NCP assets during the operation of PŪV facilities.

Impact on Group II cultural heritage assets

As mentioned earlier, in the case of Project Alternatives 2A, 3A, and 4A, assets potentially significant for scientific knowledge (4 sites—in the case of Alternatives 2A and 4A, 5 sites – in the case of Alternative 3A) would be destroyed if the proposed mitigation and avoidance measures were not implemented prior to the start of the PŪV project implementation.

Impact on Group III NCP values (World Heritage value, the Curonian Spit)

The impact on the Curonian Spit during the operation of the PŪV facilities was assessed in accordance with the requirements of the ICOMOS document “Guidance on Heritage Impact Assessments for Cultural World Heritage Properties” (2011), particularly Chapter 5 (System for Identifying and Assessing Impacts) and Annex 3b (Model Guidelines for Assessing the Extent of Impact).

Based on Annex 3a of the Recommendation, which is dedicated to determining the value of a heritage property, the value of the Curonian Spit is assessed as very high.

A key point in the assessment report is the status of the Curonian Spit, which was recognized as the IVV of the PKPV. This was also emphasized in the 2015 report by T. Fejerdy, an international expert from ICOMOS on the UNESCO mission⁴.

It is important to note that in 2013, the Description of the Outstanding Universal Value of the Curonian Spit was approved, in which, while highlighting the integrity and authenticity of the Curonian Spit, the highly valuable landscape was emphasized, and the most valuable elements and characteristics of the Curonian Spit’s cultural landscape were identified as:

1. the unique scale and overall spatial structure, revealing the harmonious coexistence of people with nature;
2. the characteristic panoramas and silhouettes of the Curonian Lagoon;
3. cultural elements, including the sand-covered remains of trade routes, 10th–11th-century trading settlements, traditional fishing villages, and other archaeological heritage;

⁴ Summary of the ICOMOS response monitoring mission report on the Curonian Spit, 2015. Available online: http://www.unesco.lt/images/M_images/misijos2015.pdf

4. the spatial planning structure and architecture of ancient fishing villages converted into resort settlements (ancient wooden fishermen's houses, 19th-century buildings designed by professional architects, including lighthouses, marinas, churches, schools, and villas);
5. elements of maritime heritage;
6. natural and man-made elements, including the unique Great Dune Ridge, individual dunes, and the remains of parabolic dunes;
7. the man-made protective coastal dune ridge;
8. remnants of moraine islands, coastal and intertidal forests, and intertidal peninsulas (horns);
9. old-growth forests, mountain pine forests, and other unique dune flora and fauna, including bird migration routes;
10. as well as the social and cultural traditions, spirituality, and social awareness of this area, reflecting the local way of life of that time, which was most strongly shaped by fishermen, artists, scientists, sailors and gliders, travelers, and other visitors.

Taking into account all the alternatives for the PŪV and the locations of the PŪV solutions, it is evident that three out of ten characteristics and elements of the PKPV IVV (1) a unique scale and overall spatial structure revealing the harmonious coexistence of people with nature; (2) characteristic panoramas and silhouettes of the Curonian Lagoon; (5) elements of maritime heritage; could be affected to varying degrees upon implementation of the KVJU PŪV solutions.

The PŪV solution that would be implemented in all PŪV alternatives—the formation of a new port land area in the northern part of the Curonian Lagoon—is associated with a potential visual impact on the PKPV and an impact on the shoreline.

In assessing the impact of the PŪV on the characteristics and elements of the PKPV IVV, the following sections review the potential impact aspects for each of the mentioned elements in turn:

1. "Unique scale and overall spatial structure, revealing the harmonious coexistence of people with nature."

The exact physical boundaries of the PKPV have not been established, but within the territory of the Republic of Lithuania, they are identified with the boundaries of the KNNP, which, in the area of the PŪV, run along the waters of the Curonian Lagoon and overlap with the boundaries of the KVJU territory. The main solutions of the PŪV are planned within the boundaries of the KVJU territory for any PŪV alternative, but would also extend into the KNNP boundaries in the lagoon waters (Figs. 3.1.2, 3.3.5–3.3.7), however, their relationship to the aforementioned boundary would differ in individual PŪV alternatives. In the case of PŪV alternative 2A, the planned main solutions involve the formation of a new land area, the western part of which, within the lagoon waters, would border the KNNP boundary, and the protective embankments of this new area would extend into the KNNP territory (Fig. 4.11.2.5). The water area being dredged for the ship turning area would also extend into the KNNP territory (approximately 78 m within the KNNP boundaries), but these solutions would be implemented underwater and would not be visually visible.

In the case of PŪV Alternative 3A, the planned new land-based solutions would not extend into the KNNP territory, while the water area being dredged for the ship turning area would extend approximately 176 m into the KNNP territory (Fig. 4.11.2.6).

In the case of PŪV Alternative 4A, the planned new land-based solutions would also not extend into the KNNP territory, while the dredged water area for the ship turning basin would extend approximately 63 m into the KNNP territory (Fig. 4.11.2.7).

Upon implementation of the PŪV solutions under Alternative 2A, the new port area with its future infrastructure would “approach” the Curonian Spit along a 1.3 km stretch, with the minimum distance to the spit’s shore being approximately 450 m in the southern part and approximately 340 m in the northern part. In the case of Alternative 3A, the minimum distance to the Spit would be in the southern part of the PŪV territory and would be approximately 545 m, while in the northern part—approximately 700 m; and in the case of Alternative 4A, the minimum distance to the Spit would be in the southern part of the PŪV territory and would be approximately 570 m, and in the northern part—about 780 m.

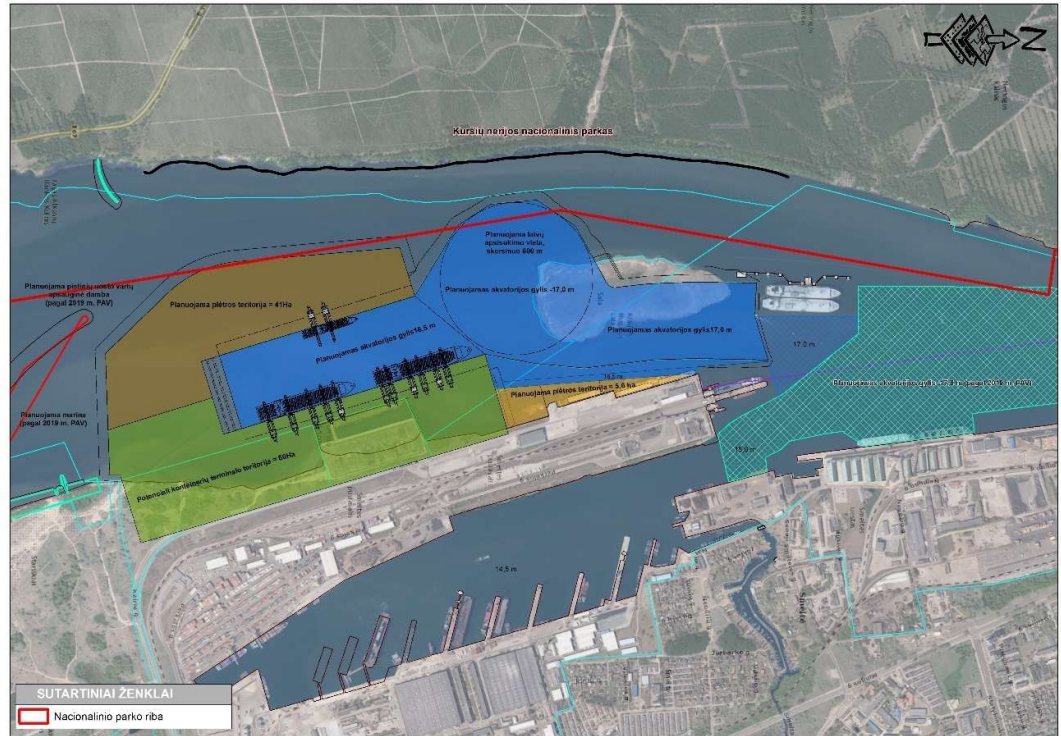
When comparing the PŪV alternatives, the least impact on the KNNP territory would occur in the case of Alternative 4A.

It should be noted that the solutions planned and scheduled for implementation in the 2019 EIA already fall within the boundaries of the Curonian Spit National Park: the coastal protection embankment near Alksnynė and the section of the underwater retaining wall from PK 83 to Alksnynė.

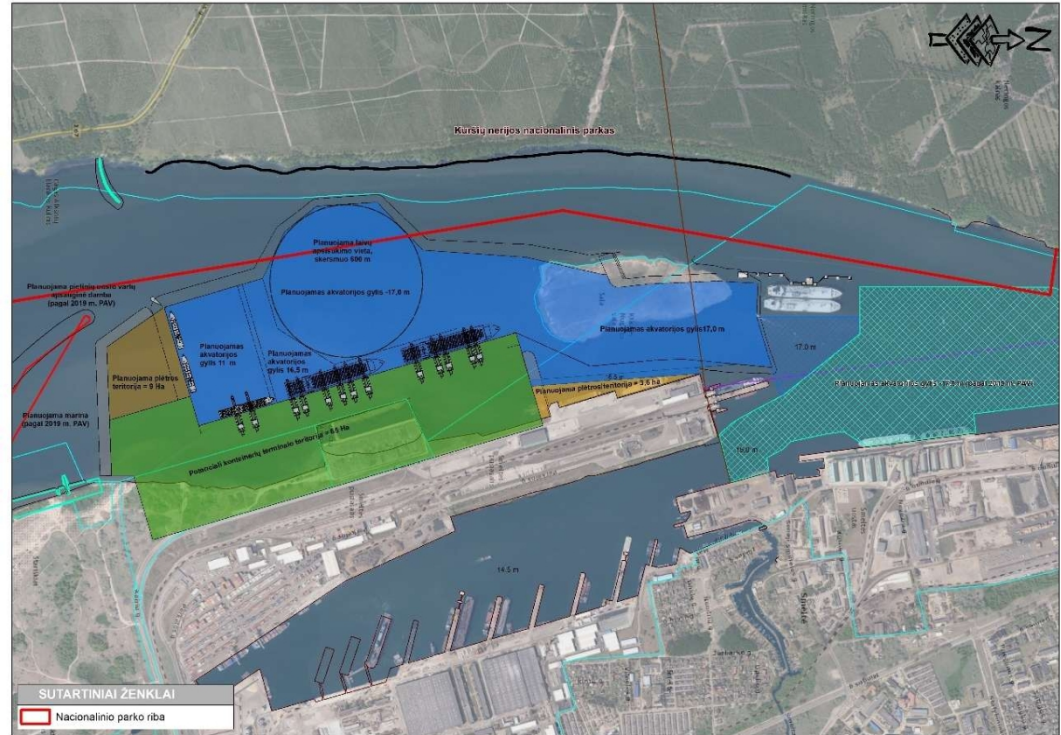
All of the proposed solutions for the project on the southern side border the northern breakwater of the Port’s southern gate, which was planned in 2019 but has not yet been constructed; meanwhile, the following planned and proposed solutions fall within the boundaries of the Curonian Spit National Park: a shoreline protection breakwater at Alksnynė and a section of underwater retaining walls from PK 83 to Alksnynė [19] (Figs. 4.7.2.2–4.7.2.4). In the enclosed water area between the aforementioned dams, a marina for small and recreational vessels is planned, featuring infrastructure and urban design typical of such facilities, analogous to the marinas in Nida and Juodkrantė. Taking into account the plans of the Klaipėda City Municipality Administration to create an attractive recreational area near the Curonian Lagoon for city residents in this part of the city, the KVJU area would begin (at the Port’s sea gate breakwaters and Melnragė I Beach) and end (at the new marina for small and recreational vessels) with areas adapted for and attractive to residents.

The PŪV’s “secondary” solutions include the planned reconstruction of the 110 kV EEPOL line section between Marios and Juodkrantė, where it is planned to dismantle approximately 6.6 km of the 110 kV EEPOL line and 42 towers, 23 of which are located within the Curonian Spit National Park (KNNP). Upon dismantling the EEPOL section and lifting the restrictions on economic activities related to the power line’s operation in this section due to the AZ, a strip approximately 50 m wide and 6.6 km long (covering a total area of about 3.3 ha, of which about 2 ha is within the KNNP territory) would be freed up for other activities (industrial—within the port area; recreational—within the KNNP territory). Dismantling the EEPOL overhead support structures along a 4 km stretch of the Curonian Spit would result in a significant positive visual change to the local landscape (Fig. 4.7.2.1).

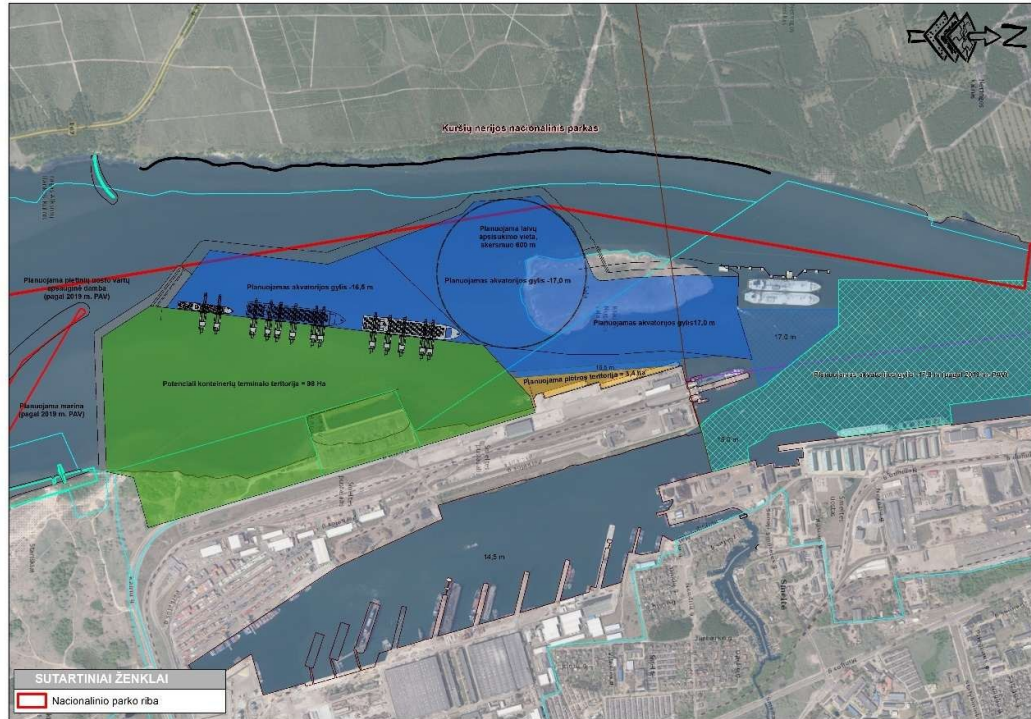
The project’s solutions will not, in their direct physical manifestation, cause significant changes to the unique scale and overall spatial structure of the PKPV. No major project solutions are planned for the Curonian Spit. Taking into account the information provided above, the impact of the PŪV on the PKPV IVV element “Unique scale and overall spatial structure reflecting the harmonious coexistence of people with nature” is assessed as insignificant (very minor).



4.11.2.5 Fig. Fig. Solutions of PŪV Alternative 2A and their relationship with the KNNP and the Curonian Spit territory



4.11.2.6 Fig. Solutions for PŪV Alternative 3A and their relationship with the KNNP and the Curonian Spit territory



4.11.2.7 Fig. Solutions of PŪV Alternative 4A and their relationship with the KNNP and the Curonian Spit territory

2. “Characteristic Panoramas and Silhouettes of the Curonian Lagoon”

Panoramas and silhouettes are best described and revealed from specific vantage points and observation decks. Currently, the southern part of the port—the water area beyond Kiaulės Nugaros Island—is underutilized; in this section, there are no attractive or popular sites on either the mainland or the Curonian Spit side. On the mainland, near the bend of Kairių Street, the Curonian Lagoon shoreline is overgrown with shrubs and scattered trees and is used only for recreational fishermen to launch their boats. On the Curonian Spit, near the aforementioned water area, there is an observation deck on the Meškos Galvos dune, but it is not heavily visited (most visitors go to more distant and more attractive locations on the Curonian Spit). Upon implementation of the PŪV solutions, regardless of which PŪV alternative is chosen, new land area would emerge in the currently open Curonian Lagoon water area, extending the boundaries of the Smeltė Peninsula, complete with all the infrastructure and superstructure characteristic of the existing port, and approximately ¼ of the area of Kiaulės Nugaros Island would be reclaimed.

As already mentioned in Section 4.7, upon implementation of the PŪV solutions for Alternative 2A, the new port area with its future infrastructure would “approach” the Curonian Spit along a stretch of approximately 1.3 km, and in the southern part the minimum distance to the spit’s shore would be about 450 m, and in the northern part—about 340 m. In the case of Alternative 3A, the minimum distance to the Spit would be in the southern part of the PŪV territory and would be approximately 545 m, and in the northern part – approximately 700 m; and in the case of Alternative 4A, the minimum distance to the Spit would be in the southern part of the PŪV territory and would be approximately 570 m, and in the northern part—about 780 m. Thus, in this respect, the solutions of Alternative 4A would be the farthest from the Curonian Spit.

The new land area above the existing water surface will rise approximately 2.5–3.0 m. The implemented PŪV solutions (the newly formed land area of the Port with its characteristic infrastructure), although of modest height (excluding future superstructure) compared to the massive volume of the Curonian Spit, would partially alter the local landscape, reinforcing the influence of man-made elements.

It should be noted that the current dominant landscape at the location of the analyzed PŪV (viewed from the eastern shore of the Curonian Lagoon) is already semi-technogenic (Malkų Bay and the Smeltė Peninsula, which is fully designated for development in the currently valid detailed plan) with a dominant port superstructure. Therefore, the impact on the aforementioned PKPV IVV feature should be assessed in two ways: when viewed from the mainland—more positively; when viewed from the Curonian Spit—as insignificant and slightly negative.

Taking into account the information provided above, the impact of the PŪV on the PKPV IVV element “Characteristic panoramas and silhouettes of the Curonian Lagoon” is assessed as – insignificant, slightly negative.

3. “Marine Heritage Elements”

The Curonian Spit was included in the World Heritage List based on Criterion V – “The Curonian Spit is an exceptional example of a sand dune landscape, the survival of which is constantly threatened by natural forces (wind, tides, and currents). After devastating human intervention nearly destroyed the spit, it was restored through massive conservation and reinforcement efforts that began in the 19th century and continue to this day,” i.e., not because of the adjacent marine heritage.

Assuming that the boundaries of the PKPV correspond to those of the KNNP, there are no protected underwater cultural heritage assets registered within the aforementioned boundaries in the PŪV territory in the Curonian Lagoon water area. As described earlier, during underwater archaeological sonar surveys in the PŪV area in 2023, the remains of potentially sunken anthropogenic objects and tree trunks or poles representing the presumed former shoreline were identified. Presumed objects No. 16, 19, 32, 33, and 35 fall within the project area’s work zones: In the case of Alternative 2A (objects No. 19, 32, 33, 35); In the case of Alternative 3A (objects No. 16, 19, 32, 33, 35); In the case of Alternative 4A

(sites No. 19, 32, 33, 35). Sites No. 16, 23, and 39 are located within the boundaries of the KNNP (in the water area); only one of them (No. 16—a possibly sunken boat) may be damaged during the implementation of Alternative 3A, therefore, it is proposed to recover it during the dredging of the water area under the supervision of a cultural heritage specialist/archaeologist.

Taking into account the information provided above, the impact on the IVV element “Marine Heritage Elements” when implementing the alternative solutions of the PŪV (while applying preventive measures) is assessed as neutral.

Conclusion: Heritage preservation is the ability to ensure that any changes are carried out in accordance with the principle of sustainable development. Every possible effort must be made to avoid or eliminate any potential changes in the area and to mitigate the negative impact on elements that confer IVV status on the site or other elements of significant importance, i.e., it is important to strike a balance between meeting the needs of society and the potential negative impact of the proposed development on the site. Ensuring such a balance is of paramount importance in preserving and fostering the values of the site.

Based on ICOMOS recommendations for assessing impacts on World Cultural Heritage values, the value of the attributes of the Curonian Spit (IVV) is very high.

It should be noted that three out of ten characteristics and elements of the Curonian Spit’s OWH ((1) unique scale and overall spatial structure revealing the harmonious coexistence of people with nature; (2) characteristic panoramas and silhouettes of the Curonian Lagoon; (5) elements of maritime heritage—could be subject to varying levels of impact—ranging from neutral to slightly negative—when implementing the PŪV solutions.

Significant negative impacts (insignificant to slightly negative) would be experienced by the IVV “(1) unique scale and general spatial structure reflecting the harmonious coexistence of people with nature” and “(2) characteristics and elements of the panoramas and silhouettes characteristic of the Curonian Lagoon” – due to the solutions envisaged in all PŪV alternatives (creation of a new port land area, dredging of the water area, and dredging of part of Kiaulės Nugaros Island), however, considering the existing landscape of the eastern coast of the Curonian Spit near the PŪV area, it is evident that a semi-industrial port landscape already dominates the mainland side of the coast; therefore, the impact on the aforementioned IVV elements is assessed as insignificant and slightly negative.

After assessing the impact on the unique scale, general spatial structures, panoramas, silhouettes, perspectives, and maritime heritage, it is evident that the solutions of PŪV Alternative 4A will have a less negative impact on the attributes of the Curonian Spit’s outstanding universal value compared to the solutions of PŪV Alternatives 2A and 3A.

Summary conclusion:

In the case of all PŪV alternatives 2A, 3A, and 4A, no significant negative impact on Group I NKP values is anticipated during either construction or the operation of the facilities. The implementation of the PŪV “secondary” solutions (dismantling the 110 kV EEPOL section), there will be a direct positive impact (two EEPOL towers will be removed from the KPV territory—the Alksnynė defensive complex (code 30540)).

In 2023, during underwater archaeological sonar surveys in the PŪV area at a depth of 2–9 m, 40 objects of anthropogenic origin were recorded, of which the 7 most significant underwater objects with potential archaeological and historical value are Nos. 16, 19, 23, 32, and 39—presumed remains of water transport (boats, ship parts), as well as presumed relic shore structures (Nos. 33, 35) (Group II NKP values). Objects No. 16, 19, 32, 33, and 35 fall within the PŪV work zones: In the case of Alternative 2A (objects No. 19, 32, 33, 35); In the case of Alternative 3A (sites No. 16, 19, 32, 33, 35);

In the case of Alternative 4A (sites No. 19, 32, 33, 35). The solutions for PŪV Alternatives 2A, 3A, and 4A may impact Group II NKP values—unidentified underwater heritage—therefore, the following mitigation measures are proposed: During dredging operations, archaeological surveys must be conducted to document any potential anthropogenic objects or artifacts located beneath the sediment layer that could not be detected during side-scan sonar surveys or visual inspections of the seabed.

After assessing the impact of the PŪV on the Group III NKP asset (a World Heritage site, the Curonian Spit), three out of ten PKPV IVV characteristics and elements (1) a unique scale and overall spatial structure revealing the harmonious coexistence of people with nature; (2) characteristic panoramas and silhouettes of the Curonian Lagoon; (5) elements of maritime heritage; could be affected to varying degrees—ranging from neutral and insignificant to slightly negative—when implementing the PŪV solutions. The solutions of PŪV Alternative 4A will have a less negative impact on the attributes of the Curonian Spit’s outstanding universal value compared to the solutions of PŪV Alternatives 2A and 3A.

4.11.3 Measures to prevent, reduce, and offset significant adverse environmental impacts

Underwater heritage assets

- The watercraft recorded in the PŪV area (sites No. 16, 19, 32) could be salvaged under expert supervision during dredging operations.

- When implementing the PŪV solutions, regardless of the PŪV alternative chosen, archaeological surveys must be conducted during the dredging of the water area to identify any potential anthropogenic objects or artifacts located beneath the sediment layer that could not be detected during side-scan sonar or visual surveys of the seabed. .

The Curonian Spit – a UNESCO World Heritage Site

As mentioned earlier, to avoid the risk of coastal erosion on the Curonian Spit and to ensure long-term prevention and stability, the solutions planned for 2019 include the installation of underwater retaining walls in the KVJU water area section from PK83 to Alksnynė. These retaining walls would be installed underwater (and thus not visible) by driving steel piles into the existing slope approximately 20–40 m from the spit's shoreline.

For more information on the Curonian Spit shoreline protection measures, see Section 4.6.

4.12 Public Health

4.12.1 Description of the current public health situation

Detailed and accurate information on the demographic and health indicators of people living in the vicinity of the proposed development solutions, including at-risk groups, is not provided in Lithuanian health databases, information systems, or published literature; therefore, when reviewing the public health status, the public health indicators of the populations of Klaipėda City Municipality and Neringa Municipality (separately for risk groups) (PŪV solutions are planned in these municipalities and their surrounding areas), which are compared with the national average, as well as with data from Klaipėda County and other municipalities within it. The overview of public health status was prepared based on the latest data from the Public Health Monitoring Information System [54] as well as statistical data, publications, and reviews provided by the Institute of Hygiene [55].

The following indicators were selected to describe the state of public health:

- Demographic indicators of the population:
 - ✓ population size and composition;
 - ✓ birth and death rates;
 - ✓ average life expectancy;
 - ✓ structure of causes of death.

In order to analyze public health indicators potentially related to the PŪV, risk factors potentially arising from the PŪV are taken into account: noise, air pollution, etc., therefore, the incidence of diseases relatively associated with the effects of physical and chemical pollution is analyzed (cardiovascular diseases, blood disorders, mental disorders, tumors, respiratory diseases, etc.).

- Population morbidity indicators:
 - ✓ overall morbidity (A00-T98) and morbidity by cause: blood diseases (D50-D89), circulatory system diseases (I00-I99), hypertensive diseases (I10-I15), asthma (J45-J46), chronic lower respiratory tract diseases (J40-J47), mental disorders (F00-F99), neoplasms (C00-D48).

- Health indicators for at-risk population groups:
 - ✓ overall morbidity (A00-T98) and morbidity by cause and age (0–17 years and 65 years and older): blood disorders (D50–D89), circulatory system diseases (I00–I99), hypertensive diseases (I10–I15), asthma (J45–J46), chronic lower respiratory tract diseases (J40–J47), mental disorders (F00–F99), neoplasms (C00–D48).

4.12.1.1 Analysis of Population Demographic Indicators

Population size and composition

The average annual population consists of all persons whose permanent place of residence is in the Republic of Lithuania during the reporting period. The number of permanent residents is a derived indicator of demographic processes (fertility, mortality, migration). The most accurate determination of the number of permanent residents in a given territory is made during the general population and housing censuses.

Population change per 1,000 inhabitants – the population is a derived indicator of demographic processes (birth rate, death rate, migration). The most accurate determination of the population in a given territory is made during the general population and housing censuses.

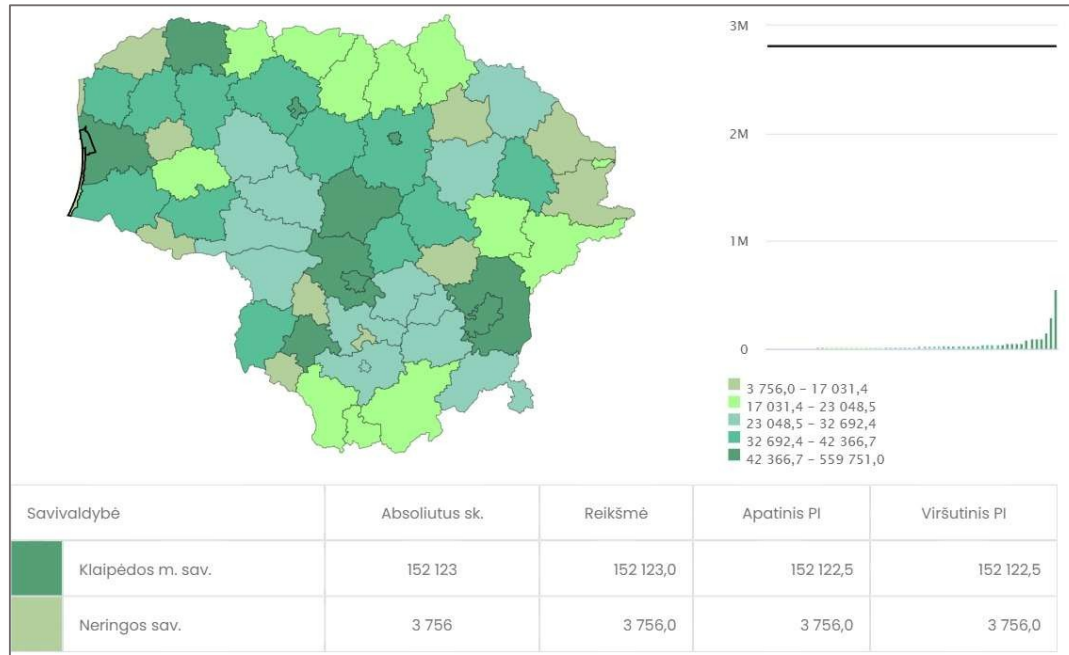
Natural increase per 1,000 inhabitants – natural population increase per 1,000 inhabitants – the difference between birth and death rates.

In 2021, the average annual population in the Klaipėda City Municipality was 152,123, and in the Neringa Municipality, 3,756 (Fig. 4.12.1.1.1, Table 4.12.1.1.1).

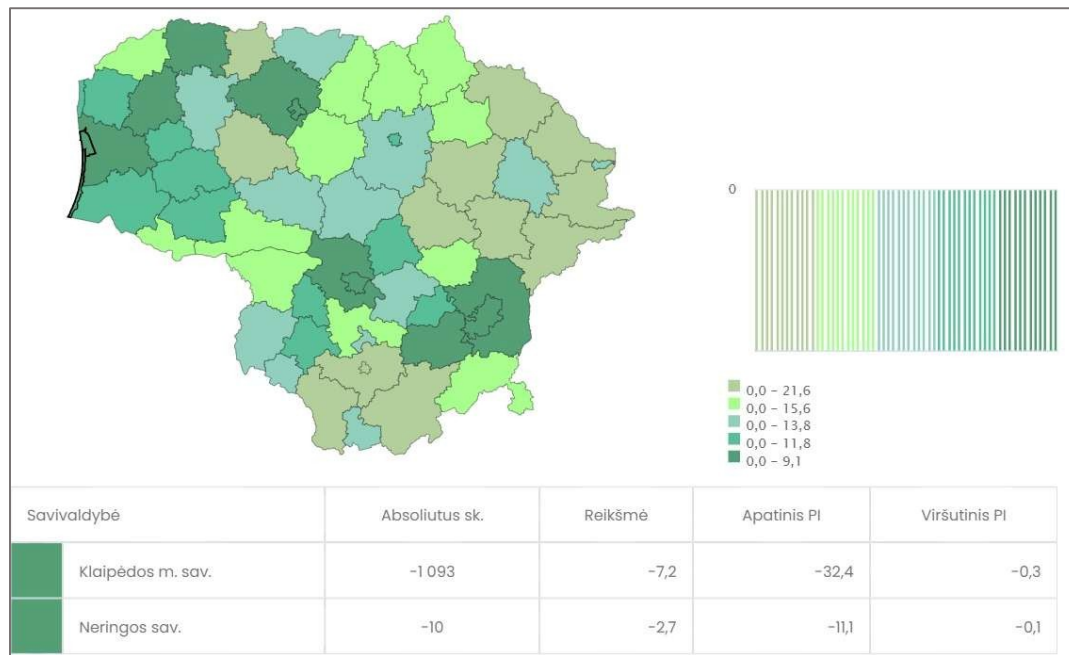
In the Klaipėda City Municipality in 2021, the proportion of men was 45.8%, and that of women was 54.2%. Population change per 1,000 inhabitants: positive, reaching 1.5 in 2021. Natural increase per 1,000 inhabitants:

negative, reaching -7.2 in 2021 (Table 4.12.1.1.1). In the Neringa Municipality, the proportion of men in 2021 was 48.8%, and that of women was 51.2%. Population change per 1,000 inhabitants was positive, reaching 78.3 in 2021. The natural increase per 1,000 inhabitants was negative, reaching -2.7 in 2021 (Table 4.12.1.1.1). A more detailed analysis of the population size and composition is presented in Table 4.12.1.1.

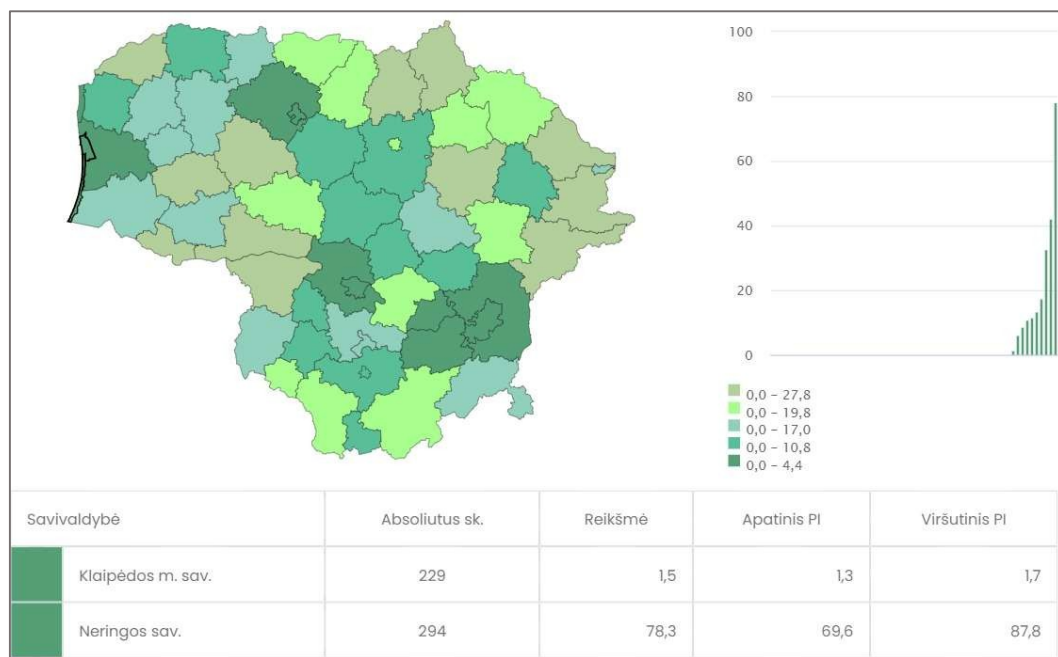
When assessed at the national level, in 2021 the average annual population in the Klaipėda City Municipality was in the highest range, while in the Neringa Municipality it was in the lowest range (Figure 4.12.1.1.1); the natural increase per 1,000 inhabitants In both municipalities, it was in the lowest range (Fig. 4.12.1.1.2), and the change in population per 1,000 inhabitants differed between municipalities; in Neringa Municipality, the indicator value is higher than in Klaipėda and is the highest in Lithuania (Fig. 4.12.1.1.3).



4.12.1.1.1 Fig. Average annual population in Lithuanian municipalities, 2021 [54]



4.12.1.1.2 Fig. Natural increase per 1,000 inhabitants in Lithuanian municipalities, 2021 [54]



4.12.1.1.3 Fig. Change in population per 1,000 inhabitants in Lithuanian municipalities, 2021 [54]

4.12.1.1.1 Table. Population size and composition of Lithuania, Klaipėda City, and Neringa municipalities; comparison of indicator values with Lithuanian indicator values, 2021

| Indicator | Value | | |
|--|-------------|-----------------------|----------------------|
| | Lithuania | Klaipėda Municipality | Neringa Municipality |
| Number of working-age residents at the beginning of the year | 1,749,067.0 | 90,974.0 | 2,496.0 |
| Average annual population | 2,808,380.0 | 152,123.0 | 3,756.0 |
| Average annual male population | 1,305,782.0 | 69,663.0 | 1,832.0 |
| Average annual population of women | 1,502,598.0 | 82,460.0 | 1,924.0 |
| Average annual population aged 15–64 | 1,830,867.0 | 95,635.0 | 2,752.0 |
| Average annual population aged 65 and over | 560,284.0 | 31,222.0 | 631.0 |
| Dependency ratio of the elderly | 30.6 | 32.6 | 22.9 |
| Percentage of men, % | 46.5 | 45.8 | 48.8 |
| Percentage of women, % | 53.5 | 54.2 | 51.2 |
| Percentage of population aged 0–14 | 14.9 | 16.6 | 9.9 |
| Percentage of the population aged 0–17 | 17.6 | 19.2 | 12.6 |
| Percentage of the population aged 18–44, % | 33.0 | 32.6 | 34.8 |
| Percentage of the population aged 45–64 | 29.5 | 27.7 | 35.8 |
| Percentage of residents aged 65 and older, % | 20.0 | 20.5 | 16.8 |
| Percentage of women of childbearing age (15–49 years) | 39.4 | 38.9 | 43.1 |
| Change in population per 1,000 inhabitants | -1.7 | 1.5 | 78.3 |
| Natural increase per 1,000 population | -8.7 | -7.2 | -2.7 |
| Values: | Better | Worse | Similar |

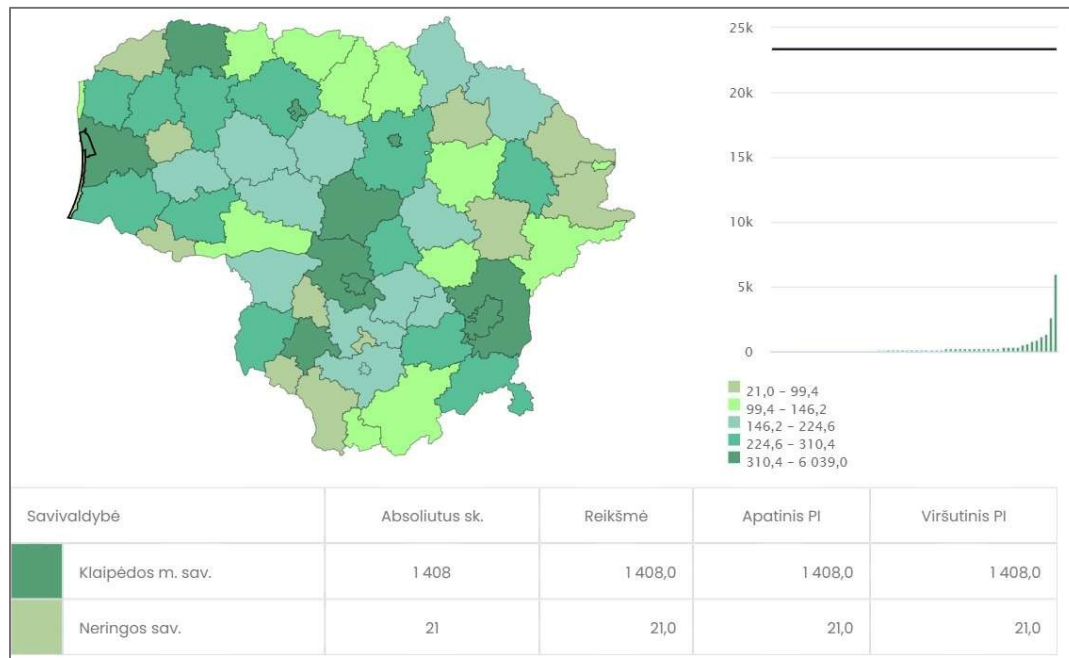
Birth and death rates

Number of live births – the birth of a baby who is breathing or exhibits other signs of life, such as a heartbeat, umbilical cord pulsation, or clear voluntary muscle activity, regardless of gestational age.

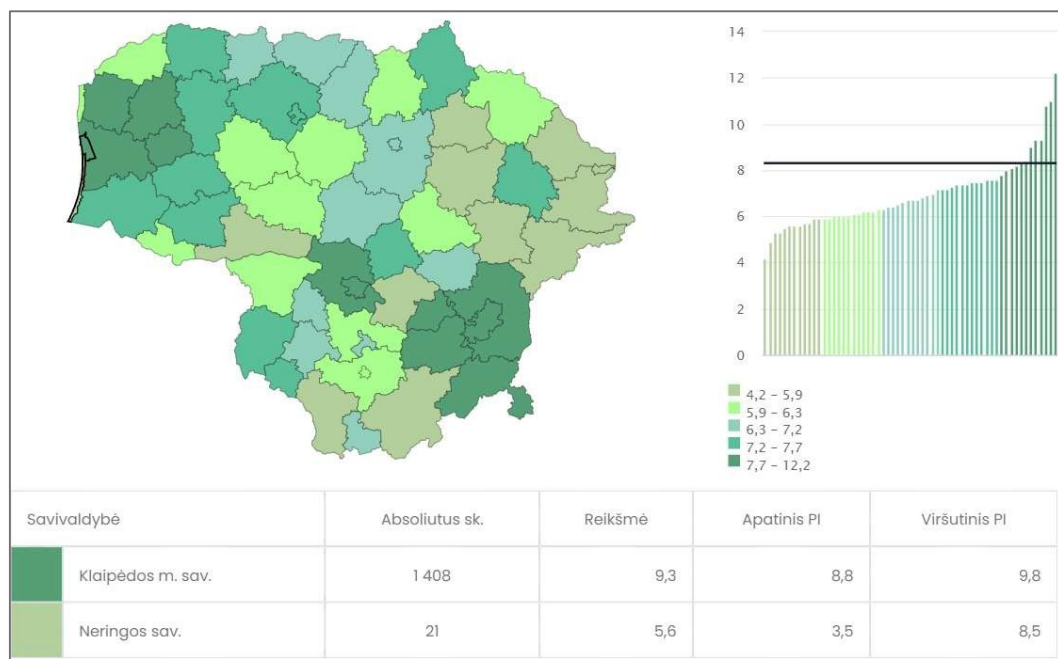
Birth rate per 1,000 population – the ratio of live births per year to the average annual population, calculated per 1,000 population. The indicator includes babies born in the Republic of Lithuania whose parents (or at least one of them) are permanent residents of the Republic of Lithuania or are unknown, as well as babies born alive in foreign countries whose mothers are permanent residents of the Republic of Lithuania and whose place of residence is registered in the Republic of Lithuania.

In 2021, the number of live births in the Klaipėda City Municipality reached 1,408 babies, with a birth rate of 9.3 per 1,000 population. More detailed information on the birth rate is provided in Table 4.12.1.1.2. In 2021, the number of live births in Neringa Municipality reached 21 infants, with a birth rate of 5.6 per 1,000 population. More detailed information on birth rates is provided in Table 4.12.1.1.2.

When assessed at the national level—in 2021, the birth rate (based on absolute numbers) differed between Klaipėda City and Neringa Municipality; in Klaipėda City Municipality, it was in the highest range, while Neringa Municipality was in the lowest range (Fig. 4.12.1.1.4), with a birth rate of 1,000 inhabitants. The figures also differed between municipalities, with Klaipėda City Municipality in the highest range and Neringa Municipality in the lowest range (Fig. 4.10.1.1.5).



4.12.1.1.4 Fig. Number of live births in Lithuanian municipalities, 2021 [54]



4.12.1.1.5 Fig. Birth rate per 1,000 inhabitants in Lithuanian municipalities, 2021 [54]

4.12.1.1.2 Table. Birth rate in Lithuania and in the municipalities of Klaipėda and Neringa; comparison of indicator values with Lithuanian indicator values, 2021

| Indicator | Value | | |
|---|-----------|---------------|----------------------|
| | Lithuania | Klaipėda City | Neringa Municipality |
| Number of live births | 23,330.0 | 1,408.0 | 21.0 |
| Birth rate per 1,000 population | 8.3 | 9.3 | 5.6 |
| Live births weighing less than 2,500 g, % | 4.3 | 3.9 | 0.0 |
| Number of induced abortions per 1,000 women | 3.7 | 3.5 | 2.5 |
| Meaning: | Better | Worse | Similar |

In 2021, the birth rate per 1,000 inhabitants in the Klaipėda City Municipality was 9.3, while in the Neringa Municipality it was 5.6. When comparing the birth rate per 1,000 inhabitants in Klaipėda City Municipality with that of Klaipėda County (8.9), the birth rate in Klaipėda City Municipality was higher, and in Neringa Municipality—it was worse (Fig. 4.12.1.1.6). When evaluating Klaipėda County, the highest birth rate per 1,000 inhabitants was in the Klaipėda City Municipality (11.0), and the lowest was in the Neringa Municipality (5.6) (Fig. 4.12.1.1.6). The birth rate per 1,000 inhabitants in Lithuania was 8.3, which was lower than that of Klaipėda County, but in some cases higher than the rates of individual municipalities (Fig. 4.12.1.1.6).

Tendencija: ➔ Nekinta ⬆ Dideja ⬇ Mažėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas

| Savivaldybė | Tendencija | Kiekis ^{↑↓} | Reikšmė ^{↑↓} | Grafikas | Apatinis PI ^{↑↓} | Viršutinis PI ^{↑↓} |
|---------------------|------------|----------------------|-----------------------|----------|---------------------------|-----------------------------|
| Lietuva | ⬇ | 23 330 | 8,3 | | 8,2 | 8,4 |
| Klaipėdos apskritis | ⬇ | 2 863 | 8,9 | | 8,5 | 9,2 |
| Klaipėdos m. sav. | ⬇ | 1 408 | 9,3 | | 8,8 | 9,8 |
| Palangos m. sav. | ⬇ | 100 | 5,9 | | 4,8 | 7,2 |
| Neringos sav. | ⬇ | 21 | 5,6 | | 3,5 | 8,5 |
| Klaipėdos r. sav. | ➔ | 643 | 11,0 | | 10,2 | 11,9 |
| Kretingos r. sav. | ⬇ | 301 | 8,0 | | 7,1 | 9,0 |
| Skuodo r. sav. | ⬇ | 97 | 6,0 | | 4,9 | 7,4 |
| Šilutės r. sav. | ⬇ | 293 | 7,6 | | 6,7 | 8,5 |

4.12.1.1.6 Fig. Birth rate per 1,000 population, comparison among municipalities in Klaipėda County, 2021 [54]

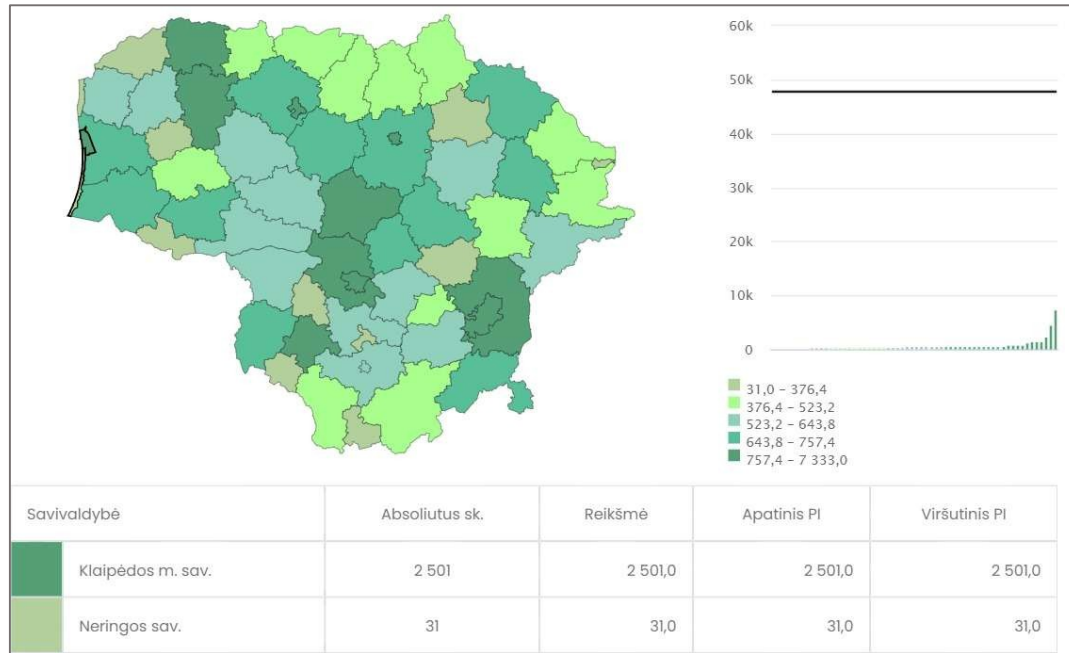
Number of deaths – the irreversible disappearance of all signs of life at any time after the birth of a live infant (cessation of vital functions after birth without the possibility of resuscitation).

Mortality rate per 1,000 population – the ratio of the number of deaths per year to the average annual population, calculated per 1,000 inhabitants.

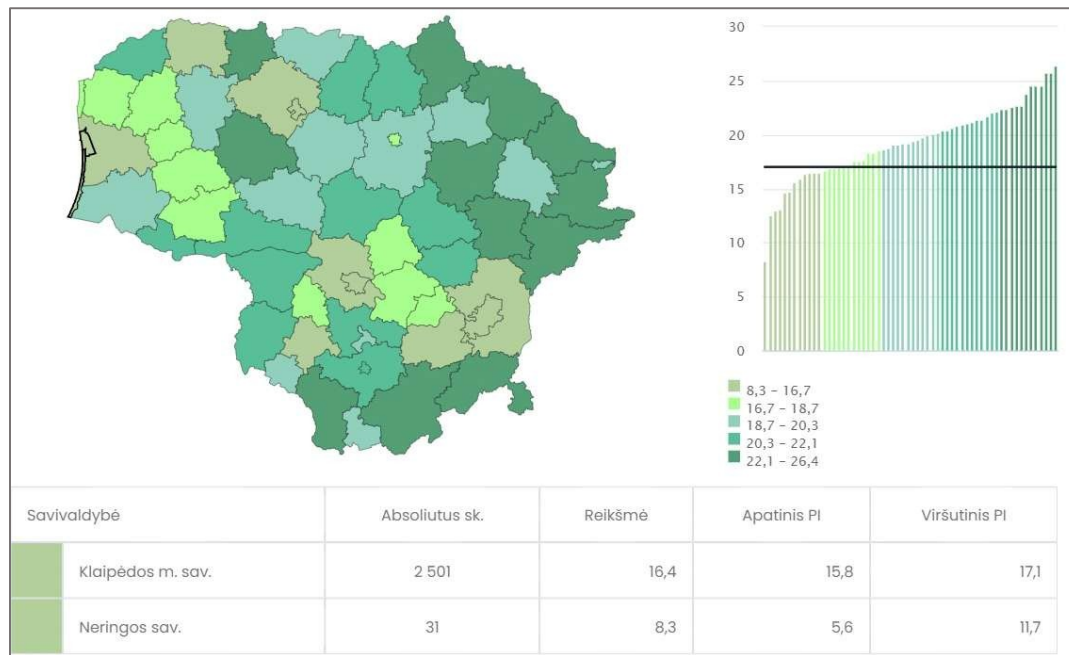
In 2021, the number of deaths in the Klaipėda City Municipality reached 2,501, with a mortality rate of 16.4 per 1,000 inhabitants; average life expectancy (according to HI calculations) was 74.9 years; more detailed mortality information is provided in Table 4.12.1.1.3. In 2021, the number of deaths in the Neringa municipality was 31, and the mortality rate per 1,000 inhabitants was 8.3. The average life expectancy (according to HI calculations) was 81.7 years; more detailed mortality information is provided

4.12.1.1.3 in the table.

When assessed at the national level—in 2021, mortality rates in the municipalities of Klaipėda City and Neringa differed significantly; the Klaipėda City municipality was in the highest range, while the Neringa municipality was in the lowest (based on absolute numbers) (Fig. 4.12.1.1.7), while when assessing mortality per 1,000 inhabitants, both municipalities were in the lowest range (Fig. 4.12.1.1.8).



4.12.1.1.7 Fig. Number of deaths in Lithuanian municipalities, 2021 [54]



4.12.1.1.8 Fig. Mortality per 1,000 inhabitants in Lithuanian municipalities, 2021 [54]

Table 4.12.1.1.3. Mortality in Lithuania and in the municipalities of Klaipėda and Neringa; comparison of indicator values with Lithuanian indicator values in 2021

| Indicator | Value | | |
|------------------|-----------|---------------|----------------------|
| | Lithuania | Klaipėda City | Neringa Municipality |
| Number of deaths | 47,746.0 | 2,501.0 | 31.0 |

| Indicator | Value | | |
|---|-----------|-----------------------|----------------------|
| | Lithuania | Klaipėda Municipality | Neringa Municipality |
| Average life expectancy at age 0 | 75.1 | 75.5 | 0.0 |
| Difference in life expectancy between women and men (years) at age 0 | 10.0 | 10.6 | 0.0 |
| Average life expectancy at age 0 (HI calculations) | 74.2 | 74.9 | 81.7 |
| Mortality per 1,000 population | 17.0 | 16.4 | 8.3 |
| Average life expectancy at age 65 | 16.8 | 16.6 | 0.0 |
| Difference in life expectancy between women and men (years) at age 65 | 5.4 | 5.2 | 0.0 |
| Infant mortality per 1,000 live births | 3.0 | 2.1 | 0.0 |
| Values: | Better | Worse | Similar |

In 2021, the mortality rate per 1,000 inhabitants in the Klaipėda City Municipality was 16.4, and in the Neringa Municipality, it was 8.3. When comparing the mortality rate per 1,000 inhabitants in Klaipėda City Municipality with that of Klaipėda County (16.3), the mortality rate in Klaipėda City Municipality was similar. In Neringa Municipality, it was better (Fig. 4.12.1.1.9). When evaluating Klaipėda County, the highest mortality rate per 1,000 inhabitants was in Skuodas District Municipality (20.4), and the lowest was in Neringa Municipality (8.3) (Fig. 4.12.1.1.9). The mortality rate per 1,000 inhabitants in Lithuania was 17.0, which was higher than that of Klaipėda County but, in some cases, lower than the rates in individual municipalities (Fig. 4.12.1.1.9).

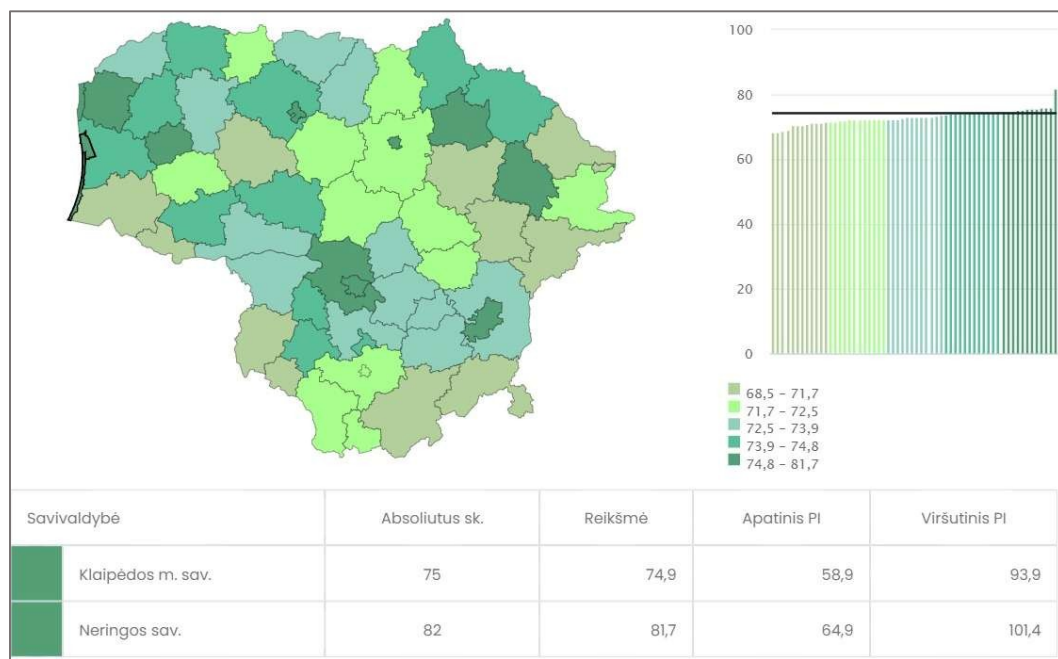


4.12.1.1.9 Fig. Mortality per 1,000 inhabitants, comparison among municipalities in Klaipėda County, 2021 [54]

Life expectancy

Life expectancy at age 0 is a probabilistic indicator showing the average number of years a person born or reaching a certain age is expected to live, assuming that mortality rates for each age group remain unchanged throughout the entire future life of the cohort in question.

In 2021, the average life expectancy in the Klaipėda City Municipality was 75 years, and in the Neringa Municipality, it was 82 years. On a national scale, in 2021, the average life expectancy in Klaipėda City and Neringa municipalities was in the highest range (Fig. 4.12.1.1.10).



4.12.1.1.10 Fig. Average life expectancy at age 0 (HI calculations), 2021 [54]

Average life expectancy at age 0 (HI calculations) in the Klaipėda City Municipality in 2021 was 74.9 years, in Neringa Municipality – 81.7 years, and was similar to the value for Klaipėda County (74.5 years in 2021). When assessing Klaipėda County, the highest average life expectancy was in Neringa Municipality (81.7), and the lowest was in Šilutė District Municipality (71.6). The average life expectancy indicator for Lithuania was 74.2 years and was similar to that of Klaipėda County (Fig. 4.12.1.1.11).



4.12.1.1.11 Fig. Comparison of life expectancy at age 0 (HI calculations) among municipalities in Klaipėda County, 2021 [54]

Structure of causes of death among the population

According to data from the Institute of Hygiene (using the all-cause mortality search tool), the City Municipality are: diseases of the circulatory system, malignant and benign neoplasms, COVID-19, external causes of death, and diseases of the digestive system.

In 2022, in the Klaipėda City Municipality, ~49% (1,125 residents) died from circulatory system diseases, ~21% (472 residents) from malignant and benign neoplasms, from COVID-19 – ~6% (139 residents), from external causes of death – ~5% (105 residents), and from diseases of the digestive system – ~5% (113 residents) of all deaths (Fig. 4.12.1.1.12).

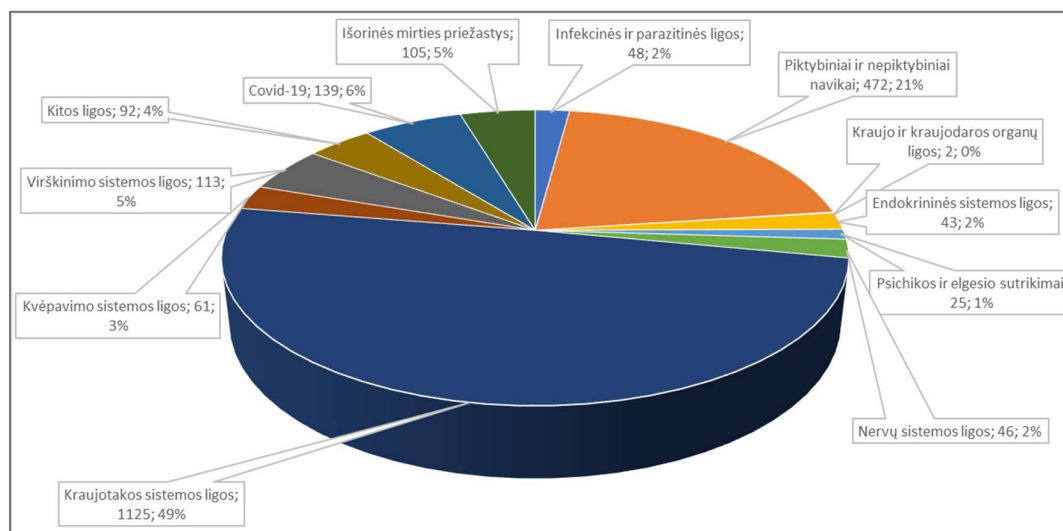


Fig. 4.12.1.1.12. Structure of causes of death in the Municipality of Klaipėda, 2022 [55]

According to data from the Institute of Hygiene (all-cause mortality search tool), the four leading causes of death among residents of Neringa Municipality are: diseases of the circulatory system, malignant and benign neoplasms, external causes of death, and diseases of the digestive system.

In 2022, approximately 53% (18 residents) of deaths in Neringa Municipality were due to diseases of the circulatory system, approximately 20% (7 residents), from diseases of the digestive system – ~12% (4 residents), and from external causes of death – ~6% (2 residents) of all deaths (Fig. 4.12.1.1.13).

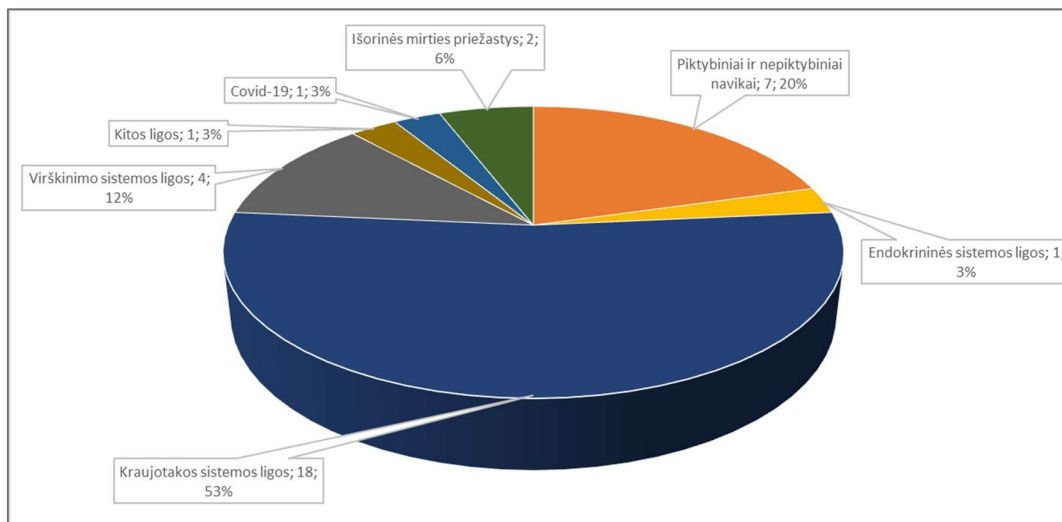


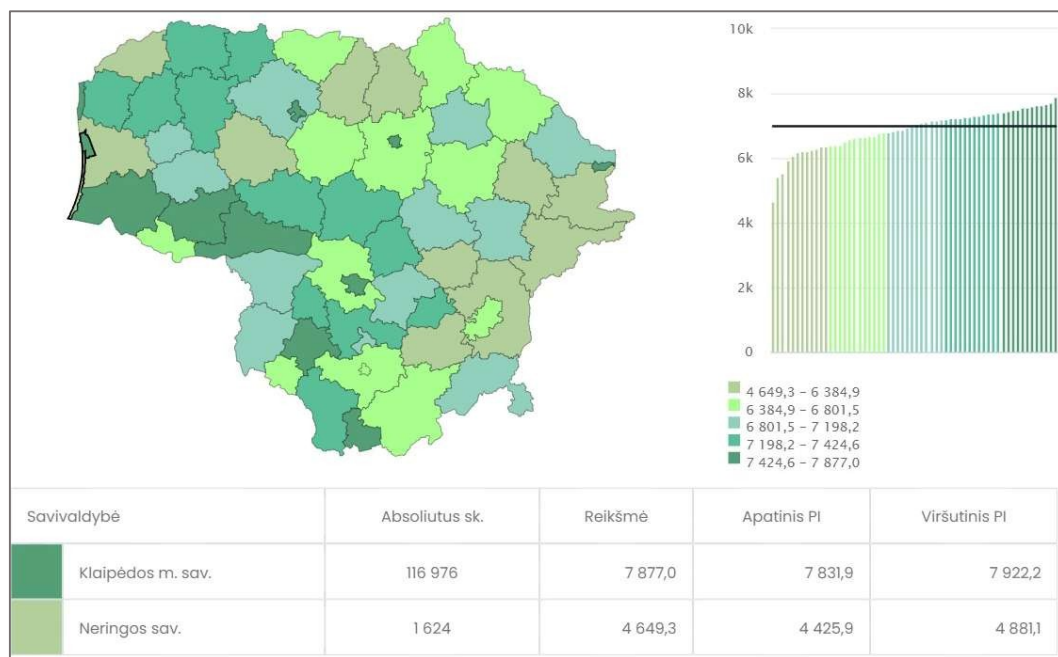
Fig. 4.12.1.1.13. Preliminary structure of causes of death in Neringa Municipality, 2022 [55]

4.12.1.2 Analysis of population morbidity indicators

Morbidity among the population, morbidity by cause

Morbidity (number of new cases) – the number of people per 10,000 residents who, during a specific period, have at least one case of an acute illness or injury recorded at a healthcare facility, or who have a chronic disease recorded for the first time in their lives. Calculation – number of cases per year / average annual population × 10,000.

When assessed at the national level, in 2019, morbidity rates differed between Klaipėda City and Neringa Municipality; Klaipėda City Municipality was in the highest range, while Neringa Municipality was in the lowest range (Fig. 4.12.1.2.1).



4.12.1.2.1 Fig. Incidence (A00-T98) per 10,000 inhabitants in Lithuanian municipalities, 2019 [54]

Incidence in Lithuania and in the municipalities of Klaipėda and Neringa, with a comparison of indicator values to those of Lithuania, is presented in Table 4.12.1.2.1.

4.12.1.2.1 Table. Incidence in Lithuania and in the municipalities of Klaipėda and Neringa; comparison of indicator values with Lithuanian indicator values, 2019

| Indicator | Value | | |
|---|-----------|-----------------------|----------------------|
| | Lithuania | Klaipėda Municipality | Neringa Municipality |
| Incidence (A00-T98) per 10,000 population | 6,983.0 | 7,877.0 | 4,649.3 |
| Incidence of neoplasms (C00-D48) per 10,000 population | 408.9 | 494.2 | 326.4 |
| Incidence of blood diseases (D50-D89) per 10,000 population | 135.6 | 177.0 | 54.4 |
| Mental disorders (F00-F99) per 10,000 population | 382.3 | 483.5 | 226.2 |
| Incidence of diseases of the circulatory system (I00-I99) per 10,000 population | 873.3 | 1,080.6 | 718.6 |
| Incidence of Hypertensive Diseases (I10-I15) per 10,000 population | 291.2 | 404.0 | 246.2 |
| Incidence of chronic lower respiratory tract diseases (J40-J47) per 10,000 population | 131.3 | 142.2 | 91.6 |
| Prevalence of asthma (J45-J46) per 10,000 population | 48.2 | 50.5 | 45.8 |
| Values: | Better | Worse | Similar |

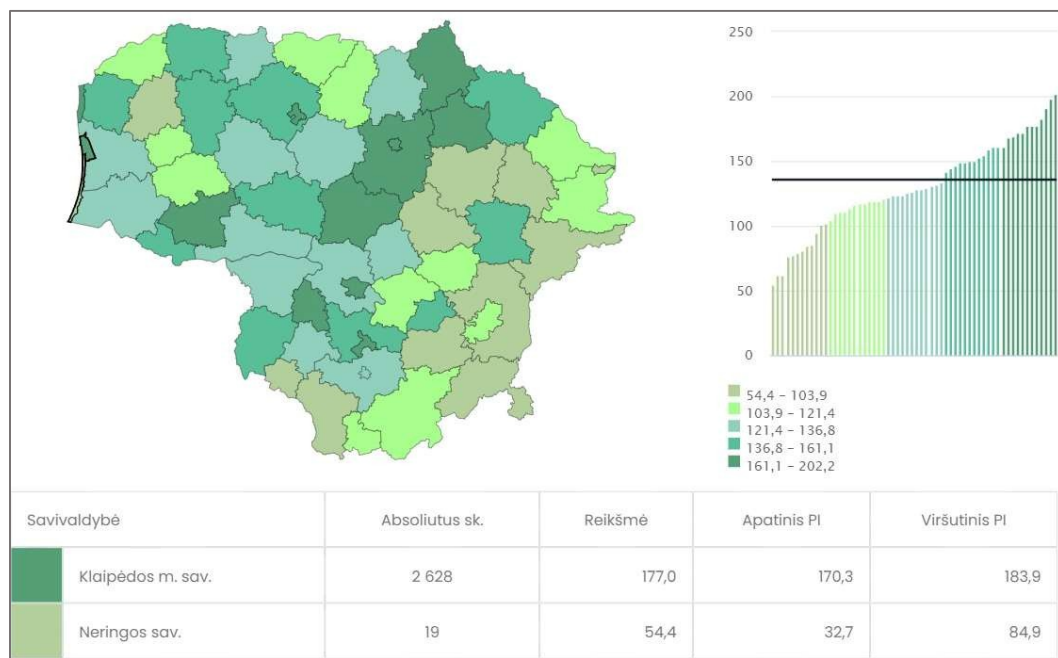
In 2019, the overall morbidity rate (A00-T98) per 10,000 population in the Klaipėda City Municipality was 7,877.0, and in the Neringa Municipality, it was 4,649.3. When comparing the value of the overall morbidity rate (A00-T98) per 10,000 inhabitants with the value for Klaipėda County (7,274.3), the value in Klaipėda City Municipality was worse (i.e., the morbidity rate was higher), in Neringa Municipality—it was better (i.e., the incidence was lower) (Fig. 4.12.1.2.2). When evaluating Klaipėda County, the highest overall incidence rate (A00-T98) per 10,000 population was in the Klaipėda City Municipality (7,877.0), and the lowest was in the Neringa Municipality (4,649.3) (Fig. 4.12.1.2.2). The value of the overall incidence rate (A00-T98) per 10,000 population in Lithuania was 6,983.0 and was

lower than the rate for Klaipėda County, but in some cases higher than the rates for individual municipalities (Fig. 4.12.1.2.2).

| Tendencija: ➔ Nekinta ⬆ Didėja ⬇ Mažėja | | | | | | | |
|--|---------------------------------------|-------------------|--------------------|----------|------------------------|--------------------------|--|
| Legend: ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas | | | | | | | |
| Savivaldybė | Tendencija | Kiekis \uparrow | Reikšmė \uparrow | Grafikas | Apatinis PI \uparrow | Viršutinis PI \uparrow | |
| Lietuva | ➔ | 1 951 166 | 6 983,0 | | 6 973,2 | 6 992,8 | |
| Klaipėdos apskritis | ⬆ | 231 936 | 7 274,3 | | 7 244,7 | 7 304,0 | |
| Klaipėdos m. sav. | ⬆ | 116 976 | 7 877,0 | | 7 831,9 | 7 922,2 | |
| Palangos m. sav. | ⬆ | 11 783 | 7 433,6 | | 7 300,0 | 7 569,1 | |
| Neringos sav. | ➔ | 1 624 | 4 649,3 | | 4 425,9 | 4 881,1 | |
| Klaipėdos r. sav. | ➔ | 35 129 | 5 925,7 | | 5 863,9 | 5 988,0 | |
| Kretingos r. sav. | ➔ | 27 662 | 7 376,5 | | 7 289,9 | 7 464,0 | |
| Skuodo r. sav. | ➔ | 10 104 | 6 203,0 | | 6 082,6 | 6 325,1 | |
| Šilutės r. sav. | ⬆ | 28 658 | 7 556,9 | | 7 469,6 | 7 644,9 | |

4.12.1.2.2 Fig. Overall incidence (A00-T98) per 10,000 population in Klaipėda County, 2019

At the national level, in 2019, the incidence of blood diseases (D50-D89) differed between Klaipėda City and Neringa Municipality; in one case, it was in the highest range, and in the other, in the lowest range (Fig. 4.12.1.2.3).



4.12.1.2.3 Fig. Incidence of blood diseases (D50-D89) per 10,000 population in Lithuanian municipalities, 2019 [54]

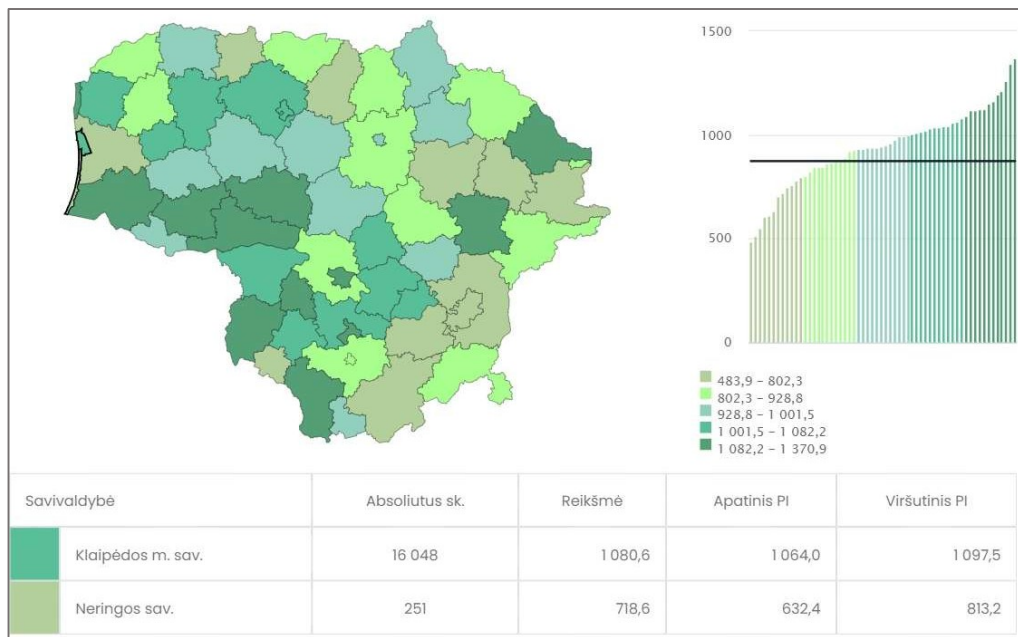
In the Klaipėda City Municipality in 2019, the incidence rate of blood diseases (D50-D89) per 10,000 population was 177.0, while in the Neringa Municipality it was 54.4. When comparing the incidence of blood diseases (D50-D89) per 10,000 inhabitants with the rate in Klaipėda County (152.4), the rate in the Klaipėda

Municipality was worse (i.e., higher incidence), while in Neringa Municipality it was better (i.e., lower incidence) (Fig. 4.12.1.2.4). When evaluating Klaipėda County, the highest indicator value was in the Klaipėda City Municipality (177.0), and the lowest was in the Neringa Municipality (54.4) (Fig. 4.12.1.2.4). The indicator value for Lithuania was 135.6 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.4).



4.12.1.2.4 Fig. Incidence of blood diseases (D50-D89) per 10,000 population, Klaipėda County, 2019 [54]

When assessed at the national level, in 2019, the incidence of circulatory system diseases (I00-I99) per 10,000 population in Klaipėda City and Neringa Municipality differed; in one case, it was in the upper-middle range, and in the other, in the lowest range (Fig. 4.12.1.2.5).



4.12.1.2.5 Fig. Incidence of diseases of the circulatory system (I00-I99) per 10,000 population in Lithuanian municipalities, 2019 [54]

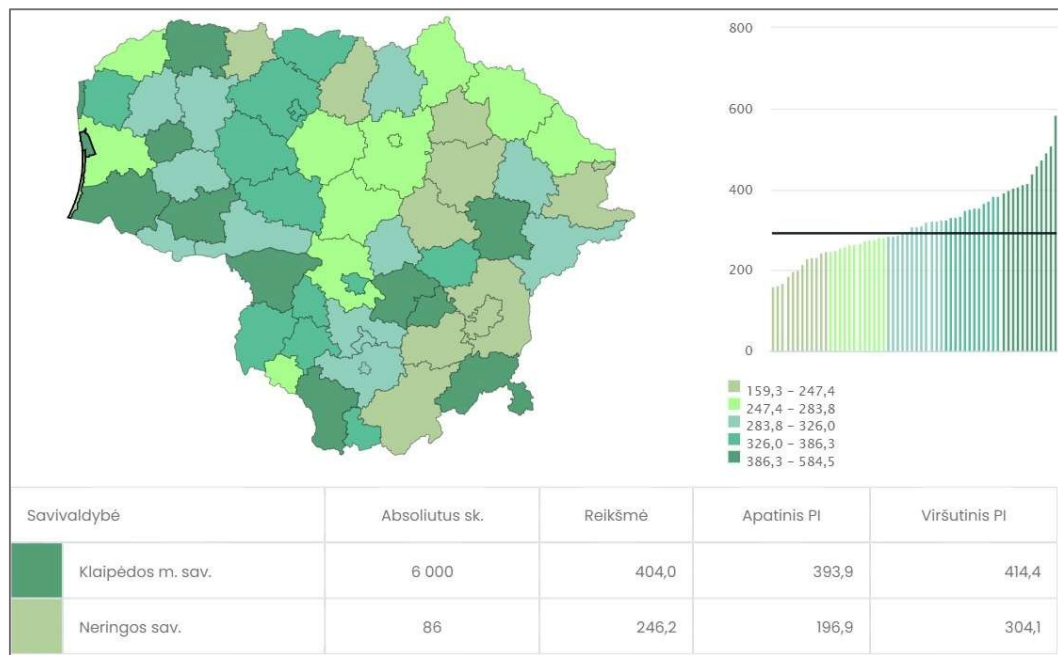
In the Klaipėda City Municipality in 2019, the incidence of circulatory system diseases (I00-I99) per 10,000 population was 1,080.6, while in the Neringa Municipality it was 718.6. When comparing the incidence rate of diseases of the circulatory system (I00-I99) per 10,000 inhabitants with the rate for Klaipėda County (1,018.3) – the indicator value in Klaipėda City Municipality was worse (i.e., higher incidence), while in Neringa Municipality it was better (i.e., lower incidence) (Fig. 4.12.1.2.6). When evaluating Klaipėda County, the highest indicator value was in Palanga City Municipality (1,370.9), and the lowest was in Neringa Municipality (718.6) (Fig. 4.12.1.2.6). The indicator value for Lithuania was 873.3 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.6).

Tendencija: ➔ Nekinta ⬆ Dideja ⬇ Mažėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas

| Savivaldybė | Tendencija | Kiekis ↑↓ | Reikšmė ↑↓ | Grafikas | Apatinis PI ↑↓ | Viršutinis PI ↑↓ |
|---------------------|------------|--|---|----------|---|---|
| Lietuva | ⬆ | 244 007 | 873,3 | | 869,8 | 876,7 |
| Klaipėdos apskritis | ⬆ | 32 467 | 1 018,3 | | 1 007,2 | 1 029,4 |
| Klaipėdos m. sav. | ⬆ | 16 048 | 1 080,6 | | 1 064,0 | 1 097,5 |
| Palangos m. sav. | ⬆ | 2 173 | 1 370,9 | | 1 313,9 | 1 429,8 |
| Neringos sav. | ⬆ | 251 | 718,6 | | 632,4 | 813,2 |
| Klaipėdos r. sav. | ➔ | 4 485 | 756,6 | | 734,6 | 779,0 |
| Kretingos r. sav. | ➔ | 3 770 | 1 005,3 | | 973,5 | 1 037,9 |
| Skuodo r. sav. | ⬆ | 1 342 | 823,9 | | 780,4 | 869,2 |
| Šilutės r. sav. | ⬆ | 4 398 | 1 159,7 | | 1 125,7 | 1 194,5 |

4.12.1.2.6 Fig. Incidence of diseases of the circulatory system (I00–I99) per 10,000 inhabitants in Klaipėda County, 2019 [54]

When assessed at the national level, the incidence of hypertensive diseases (I10-I15) per 10,000 inhabitants in the municipalities of Klaipėda and Neringa in 2019 It varied, with one municipality in the highest range and the other in the lowest range (Fig. 4.12.1.2.7).



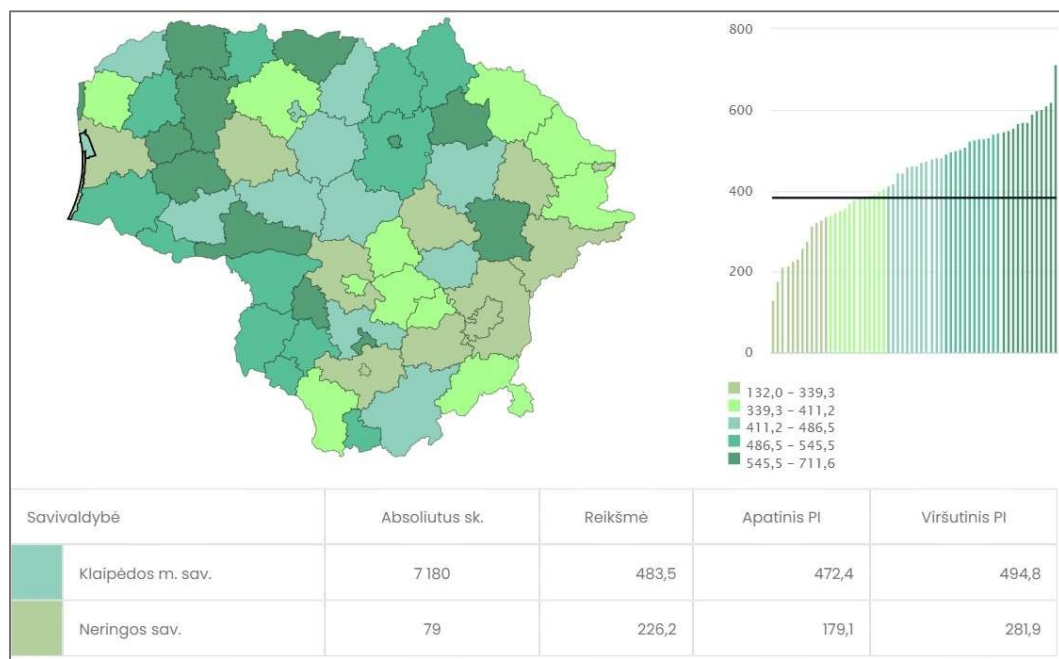
4.12.1.2.7 Fig. Incidence of hypertensive diseases (I10-I15) per 10,000 population in Lithuanian municipalities, 2019 [54]

In the Klaipėda City Municipality in 2019, the incidence of hypertensive diseases (I10-I15) per 10,000 population was 404.0, while in the Neringa Municipality it was 246.2. When comparing the incidence of hypertensive diseases (I10-I15) per 10,000 inhabitants with the incidence rate in Klaipėda County (373.2) – the indicator value in Klaipėda City Municipality was worse (i.e., higher incidence), while in Neringa Municipality it was better (i.e., lower incidence) (Fig. 4.12.1.2.8). When evaluating Klaipėda County, the highest indicator value was in Palanga City Municipality (508.5), and the lowest was in Neringa Municipality (246.2) (Fig. 4.12.1.2.8). The indicator value for Lithuania was 291.2 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.8).



4.12.1.2.8 Fig. Prevalence of hypertensive diseases (I10-I15) per 10,000 population in Klaipėda County, 2019 [54]

When assessed at the national level, in 2019 the incidence of mental disorders (F00-F99) per 10,000 population in Klaipėda City and Neringa Municipality varied; in one case, it fell within the middle range, and in another, within the lowest range (Fig. 4.12.1.2.9).



4.12.1.2.9 Fig. Incidence of mental disorders (F00-F99) per 10,000 population in Lithuanian municipalities, 2019 [54]

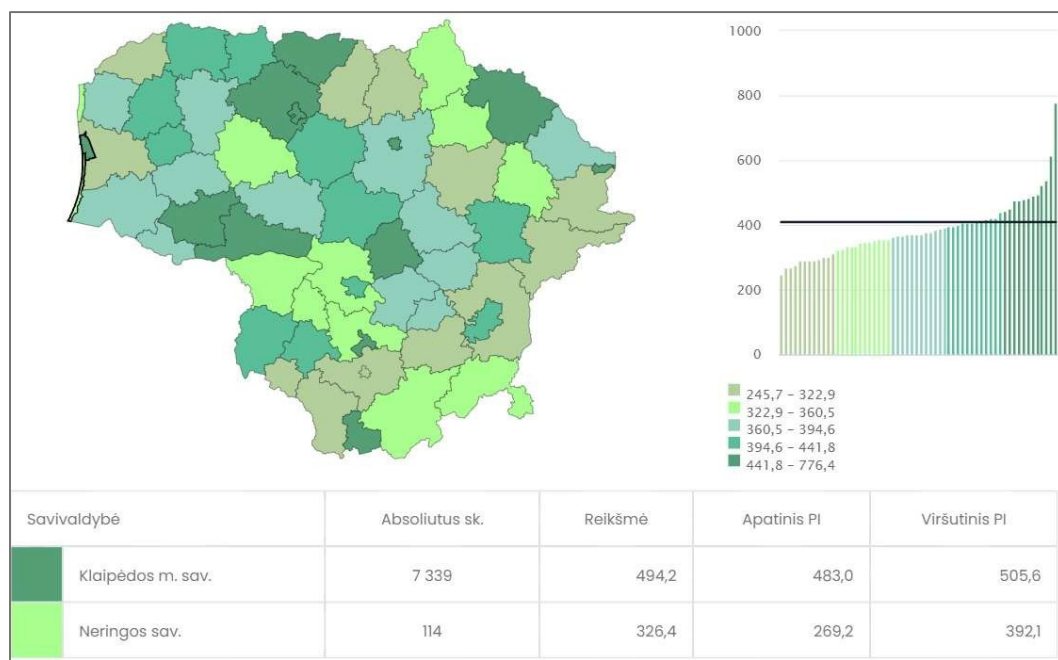
In the Klaipėda City Municipality in 2019, the incidence of mental disorders (F00-F99) per 10,000 population was 483.5, while in the Neringa Municipality it was 226.2. When comparing the incidence of mental disorders (F00-F99) per 10,000 inhabitants in the Neringa Municipality with that of the Klaipėda County (455.4), the rate in the Klaipėda City Municipality was worse (i.e., higher incidence), in Neringa Municipality—it was better (i.e., the incidence was lower) (Fig. 4.12.1.2.10). When evaluating Klaipėda County, the highest indicator value was in the Palanga City Municipality (711.6), and the lowest was in the Neringa Municipality (226.2) (Fig. 4.12.1.2.10). The indicator value for Lithuania was 382.3 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.10).

Tendencija: ➔ Nekinta ⬆ Dideja ⬇ Mažėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas

| Savivaldybė | Tendencija | Kiekis ¹ | Reikšmė ¹ | Grafikas | Apatinis PI ¹ | Viršutinis PI ¹ |
|---------------------|------------|---------------------|----------------------|----------|--------------------------|----------------------------|
| Lietuva | ⬆ | 106 823 | 382,3 | | 380,0 | 384,6 |
| Klaipėdos apskritis | ⬆ | 14 521 | 455,4 | | 448,1 | 462,9 |
| Klaipėdos m. sav. | ⬆ | 7 180 | 483,5 | | 472,4 | 494,8 |
| Palangos m. sav. | ⬆ | 1 128 | 711,6 | | 670,7 | 754,4 |
| Neringos sav. | ⬆ | 79 | 226,2 | | 179,1 | 281,9 |
| Klaipėdos r. sav. | ➔ | 1 856 | 313,1 | | 299,0 | 327,7 |
| Kretingos r. sav. | ➔ | 1 443 | 384,8 | | 365,2 | 405,2 |
| Skuodo r. sav. | ⬆ | 788 | 483,8 | | 450,6 | 518,8 |
| Šilutės r. sav. | ⬆ | 2 047 | 539,8 | | 516,6 | 563,7 |

4.12.1.2.10 Fig. Incidence of mental disorders (F00-F99) per 10,000 population in Klaipėda County, 2019 [54]

When assessed at the national level, in 2019, the incidence of neoplasms (C00-D48) per 10,000 population in Klaipėda City and Neringa Municipality differed; in one case, it was in the highest interval, and in the other, in the lower non-middle interval (Fig. 4.12.1.2.11).



4.12.1.2.11 Fig. Incidence of neoplasms (C00-D48) per 10,000 population in Lithuanian municipalities, 2019 [54]

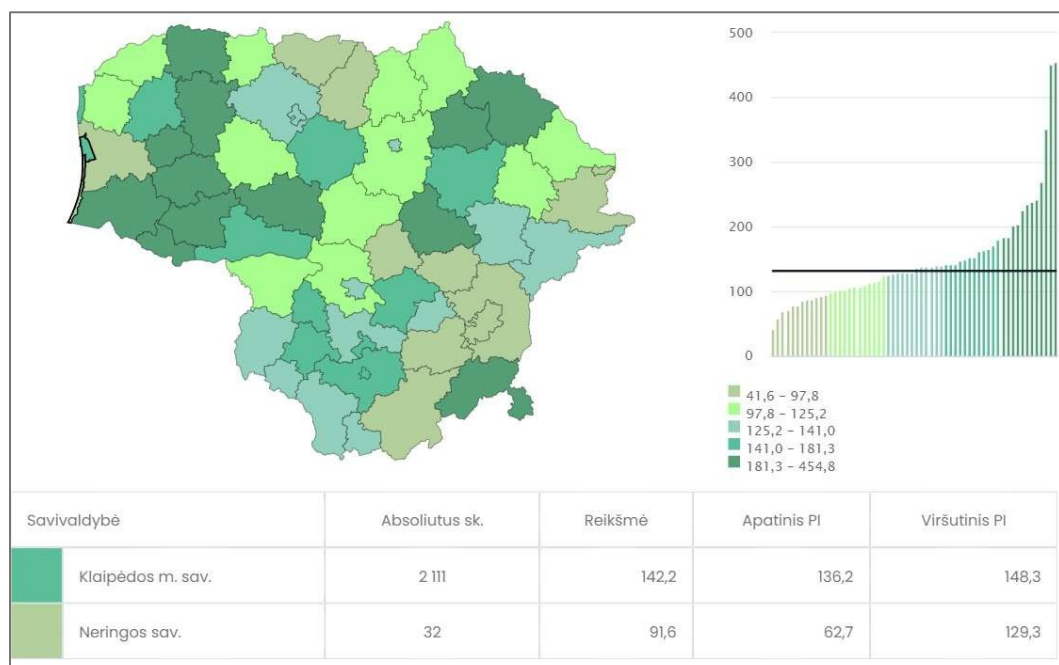
In the Klaipėda City Municipality in 2019, the incidence of neoplasms (C00-D48) per 10,000 population was 494.2, while in the Neringa Municipality it was 326.4. When comparing the incidence of neoplasms (C00-D48) per 10,000 inhabitants in the Klaipėda City Municipality with the corresponding figure for Klaipėda County (405.2), the incidence rate in the Klaipėda City Municipality was higher (i.e., the incidence was greater), in Neringa

Municipality – it was better (i.e., the incidence was lower) (Fig. 4.12.1.2.12). When evaluating Klaipėda County, the highest indicator value was in the Klaipėda City Municipality (494.2), and the lowest was in the Klaipėda District Municipality (276.0) (Fig. 4.12.1.2.12). The indicator value for Lithuania was 408.9 and was similar to that of the Klaipėda County, but in some cases higher than the values for individual municipalities (Fig. 4.12.1.2.12).



4.12.1.2.12 Fig. Incidence of neoplasms (C00-D48) per 10,000 population in Klaipėda County, 2019 [54]

When assessed at the national level, in 2019, the incidence of chronic lower respiratory tract diseases (J40-J47) per 10,000 population in Klaipėda City and Neringa Municipality differed; in one case, it was in the upper range, and in the other, in the lower range (Fig. 4.12.1.2.13).



4.12.1.2.13 Fig. Incidence of chronic lower respiratory tract diseases (J40-J47) per 10,000 inhabitants in Lithuanian municipalities, 2019 [54]

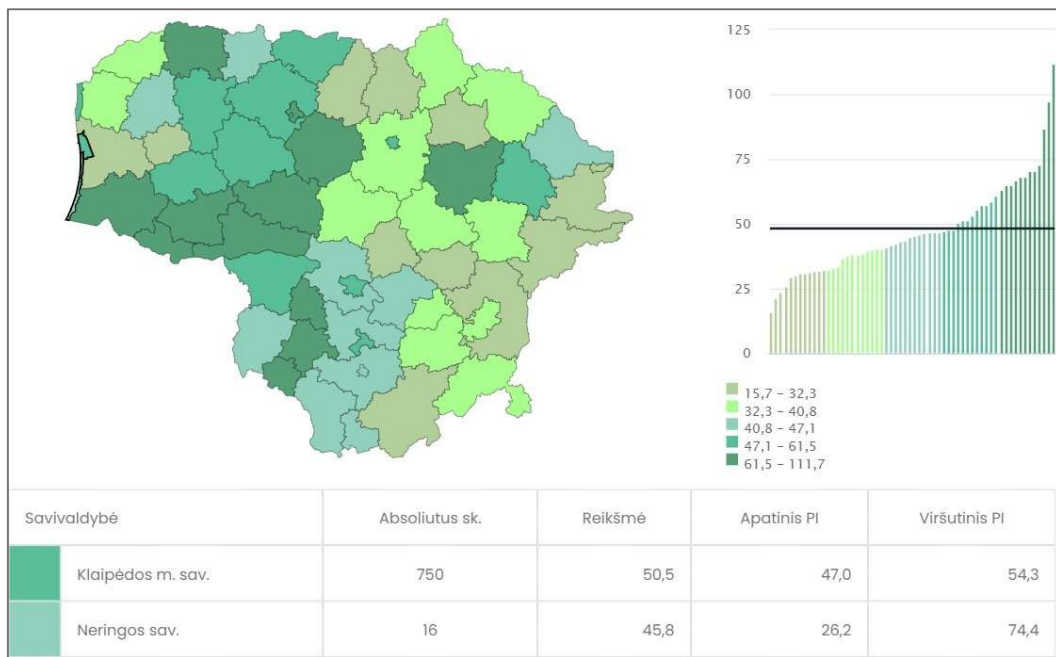
In the Klaipėda City Municipality in 2019, the incidence of chronic lower respiratory tract diseases (J40-J47) per 10,000 inhabitants was 142.2, while in the Neringa Municipality it was 91.6. When comparing the incidence of chronic lower respiratory tract diseases respiratory tract diseases (J40-J47) per 10,000 inhabitants with the indicator value for Klaipėda County (135.9)—the indicator value in the Klaipėda City Municipality was worse (i.e., the incidence was higher), in Neringa Municipality – better (i.e., lower incidence) (Fig. 4.12.1.2.14). When evaluating Klaipėda County, the highest indicator value was in Šilutė District Municipality (241.3), and the lowest was in Klaipėda District Municipality (85.0) (Fig. 4.12.1.2.14). The indicator value for Lithuania was 131.3 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.14).

Tendencija: ➡ Nekinta ⬆ Dideja ⬇ Možėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas

| Savivaldybė | Tendencija | Kiekis ↑↓ | Reikšmė ↑↓ | Grafikas | Apatinis PI ↑↓ | Viršutinis PI ↑↓ |
|---------------------|------------|--|---|----------|---|---|
| Lietuva | ⬆ | 36 678 | 131,3 | | 129,9 | 132,6 |
| Klaipėdos apskritis | ➡ | 4 333 | 135,9 | | 131,9 | 140,0 |
| Klaipėdos m. sav. | ⬆ | 2 111 | 142,2 | | 136,2 | 148,3 |
| Palangos m. sav. | ⬆ | 225 | 141,9 | | 124,0 | 161,8 |
| Neringos sav. | ⬆ | 32 | 91,6 | | 62,7 | 129,3 |
| Klaipėdos r. sav. | ➡ | 504 | 85,0 | | 77,8 | 92,8 |
| Kretingos r. sav. | ➡ | 370 | 98,7 | | 88,9 | 109,3 |
| Skuodo r. sav. | ⬆ | 176 | 108,0 | | 92,7 | 125,2 |
| Šilutės r. sav. | ⬇ | 915 | 241,3 | | 225,9 | 257,4 |

4.12.1.2.14 Fig. Incidence of chronic lower respiratory tract diseases (J40-J47) per 10,000 population. Klaipėda County, 2019 [54]

When assessed at the national level, the incidence of asthma (J45-J46) per 10,000 population in Klaipėda City and Neringa Municipality in 2019 differed; in one case, it was in the higher-than-average range, and in the other, in the average range (Fig. 4.12.1.2.15).



4.12.1.2.15 Fig. Prevalence of asthma (J45-J46) per 10,000 population in Lithuanian municipalities, 2019 [54]

In the Klaipėda City Municipality in 2019, the incidence of asthma (J45-J46) per 10,000 population was 50.5, while in the Neringa Municipality it was 45.8. When comparing the incidence of asthma (J45-J46) per 10,000 inhabitants in the Klaipėda City Municipality with the corresponding figure for Klaipėda County (46.3), the incidence rate in the Klaipėda City Municipality was higher (i.e., the incidence was greater), in Neringa Municipality – similar (Fig. 4.12.1.2.16). When evaluating Klaipėda County, the highest indicator value was in Šilutė District Municipality (70.4), and the lowest was in Klaipėda District Municipality (31.7) (Fig. 4.12.1.2.16). The value of the indicator for Lithuania was 48.2 and was higher than that of the Klaipėda County, but in some cases lower than the values of individual municipalities (Fig. 4.12.1.2.16).



4.12.1.2.16 Fig. Incidence of asthma (J45-J46) per 10,000 inhabitants in Klaipėda County, 2019 [54]

Analysis of at-risk population groups

The most vulnerable population groups: children, pregnant women, the sick, and the elderly. Members of these groups are particularly sensitive to increased pollution, noise, and other indicators of environmental and lifestyle changes.

In 2021, children (ages 0–17) accounted for 19.2% of the population of Klaipėda City Municipality, while people aged 65 and older accounted for 20.5% of the total population of Klaipėda City Municipality. In 2021, the proportion of residents aged 0–17 in the Klaipėda City Municipality was higher than in Lithuania, where it stood at 17.6%. In 2021, the proportion of residents aged 65 and older in Klaipėda City Municipality was higher than in Lithuania, which stood at 20.0%.

In 2021, children (ages 0–17) accounted for 12.6% of the total population of Neringa Municipality, while people aged 65 and older accounted for 16.8%. In 2021, the proportion of residents aged 0–17 in Neringa Municipality was lower than in Lithuania, where it stood at 17.6%. In 2021, the proportion of residents aged 65 and older in Neringa Municipality was also lower than in Lithuania, which stood at 20.0%.

Morbidity (in the 0–17 age group) in Lithuania, Klaipėda City, and Neringa Municipality, with a comparison of indicator values to those of Lithuania, is presented in Table 4.12.1.2.2.

4.12.1.2.2 Table. Incidence (in the 0–17 age group) in Lithuania and in the municipalities of Klaipėda and Neringa; comparison of indicator values with Lithuanian indicator values, 2019

| Indicator | Value | | | |
|--|-----------|-----------------------|----------------------|---------|
| | Lithuania | Klaipėda Municipality | Neringa Municipality | |
| Incidence (A00-T98) per 10,000 population | 8,953.1 | 9,669.9 | 3,424.7 | |
| Incidence of neoplasms (C00-D48) per 10,000 population | 133.5 | 118.2 | 17.1 | |
| Incidence of blood diseases (D50-D89) per 10,000 population | 163.4 | 164.5 | 17.1 | |
| Mental disorders (F00-F99) per 10,000 population | 462.4 | 589.1 | 68.5 | |
| Diseases of the circulatory system (I00-I99) per 10,000 population | 185.1 | 400.5 | 119.9 | |
| Incidence of Hypertensive Diseases (I10-I15) per 10,000 population | 20.6 | 38.2 | 34.2 | |
| Prevalence of chronic lower respiratory tract diseases (J40-J47) per 10,000 population | | 116.4 | 85.6 | |
| Prevalence of asthma (J45-J46) per 10,000 population | | 109.3 | 85.6 | |
| Values: | | Better | Worse | Similar |

In the Klaipėda City Municipality, for the 0–17 age group, the 2019 overall morbidity rate (A00–T98) per 10,000 population was 9,669.9, while in the Neringa Municipality it was 3,424.7. When comparing the overall incidence rate (A00–T98) per 10,000 population in Klaipėda City Municipality with that of Klaipėda County (9,054.9), the rate in Klaipėda City Municipality was worse (i.e., higher incidence), in Neringa Municipality—it was better (i.e., the incidence was lower) (Fig. 4.12.1.2.17). When evaluating Klaipėda County, the highest overall incidence rate (A00–T98) per 10,000 population was in the Klaipėda City Municipality (9,669.9), and the lowest was in the Neringa Municipality (3,424.7) (Fig. 4.12.1.2.17). The value of the overall incidence rate (A00–T98) per 10,000 population was 8,953.1 and was lower than the rate for Klaipėda County, but in some cases higher than the rates for individual municipalities (Fig. 4.12.1.2.17).



4.12.1.2.17 Fig. Overall incidence (A00-T98) per 10,000 population in the 0–17 age group, Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 0–17 age group, the incidence rate of blood diseases (D50–D89) per 10,000 population in 2019 was 164.5, while in the Neringa Municipality it was 17.1. When comparing the incidence of blood diseases (D50–D89) per 10,000 population in Klaipėda City Municipality with that of Klaipėda County (163.1), the rate in Klaipėda City Municipality was similar, in Neringa Municipality – better (i.e., lower incidence) (Fig. 4.12.1.2.18). When evaluating Klaipėda County, the highest indicator value was in Klaipėda District Municipality (188.4), and the lowest was in Neringa Municipality (17.1) (Fig. 4.12.1.2.18). The indicator value for Lithuania was 163.4 and was similar to that of the Klaipėda County, in some cases lower or higher than the values of individual municipalities (Fig. 4.12.1.2.18).



4.12.1.2.18 Fig. Incidence of blood diseases (D50–D89) per 10,000 population in the 0–17 age group, Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 0–17 age group, the incidence of mental disorders (F00–F99) per 10,000 population in 2019 was 589.1, while in the Neringa Municipality it was 68.5. When comparing the incidence of mental disorders (F00–F99) per 10,000 population in Neringa Municipality with that of Klaipėda County (497.9), the rate in Klaipėda City Municipality was higher (i.e., incidence was higher), in Neringa Municipality—it was better (i.e., the incidence was lower) (Fig. 4.12.1.2.19). When evaluating Klaipėda County, the highest indicator value was in the Klaipėda City Municipality (589.1), and the lowest was in the Neringa Municipality (68.5) (Fig. 4.12.1.2.19). The indicator value for Lithuania was 462.4 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.19).



4.12.1.2.19 Fig. Incidence of mental disorders (F00-F99) per 10,000 population aged 0–17 in Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 0–17 age group, the incidence of diseases of the circulatory system (I00–I99) per 10,000 population in 2019 was 400.5, while in the Neringa Municipality it was 119.9. When comparing the incidence of diseases of the circulatory system (I00–I99) per 10,000 population with that of Klaipėda County (333.1)—the indicator value in Klaipėda City Municipality was worse (i.e., higher incidence), in Neringa Municipality – better (i.e., lower incidence) (Fig. 4.12.1.2.20). When evaluating Klaipėda County, the highest indicator value was in the Klaipėda City Municipality (400.5), and the lowest was in the Neringa Municipality (119.9) (Fig. 4.12.1.2.20). The indicator value for Lithuania was 185.1 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.20).



4.12.1.2.20 Fig. Incidence of diseases of the circulatory system (I00-I99) per 10,000 population aged 0–17 in Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 0–17 age group, the incidence of hypertensive diseases (I10-I15) per 10,000 population in 2019 was 38.2; in the Neringa Municipality, it was 34.2. When comparing the incidence of hypertensive diseases (I10-I15) per 10,000 population with the rate in Klaipėda County (39.7) – the indicator value in Klaipėda City Municipality was similar, while in Neringa Municipality it was better (i.e., the incidence was lower) (Fig. 4.12.1.2.21). When evaluating Klaipėda County, the highest indicator value was in Klaipėda District Municipality (48.8), and the lowest was in Skuodas District Municipality (18.0) (Fig. 4.12.1.2.21). The indicator value for Lithuania was 20.6 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.21).



4.12.1.2.21 Fig. Incidence of hypertensive diseases (I10-I15) per 10,000 population aged 0–17 in Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 0–17 age group, the incidence of neoplasms (C00–D48) per 10,000 population in 2019 was 118.2, while in the Neringa Municipality it was 17.1. When comparing the incidence of neoplasms (C00–D48) per 10,000 population in the Klaipėda City Municipality with the corresponding figure for Klaipėda County (101.1), the indicator value in the Klaipėda City Municipality was worse (i.e., incidence was higher), in Neringa Municipality – better (i.e., lower incidence) (Fig. 4.12.1.2.22). When evaluating Klaipėda County, the highest indicator value was in the Klaipėda City Municipality (118.2), and the lowest was in the Neringa Municipality (17.1) (Fig. 4.12.1.2.22). The indicator value for Lithuania was 133.5 and was higher than the indicator value for Klaipėda County and the indicator values for individual municipalities (Fig. 4.12.1.2.22).



4.12.1.2.22 Fig. Incidence of neoplasms (C00–D48) per 10,000 population in the 0–17 age group, Klaipėda County, 2019 [54]

In Klaipėda City Municipality, in the 0–17 age group, the incidence of chronic lower respiratory tract diseases (J40–J47) per 10,000 population in 2019 (J40–J47) per 10,000 population. The indicator value was 116.4, while in Neringa Municipality it was 85.6. When comparing the incidence of chronic lower respiratory tract diseases (J40–J47) per 10,000 population with the indicator value for Klaipėda County (124.1), the indicator value in the Klaipėda City Municipality was similar, in Neringa Municipality – better (i.e., lower incidence) (Fig. 4.12.1.2.23). When evaluating Klaipėda County, the highest indicator value was in Šilutė District Municipality (2,554.0), and the lowest was in Kretinga District Municipality (71.2) (Fig. 4.12.1.2.23). The indicator value for Lithuania was 123.6 and was similar to that of the Klaipėda County, but in some cases higher than the values for individual municipalities (Fig. 4.12.1.2.23).

| Tendencija: ➔ Nekinta ⬆️ Didėja ⬇️ Mažėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas | | | | | | | |
|--|------------|--------|---------|----------|-------------|---------------|--|
| Savivaldybė | Tendencija | Kiekis | Reikšmė | Grafikas | Apatinis PI | Viršutinis PI | |
| Lietuva | ➔ | 6 170 | 123,6 | | 120,5 | 126,7 | |
| Klaipėdos apskritis | ⬆️ | 746 | 124,1 | | 115,3 | 133,3 | |
| Klaipėdos m. sav. | ⬆️ | 329 | 116,4 | | 104,2 | 129,7 | |
| Palangos m. sav. | ⬆️ | 29 | 111,5 | | 74,7 | 160,2 | |
| Neringos sav. | ⬆️ | 5 | 85,6 | | 27,6 | 199,8 | |
| Klaipėdos r. sav. | ⬆️ | 114 | 97,6 | | 80,5 | 117,3 | |
| Kretingos r. sav. | ⬇️ | 50 | 71,2 | | 52,9 | 93,9 | |
| Skuodo r. sav. | ⬆️ | 36 | 129,7 | | 90,8 | 179,6 | |
| Šilutės r. sav. | ⬇️ | 183 | 254,0 | | 218,6 | 293,6 | |

4.12.1.2.23 Fig. Prevalence of chronic lower respiratory tract diseases (J40-J47) per 10,000 population in the 0-17 in Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 0–17 age group, the incidence of asthma (J45–J46) per 10,000 population in 2019 was 109.3, while in the Neringa Municipality it was 85.6. When comparing the incidence of asthma (J45–J46) per 10,000 population in Klaipėda City Municipality with that of Klaipėda County (113.9), the rate in Klaipėda City Municipality was similar, and in Neringa Municipality, it was better (i.e., the incidence was lower) (Fig. 4.12.1.2.24). When evaluating Klaipėda County, the highest indicator value was in Šilutė District Municipality (217.9), and the lowest was in Kretinga District Municipality (68.4) (Fig. 4.12.1.2.24). The indicator value for Lithuania was 115.3 and was similar to that of the Klaipėda County, but in some cases higher than the values for individual municipalities (Fig. 4.12.1.2.24).

| Tendencija: ➔ Nekinta ⬆️ Didėja ⬇️ Mažėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas | | | | | | | |
|--|------------|--------|---------|----------|-------------|---------------|--|
| Savivaldybė | Tendencija | Kiekis | Reikšmė | Grafikas | Apatinis PI | Viršutinis PI | |
| Lietuva | ➔ | 5 758 | 115,3 | | 112,4 | 118,4 | |
| Klaipėdos apskritis | ⬆️ | 685 | 113,9 | | 105,5 | 122,8 | |
| Klaipėdos m. sav. | ⬆️ | 309 | 109,3 | | 97,5 | 122,2 | |
| Palangos m. sav. | ⬆️ | 26 | 100,0 | | 65,3 | 146,5 | |
| Neringos sav. | ⬆️ | 5 | 85,6 | | 27,6 | 199,8 | |
| Klaipėdos r. sav. | ⬆️ | 109 | 93,3 | | 76,6 | 112,6 | |
| Kretingos r. sav. | ⬇️ | 48 | 68,4 | | 50,4 | 90,6 | |
| Skuodo r. sav. | ⬆️ | 31 | 111,7 | | 75,9 | 158,6 | |
| Šilutės r. sav. | ⬆️ | 157 | 217,9 | | 185,2 | 254,8 | |

4.12.1.2.24 Fig. Incidence of asthma (J45-J46) per 10,000 population in the 0–17 age group, Klaipėda County, 2019 [54]

Incidence (in the 65+ age group) in Lithuania and in the municipalities of Klaipėda and Neringa; a comparison of indicator values with Lithuanian indicator values is presented in Table 4.12.1.2.3.

4.12.1.2.3 Table. Incidence (in the 65+ age group) in Lithuania and in the municipalities of Klaipėda and Neringa; a comparison of indicator values with those for Lithuania, 2019

| Indicator | Value | | | |
|--|---|--|---|---|
| | Lithuania | Klaipėda Municipality | Neringa Municipality | |
| Incidence (A00-T98) per 10,000 population | 7,269.9 | 8,308.2 | 7,473.5 | |
| Incidence of neoplasms (C00-D48) per 10,000 population | 632.5 | 843.0 | 849.3 | |
| Incidence of blood diseases (D50-D89) per 10,000 population | 193.3 | 247.5 | 127.4 | |
| Mental disorders (F00-F99) per 10,000 population | 637.0 | 762.3 | 636.9 | |
| Incidence of diseases of the circulatory system (I00-I99) per 10,000 population | 2,103.3 | 2,546.1 | 2,653.9 | |
| Incidence of Hypertensive Diseases (I10-I15) per 10,000 population | 520.1 | 755.1 | 700.6 | |
| Prevalence of chronic lower respiratory tract diseases (J40-J47) per 10,000 population | 230.6 | 263.6 | 339.7 | |
| Incidence of asthma (J45-J46) per 10,000 population | 43.8 | 43.1 | 127.4 | |
| Values: | | Better | Worse | Similar |

In the Klaipėda City Municipality, in the 65+ age group, the value of the general morbidity (A00-T98) per 10,000 was 8,308.2, while in Neringa Municipality it was 7,473.5. When comparing the value of the overall morbidity rate (A00-T98) per 10,000 population with the value of the Klaipėda County indicator (7,715.1), the value in Klaipėda City Municipality was worse (i.e., higher morbidity), in Neringa Municipality—it was better (i.e., the incidence was lower) (Fig. 4.12.1.2.25). When evaluating Klaipėda County, the highest overall incidence rate (A00-T98) per 10,000 population was in the Klaipėda City Municipality (8,308.2), and the lowest was in the Klaipėda District Municipality (6,468.9) (Fig. 4.12.1.2.25). The value of the overall incidence rate (A00-T98) per 10,000 population. The indicator value was 7,269.9 and was lower than the value for Klaipėda County, but in some cases higher than the indicators for individual municipalities (Fig. 4.12.1.2.25).



4.12.1.2.25 Fig. Overall incidence (A00-T98) per 10,000 population in the 65+ age group, Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 65+ age group, the incidence rate of blood diseases (D50-D89) per 10,000 population in 2019 was 247.5, while in the Neringa Municipality it was 127.4. When comparing the incidence of blood diseases (D50-D89) per 10,000 population in Klaipėda City Municipality with that of Klaipėda County (212.6), the indicator value in Klaipėda City Municipality was worse (i.e., incidence was higher), in Neringa Municipality—it was better (i.e., the incidence was lower) (Fig. 4.12.1.2.26). When evaluating Klaipėda County, the highest indicator value was in the municipalities of Klaipėda City and Palanga City (247.5), and the lowest was in the municipality of Skuodas District (94.0) (Fig. 4.12.1.2.26). The indicator value for Lithuania was 193.3 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.26).



4.12.1.2.26 Fig. Incidence of blood diseases (D50-D89) per 10,000 people aged 65 and older, Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 65+ age group, the incidence of mental disorders (F00-F99) per 10,000 population in 2019 was 762.3, while in the Neringa Municipality it was 636.9. When comparing the incidence of mental disorders (F00-F99) per 10,000 population with the rate for Klaipėda County (763.9) – the indicator value in Klaipėda City Municipality was similar, while in Neringa Municipality it was better (i.e., the incidence was lower) (Fig. 4.12.1.2.27). When evaluating Klaipėda County, the highest indicator value was in Palanga City Municipality (1,227.0), and the lowest was in Klaipėda District Municipality (540.5) (Fig. 4.12.1.2.27). The indicator value for Lithuania was 637.0 and was lower than that of the Klaipėda County, but in some cases higher than the indicator values of individual municipalities (Fig. 4.12.1.2.27).

Tendencija: ➔ Nekinta ⬆️ Dideja ⬇️ Mažėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas

| Savivaldybė | Tendencija | Kiekis [↑] | Reikšmė [↑] | Grafikas | Apatinis PI [↑] | Viršutinis PI [↑] |
|---------------------|------------|---------------------|----------------------|----------|--------------------------|----------------------------|
| Lietuva | ⬆️ | 35 300 | 637,0 | | 630,3 | 643,6 |
| Klaipėdos apskritis | ⬆️ | 4 692 | 763,9 | | 742,2 | 786,0 |
| Klaipėdos m. sav. | ⬆️ | 2 230 | 762,3 | | 731,0 | 794,6 |
| Palangos m. sav. | ⬆️ | 466 | 1 227,0 | | 1 118,1 | 1 343,6 |
| Neringos sav. | ⬆️ | 30 | 636,9 | | 429,7 | 909,3 |
| Klaipėdos r. sav. | ⬆️ | 482 | 540,5 | | 493,3 | 591,0 |
| Kretingos r. sav. | ⬆️ | 438 | 586,8 | | 533,1 | 644,4 |
| Skuodo r. sav. | ⬆️ | 318 | 808,1 | | 721,7 | 902,0 |
| Šilutės r. sav. | ⬆️ | 728 | 959,7 | | 891,2 | 1 032,0 |

4.12.1.2.27 Fig. Incidence of mental disorders (F00-F99) per 10,000 people aged 65 and older, Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 65+ age group, the incidence of diseases of the circulatory system (I00-I99) per 10,000 population in 2019 was 2,546.1; in the Neringa Municipality, it was 2,653.9. When comparing the incidence of diseases of the circulatory system (I00-I99) per 10,000 population with that of Klaipėda County (2,428.5), the indicator was worse (i.e., the incidence was higher) in Klaipėda City and Neringa Municipality (Fig. 4.12.1.2.28). When evaluating Klaipėda County, the highest indicator value was in the municipality of Palanga (3,104.3), and the lowest was in the municipality of Skuodas (1,692.5) (Fig. 4.12.1.2.28). The indicator value for Lithuania was 2,103.3 and was lower than that of the Klaipėda County, but in some cases higher than the indicator values of individual municipalities (Fig. 4.12.1.2.28).

Tendencija: ➔ Nekinta ⬆️ Dideja ⬇️ Mažėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas

| Savivaldybė | Tendencija | Kiekis [↑] | Reikšmė [↑] | Grafikas | Apatinis PI [↑] | Viršutinis PI [↑] |
|---------------------|------------|---------------------|----------------------|----------|--------------------------|----------------------------|
| Lietuva | ⬆️ | 116 562 | 2 103,3 | | 2 091,2 | 2 115,4 |
| Klaipėdos apskritis | ⬆️ | 14 917 | 2 428,5 | | 2 389,7 | 2 467,8 |
| Klaipėdos m. sav. | ⬆️ | 7 448 | 2 546,1 | | 2 488,6 | 2 604,6 |
| Palangos m. sav. | ⬆️ | 1 179 | 3 104,3 | | 2 929,6 | 3 286,7 |
| Neringos sav. | ⬆️ | 125 | 2 653,9 | | 2 209,1 | 3 162,1 |
| Klaipėdos r. sav. | ⬆️ | 1 797 | 2 015,0 | | 1 922,9 | 2 110,4 |
| Kretingos r. sav. | ➔ | 1 727 | 2 313,8 | | 2 205,9 | 2 425,5 |
| Skuodo r. sav. | ⬆️ | 666 | 1 692,5 | | 1 566,4 | 1 826,1 |
| Šilutės r. sav. | ⬆️ | 1 975 | 2 603,5 | | 2 489,9 | 2 720,9 |

4.12.1.2.28 Fig. Incidence of diseases of the circulatory system (I00-I99) per 10,000 people aged 65+ in Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 65+ age group, the incidence of hypertensive diseases (I10-I15) per 10,000 population in 2019 was 755.1, while in the Neringa Municipality it was 700.6. When comparing the incidence of hypertensive diseases (I10-I15) per 10,000 population with the rate for Klaipėda County (682.9) – the indicator value in Klaipėda City Municipality was worse (i.e., the incidence was higher), while in Neringa Municipality it was similar (Fig. 4.12.1.2.29). When evaluating Klaipėda County, the highest indicator value was in Palanga City Municipality (911.0), and the lowest was in Skuodas District Municipality (493.0) (Fig. 4.12.1.2.29). The indicator value for Lithuania was 520.1 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.29).

Tendencija: ➡ Nekinta ⬆ Dideja ⬇ Možėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas

| Savivaldybė | Tendencija | Kiekis ↑↓ | Reikšmė ↑↓ | Grafikas | Apatinis PI ↑↓ | Viršutinis PI ↑↓ |
|---------------------|------------|-----------|------------|----------|----------------|------------------|
| Lietuva | ⬆ | 28 825 | 520,1 | | 514,1 | 526,2 |
| Klaipėdos apskritis | ⬆ | 4 195 | 682,9 | | 662,4 | 703,9 |
| Klaipėdos m. sav. | ⬆ | 2 209 | 755,1 | | 724,0 | 787,3 |
| Palangos m. sav. | ➡ | 346 | 911,0 | | 817,5 | 1 012,2 |
| Neringos sav. | ⬆ | 33 | 700,6 | | 482,2 | 984,0 |
| Klaipėdos r. sav. | ⬆ | 458 | 513,6 | | 467,6 | 562,8 |
| Kretingos r. sav. | ➡ | 376 | 503,8 | | 454,1 | 557,3 |
| Skuodo r. sav. | ⬆ | 194 | 493,0 | | 426,1 | 567,5 |
| Šilutės r. sav. | ⬆ | 579 | 763,2 | | 702,3 | 828,0 |

4.12.1.2.29 Fig. Prevalence of hypertensive diseases (I10-I15) per 10,000 people aged 65+ in Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 65+ age group, the incidence of neoplasms (C00-D48) per 10,000 population in 2019 was 843.0; in the Neringa Municipality, it was 849.3. When comparing the incidence of neoplasms (C00-D48) per 10,000 population with the indicator value for Klaipėda County (679.5)—the indicator value was higher (i.e., incidence was higher) in Klaipėda City and Neringa Municipality (Fig. 4.12.1.2.30). When evaluating Klaipėda County, the highest indicator value was in Neringa Municipality (849.3), and the lowest was in Skuodas District Municipality (350.7) (Fig. 4.12.1.2.30). The indicator value for Lithuania was 632.5 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.30).

Tendencija: ➔ Nekinta ⬆️ Didėja ⬇️ Mažėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas

| Savivaldybė | Tendencija | Kiekis ^{↑↓} | Reikšmė ^{↑↓} | Grafikas | Apatinis PI ^{↑↓} | Viršutinis PI ^{↑↓} |
|---------------------|------------|----------------------|-----------------------|----------|---------------------------|-----------------------------|
| Lietuva | ⬆️ | 35 055 | 632,5 | | 625,9 | 639,2 |
| Klaipėdos apskritis | ➔ | 4 174 | 679,5 | | 659,1 | 700,5 |
| Klaipėdos m. sav. | ➔ | 2 466 | 843,0 | | 810,0 | 876,9 |
| Palangos m. sav. | ➔ | 227 | 597,7 | | 522,5 | 680,7 |
| Neringos sav. | ➔ | 40 | 849,3 | | 606,6 | 1 156,5 |
| Klaipėdos r. sav. | ➔ | 415 | 465,4 | | 421,6 | 512,4 |
| Kretingos r. sav. | ➔ | 430 | 576,1 | | 522,9 | 633,2 |
| Skuodo r. sav. | ➔ | 138 | 350,7 | | 294,6 | 414,3 |
| Šilutės r. sav. | ⬆️ | 458 | 603,7 | | 549,7 | 661,7 |

4.12.1.2.30 Fig. Incidence of neoplasms (C00-D48) per 10,000 population aged 65+, Klaipėda County, 2019 [54]

In the Klaipėda City Municipality, in the 65+ age group, the incidence of chronic lower (J40-J47) per 10,000 population. The indicator value was 263.6, while in Neringa Municipality it was 339.7. When comparing the incidence of chronic lower respiratory tract diseases (J40-J47) per 10,000 population with the indicator value for Klaipėda County (253.3)—the indicator value in Klaipėda City Municipality was similar, while in Neringa Municipality it was worse (i.e., the incidence was higher) (Fig. 4.12.1.2.31). When evaluating Klaipėda County, the highest indicator value was in Šilutė District Municipality (374.4), and the lowest was in Skuodas District Municipality (147.4) (Fig. 4.12.1.2.31). The indicator value for Lithuania was 230.6 and was lower than that of the Klaipėda County, but in some cases, higher than the indicator values of individual municipalities (Fig. 4.12.1.2.31).

Tendencija: ➔ Nekinta ⬆️ Didėja ⬇️ Mažėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas

| Savivaldybė | Tendencija | Kiekis ^{↑↓} | Reikšmė ^{↑↓} | Grafikas | Apatinis PI ^{↑↓} | Viršutinis PI ^{↑↓} |
|---------------------|------------|----------------------|-----------------------|----------|---------------------------|-----------------------------|
| Lietuva | ⬆️ | 12 779 | 230,6 | | 226,6 | 234,6 |
| Klaipėdos apskritis | ⬆️ | 1 556 | 253,3 | | 240,9 | 266,2 |
| Klaipėdos m. sav. | ⬆️ | 771 | 263,6 | | 245,3 | 282,8 |
| Palangos m. sav. | ⬆️ | 105 | 276,5 | | 226,1 | 334,7 |
| Neringos sav. | ⬆️ | 16 | 339,7 | | 194,0 | 551,7 |
| Klaipėdos r. sav. | ➔ | 178 | 199,6 | | 171,3 | 231,2 |
| Kretingos r. sav. | ➔ | 144 | 192,9 | | 162,7 | 227,1 |
| Skuodo r. sav. | ⬆️ | 58 | 147,4 | | 111,9 | 190,5 |
| Šilutės r. sav. | ➔ | 284 | 374,4 | | 332,1 | 420,5 |

4.12.1.2.31 Fig. Incidence of chronic lower respiratory tract diseases (J40-J47) per 10,000 people aged 65 and older in Klaipėda County, 2019 [54]

In Klaipėda City Municipality, among the population aged 65 and older, the incidence of asthma (J45-J46) per 10,000 population in 2019 was 43.1, while in Neringa Municipality it was 127.4. When comparing the incidence of asthma (J45-J46) per 10,000 population with the rate in Klaipėda County (38.9), the rate in Klaipėda

municipality, the indicator value was similar, while in Neringa Municipality it was worse (i.e., the incidence was higher) (Fig. 4.12.1.2.32). When evaluating Klaipėda County, the highest indicator value was in Neringa Municipality (127.4), and the lowest was in Skuodas District Municipality (15.2) (Fig. 4.12.1.2.32). The indicator value for Lithuania was 43.8 and was higher than that of the Klaipėda County, but in some cases lower than the indicator values of individual municipalities (Fig. 4.12.1.2.32).

Tendencija: ↑ Nekinta ↑ Didėja ↓ Možėja ■ Geriau ■ Blogiau ■ Panašus ■ Nepalyginamas

| Savivaldybė | Tendencija | Kiekis ↑↓ | Reikšmė ↑↓ | Grafikas | Apatinis PI ↑↓ | Viršutinis PI ↑↓ |
|---------------------|------------|-----------|------------|----------|----------------|------------------|
| Lietuva | ↑ | 2 427 | 43,8 | | 42,1 | 45,6 |
| Klaipėdos apskritis | ↑ | 239 | 38,9 | | 34,1 | 44,2 |
| Klaipėdos m. sav. | ↑ | 126 | 43,1 | | 35,9 | 51,3 |
| Palangos m. sav. | ↓ | 17 | 44,8 | | 26,1 | 71,7 |
| Neringos sav. | ↑ | 6 | 127,4 | | 46,5 | 277,3 |
| Klaipėdos r. sav. | ↑ | 32 | 35,9 | | 24,5 | 50,7 |
| Kretingos r. sav. | ↓ | 20 | 26,8 | | 16,4 | 41,4 |
| Skuodo r. sav. | ↑ | 6 | 15,2 | | 5,6 | 33,2 |
| Šilutės r. sav. | ↑ | 32 | 42,2 | | 28,8 | 59,6 |

4.12.1.2.32 Fig. Incidence of asthma (J45-J46) per 10,000 people aged 65 and older, Klaipėda County, 2019 [54]

4.12.1.3 Distance of the PŪV territory from recreational, residential, and public areas and buildings in the county

Definitions of residential and public buildings, and recreational areas

Residential building – as defined in point 6 of the Technical Regulation for Construction STR 1.01.03:2017 “Classification of Structures” (hereinafter – STR) [60], Section 6. According to Section 6 of the STR:

Residential buildings are classified into subgroups by type:

- ✓ residential (single-family) buildings – intended for one family;
- ✓ residential (two-unit) buildings—intended for two families;
- ✓ residential buildings (with three or more apartments (multi-family buildings))—intended for three or more families;
- ✓ residential buildings (for persons from various social groups) – intended for persons from various social groups (dormitories, children’s homes, shelters, nursing homes, family homes, monasteries, etc.).

Public-purpose building – a building intended to meet public needs and, in accordance with the provisions of the STR, classified as hotels, catering, cultural, scientific (excluding institutes and scientific research institutions, observatories, meteorological stations, laboratories), healthcare (inpatient healthcare facilities), recreation, or special-purpose buildings related to accommodation.

- ✓ hotels – buildings for short-term accommodation (hotels, motels, and guesthouses);
- ✓ food service buildings – intended for serving food: cafeterias, restaurants, cafes, bars, and other buildings;
- ✓ cultural buildings – intended for cultural purposes: movie theaters, theaters, cultural centers, clubs, libraries, museums, archives, exhibition centers, planetariums, radio and television buildings, and other buildings;
- ✓ educational buildings – intended for educational and scientific purposes: general education, vocational, and higher education institutions, kindergartens, nurseries, and other buildings. HN 33 does not apply to institutes and scientific research institutions, observatories, meteorological stations, or laboratories.
- ✓ Medical buildings – buildings for medical purposes, i.e., buildings where medical care and treatment are provided to sick people (hospitals, clinics, polyclinics, sanatoriums, rehabilitation centers, health care buildings of special institutions, treatment facilities, nursing homes of medical care institutions, and others). HN 33 applies only to inpatient healthcare facilities providing inpatient treatment—the treatment of patients hospitalized in a hospital.
- ✓ recreational buildings – buildings intended for recreation (vacation homes, tourist centers, campground buildings, rural tourism buildings, summer cottages, hunting cabins, and other recreational buildings);
- ✓ special-purpose buildings – buildings intended for special purposes (barracks, prisons, correctional facilities, detention centers, police, fire, and rescue service buildings, shelters, border control points, and other buildings) related to accommodation.

Based on the definition provided in the Regulations on the Use, Planning, and Protection of Recreational Areas [56]:

A recreational area is an area possessing natural or cultural environmental characteristics and conditions suitable for organizing full-fledged physical and mental recreation for people, whose boundaries, land use methods and nature are established, and priority for recreational use is granted by territorial planning documents or legislation. The concept and types of recreational areas (recreational zone, recreational district, recreational site, recreational land parcel), as well as the classification of these areas, depend on the level of spatial planning.

The system of recreational areas consists of:

- ✓ recreational areas and districts;

- ✓ recreational areas (residential areas with resort status; zones of recreational functional priority and their parts; public green spaces in cities and other residential areas, as well as park areas and other areas designated for public use; forests classified as Group IIB (recreational forests) in accordance with the procedure established by the Government of the Republic of Lithuania; surface water bodies classified as recreational resources in the national spatial planning documents, as well as in the territorial planning documents of counties and municipalities;
- ✓ other (recreational) land plots with a primary designated purpose, used for the installation and operation of recreational infrastructure.

Based on the decisions of the Klaipėda City Master Plan and the Klaipėda Region Spatial Plan, the areas closest to the PŪV territory where one of the possible land uses is: recreational areas, recreational bodies of water, or one of the possible land use types—public spaces, green areas—are:

- In the Žardė district (Stariškės), Service and Specialized Complex Zones have been designated, where one of the possible land use types is recreational areas. This district also includes an Intensively Used Green Space Zone, where one of the possible land use types is public spaces and green areas. It also includes Engineering Infrastructure, Service Areas, and Water Zones, where one of the possible land uses is recreational water bodies. The PŪV solutions do not fall within these zones (Section 3.2, “*Location of the PŪV in Approved Spatial Planning Documents,*” Fig. 3.2.4).
- In the Žardė district (Vilhelmo Canal), an Intensively Used Green Space Zone has been established, where one of the possible land use types is public spaces and green areas. A Water Zone is also designated, where one of the possible land uses is recreational water bodies. The PŪV solutions do not fall within these zones (Section 3.2, “*Location of the PŪV in Approved Spatial Planning Documents,*” Fig. 3.2.4).
- In the Smeltė district (Smeltė I, Smeltė II), a Service Zone and a Low-Density Residential Zone have been designated, where one of the possible land uses is recreational areas. An Intensively Used Green Space Zone is also designated, where one of the possible land use types is public spaces and green areas. The PŪV solutions do not fall within these zones (Section 3.2, “*Location of the PŪV in Approved Spatial Planning Documents,*” Fig. 3.2.4).
- In the Žardė district (Smeltė Peninsula), a Water Zone is designated, where one of the possible land uses is recreational water bodies. A small part of this zone falls within the PŪV territory (Section 3.2, “*Location of the PŪV in Approved Spatial Planning Documents,*” Fig. 3.2.4).

The nearest residential buildings relative to the PŪV territory are listed in Table 4.12.1.3.1 and shown in Graphic Appendix 3.

4.12.1.3.1 Table. Nearest residential buildings relative to the PŪV territory

| No. | Address of the residential building | Minimum distance from the PŪV territory to the building (m) |
|-----|---|---|
| | | <i>Alternatives 2A, 3A, 4A</i> |
| 1 | 175 Nemuno St., Klaipėda | 415 m in the R direction |
| 2 | 1 Senoji Smiltelės St., Klaipėda | 467 m in the R direction |
| 3 | 3 Senoji Smiltelės St., Klaipėda | 510 m in the R direction |
| 4 | 4A Senoji Smiltelės St., Klaipėda | 764 m in the R direction |
| 5 | Marių St. 1, Klaipėda | 555 m in the R direction |
| 6 | 3 Marių St., Klaipėda | 564 m in the R direction |
| 7 | 5 Marių St., Klaipėda | 582 m in the R direction |
| 8 | 7 Marių St., Klaipėda | 594 m in the R direction |
| 9 | 9 Marių St., Klaipėda | 602 m in the R direction |
| 10 | 11 Marių St., Klaipėda | 604 m in the R direction |
| 11 | 13 Marių St., Klaipėda | 606 m in the R direction |
| 12 | 15 Marių St., Klaipėda | 605 m in the R direction |
| 13 | Marių St. 17;19;21;23;25;27;29;31;33;35, Klaipėda | 610 m in the R direction |
| 14 | Žūklės St. 2, Klaipėda | 584 m in the R direction |
| 15 | 3 Žūklės St., Klaipėda | 559 m in the R direction |
| 16 | 5 Žūklės St., Klaipėda | 653 m in the R direction |
| 17 | 6 Žūklės St., Klaipėda | 631 m in the R direction |
| 18 | 7 Žūklės St., Klaipėda | 666 m in the R direction |
| 19 | 8 Žūklės St., Klaipėda | 639 m in the R direction |
| 20 | 9 Žūklės St., Klaipėda | 675 m in the R direction |
| 21 | 10 Žūklės St., Klaipėda | 647 m in the R direction |
| 22 | 11 Žūklės St., Klaipėda | 677 m in the R direction |
| 23 | 12 Žūklės St., Klaipėda | 649 m in the R direction |
| 24 | 13 Žūklės St., Klaipėda | 696 m in the R direction |
| 25 | 13A Žūklės St., Klaipėda | 687 m in the R direction |
| 26 | 14 Žūklės St., Klaipėda | 651 m in the R direction |
| 27 | 20 Žūklės St., Klaipėda | 652 m in the R direction |
| 28 | 22 Žūklės St., Klaipėda | 650 m in the R direction |
| 29 | 17 Žūklės St., Klaipėda | 677 m in the R direction |
| 30 | 19 Žūklės St., Klaipėda | 678 m in the R direction |
| 31 | 21 Žūklės St., Klaipėda | 674 m in the R direction |
| 32 | 23 Žūklės St., Klaipėda | 675 m in the R direction |
| 33 | 25 Žūklės St., Klaipėda | 673 m in the R direction |
| 34 | 27 Žūklės St., Klaipėda | 667 m in the R direction |
| 35 | 4 Tinklų St., Klaipėda | 712 m in the R direction |
| 36 | 4A Tinklų St., Klaipėda | 709 m in the R direction |
| 37 | 6 Tinklų St., Klaipėda | 735 m in the R direction |
| 38 | 6A Tinklų St., Klaipėda | 732 m in the R direction |
| 39 | 8 Tinklų St., Klaipėda | 751 m in the R direction |
| 40 | 8A Tinklų St., Klaipėda | 667 m in the R direction |
| 41 | 12 Dusetų St., Klaipėda | 797 m in the R direction |

| No. | Address of the residential building | Minimum distance from the PŪV to the building (m) |
|-----|-------------------------------------|---|
| | | <i>Alternatives 2A, 3A, 4A</i> |
| 42 | Skirvytės St. 15, Klaipėda | 722 m in the R direction |
| 43 | 17 Skirvytės St., Klaipėda | 745 m in the R direction |
| 44 | 19 Skirvytės St., Klaipėda | 749 m in the R direction |
| 45 | 45 Jurbarko St., Klaipėda | 933 m in the R direction |
| 46 | 47 Jurbarko St., Klaipėda | 926 m in the R direction |
| 47 | 49 Jurbarko St., Klaipėda | 922 m in the R direction |
| 48 | 51 Jurbarko St., Klaipėda | 916 m in the R direction |
| 49 | 53 Jurbarko St., Klaipėda | 912 m in the R direction |
| 50 | 55 Jurbarko St., Klaipėda | 906 m in the R direction |
| 51 | 57 Jurbarko St., Klaipėda | 904 m in the R direction |
| 52 | 59 Jurbarko St., Klaipėda | 898 m in the R direction |
| 53 | 61 Jurbarko St., Klaipėda | 894 m in the R direction |
| 54 | 63 Jurbarko St., Klaipėda | 886 m in the R direction |
| 55 | 65 Jurbarko St., Klaipėda | 880 m in the R direction |
| 56 | 1 Alksnynės St., Neringa | 1,072 m in the R direction |

Public buildings are located at a considerable distance from the PŪV; information on the public buildings closest to the PŪV territory is provided in Table 4.12.1.3.2.

4.12.1.3.2 Table. Nearest public buildings relative to the PŪV territory

| Name of the facility | Address | Minimum distance from the PŪV territory to the building (m) |
|----------------------------|---------------------------|---|
| | | <i>Alternatives 2A, 3A, 4A</i> |
| Klaipėda Judo Club | Marių St. 1, Klaipėda | 593 m in the R direction |
| Handball Club "Handbalis" | 6 Kintų St., Klaipėda | 956 m in the R direction |
| VAKARŲ LAIVŲ GAMYKLA, Inc. | 180 Minijos St., Klaipėda | 1,036 m in the R direction |

4.12.2 Significant impact anticipated

When analyzing the impact of the PŪV on public health, the greatest attention is paid to harmful risk factors which, if the concentration, magnitude, or duration of the factor were significant, could have a significant negative impact on public health. The significant impact of the PŪV on public health for all PŪV alternatives would depend on the impact zone of the solutions, the scale of the impact, and the direct relationship with residential/public and other areas. The impact is analyzed during construction/implementation and during operation.

Key risk factors associated with the PŪV:

- air pollution with chemical substances (emissions released into the ambient air from internal combustion engines of vehicles and equipment (combustion products: NO_x, CO, HC, SO_x, VOC) during the transportation of materials and soil, the development of areas with the necessary infrastructure, and the construction, dismantling, and demolition of hydraulic structures and facilities);
- physical pollution (noise sources (dredgers and/or excavators, barges—soil carriers, pile drivers, and other machinery);

- potential chemical/physical pollution in the vicinity of the King William Canal and Klaipėda City Water Supply Area III, as well as on Melnragė Beach I (at the bathing area) (during dredging works on the KVJU shipping channel and water area, and when dumping soil in the operational dredging (dumping) area).

The assessment of the impact on public health is based on the information and data presented in other sections of the EIA report.

It should be noted that the PŪV solutions are not related to odor generation; the PŪV has no stationary organized or unorganized sources of odor generation, therefore, no emission of odor-causing substances into the ambient air is anticipated; consequently, the formation of odor pollution due to the PŪV is not quantified and is not examined in detail.

4.12.2.1 Assessment of Chemical Air Pollution

Impact during the construction of the PŪV facilities

Detailed information on ambient air pollution by chemical substances is provided in Section 4.2 “*Ambient Air*” of the EIA report.

Conclusion: Emissions during the construction of the PŪV facilities and during the maintenance of the port’s water area will not cause significant changes in ambient air quality. It is recommended to implement the mitigation measures specified in Section 4.2.3. The solutions of PŪV Alternative 2A would have the least impact, while those of PŪV Alternative 3A would have the greatest impact.

4.12.2.2 Assessment of physical pollution

Noise

The assessment of noise pollution from the PŪV that could affect public health was conducted in accordance with Lithuanian Hygiene Standard HN 33:2011 “*Noise Limit Values in Residential and Public Buildings and Their Surroundings*,” approved by Order No. V-604 of the Minister of Health of the Republic of Lithuania on June 13, 2011 (new version of February 12, 2018, No. V-166) (hereinafter—HN 33:2011).

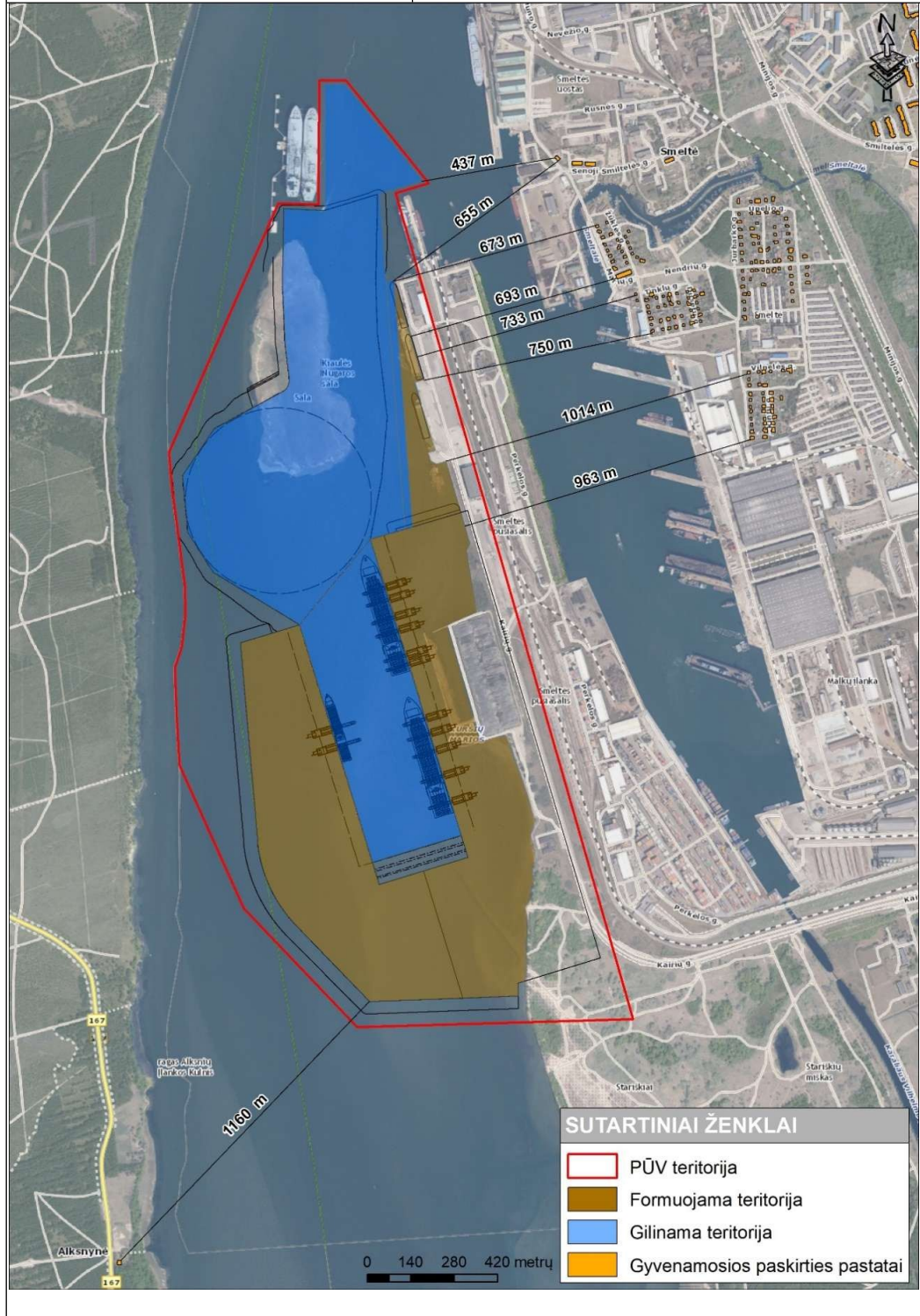
Work methodology

In assessing the propagation of acoustic noise generated by construction works in the southern part of the KVJU, the construction phase and its impact on the nearest residential/public environment were reviewed.

The noise propagation assessment was performed based on the proximity of the dominant noise sources to the nearest residential/public buildings and their surroundings, i.e., the location of the noise sources was selected at the shortest distance to the nearest residential/public buildings and their surroundings. The location of the noise sources was also selected taking into account the existing built-up area, so that the path of sound waves from the noise source to the receiver would not be obstructed by barriers along the way. When evaluating all three PŪV alternatives—2A, 3A, and 4A—in relation to the nearest residential buildings, the minimum distances from the PŪV solutions are as follows:

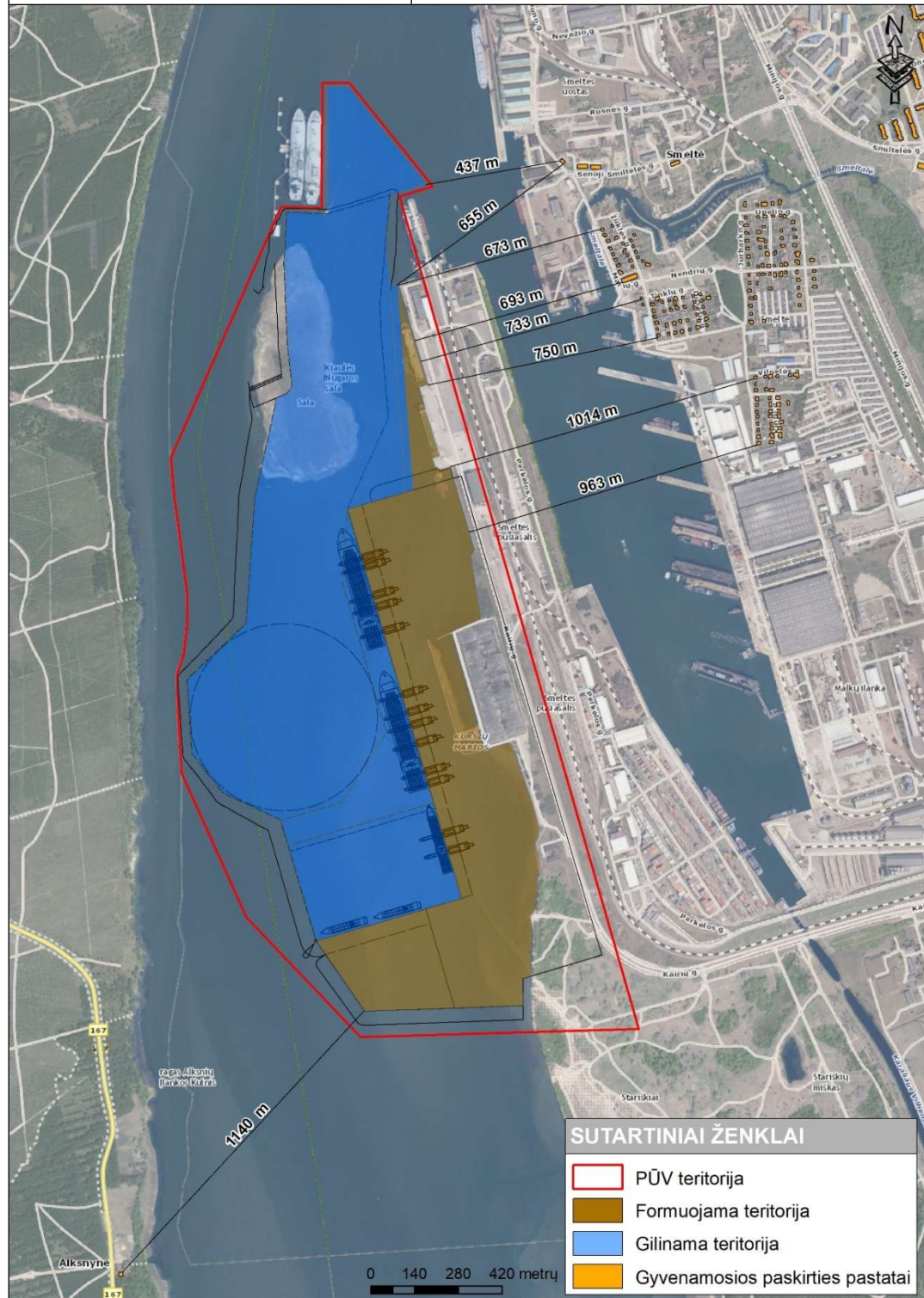
Alternative 2A

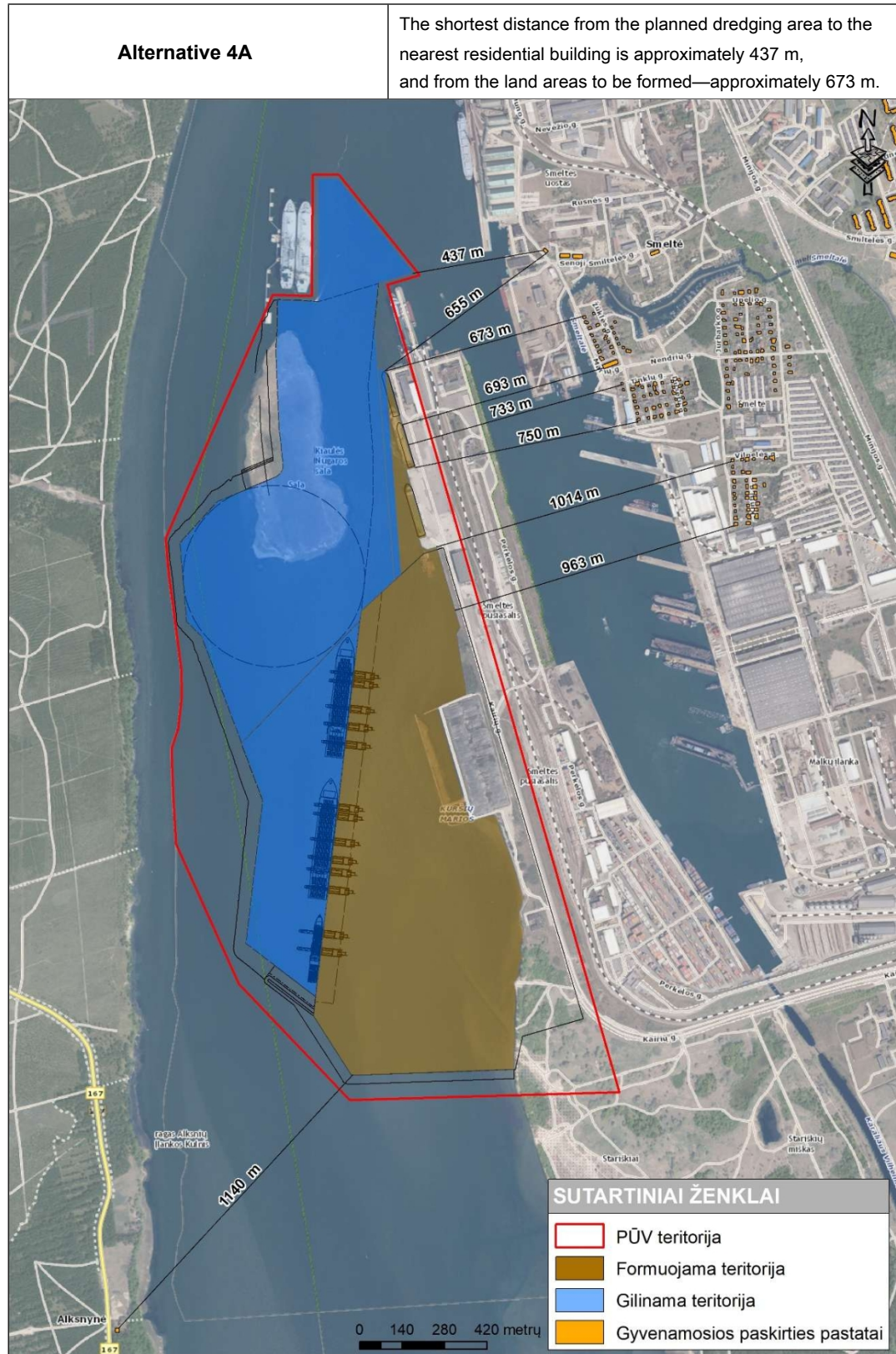
The shortest distance from the planned dredged water area to the nearest residential building is approximately 437 m, and from the land areas to be formed – approximately 655 m.



Alternative 3A

The minimum distance from the planned dredged water area to the nearest residential building is approximately 437 m, and from the land areas to be formed—approximately 655 m.





After analyzing the nearest residential buildings in each PŪV alternative separately, it is assumed for further assessment that, for all PŪV alternatives, during dredging works and

during the formation of the area, the nearest residential buildings and their surroundings will remain the same for all PŪV alternatives.

Based on the principle of noise assessment, it is evident that if the dominant noise sources—equipment/machinery operating closest to residential and/or public buildings and their surroundings—do not exceed the maximum permissible noise levels under the adopted assessment conditions, then these levels will not be exceeded when they are operating in any other area of the site’s excavation or formation works, and it is not appropriate to assess individual construction works by type.

Existing background noise

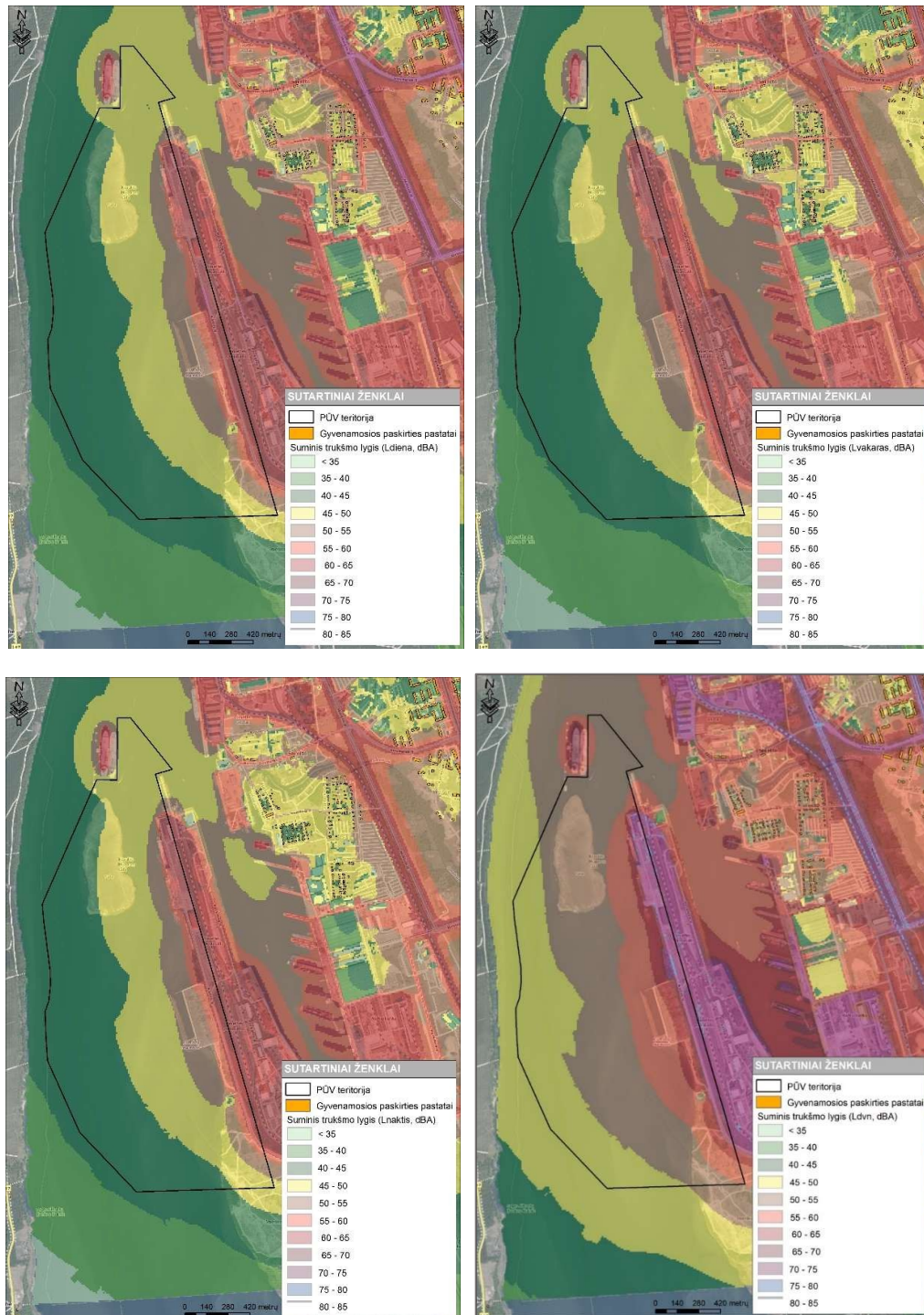
Based on data from the Klaipėda City Municipality’s strategic noise mapping maps of the projected total noise from various sources, a conditional background (existing) noise level has been established for the nearest residential/public environment under evaluation, based on the daytime (L_{day}), evening ($L_{evening}$), night (L_{night}), and 24-hour (L_{24h}) noise indicators, the conditional background (existing) noise level is as follows (Table 4.12.2.2.1 and Figure 4.12.2.2.1):

4.12.2.2.1 Table. Results of the Klaipėda City Municipality’s strategic noise mapping of the projected total noise from various sources

| Address of residential/public environment | Results of the map of the combined impact (total) of various Noise Sources (Total) Map | | | |
|--|--|--------------|------------|----------|
| | Daytime, dBA | Evening, dBA | Night, dBA | Day, dBA |
| 175 Nemuno St. | 65–70 | 60–65 | 60–65 | 65–70 |
| 1 Senoji Smiltelės St. | 55–60 | 55–60 | 50–55 | 60–65 |
| 1 Marių St. (Association – Klaipėda Judo Club) | 50–55 | 50–55 | 45–50 | 55–60 |
| 3 Marių St. | 50–55 | 50–55 | 45–50 | 50–55 |
| 5 Marių St. | 50–55 | 50–55 | 45–50 | 50–55 |
| 7 Marių St. | 50–55 | 50–55 | 45–50 | 50–55 |
| 9 Marių St. | 50–55 | 50–55 | 45–50 | 50–55 |
| 11 Marių St. | 50–55 | 50–55 | 45–50 | 50–55 |
| 13 Marių St. | 50–55 | 50–55 | 45–50 | 50–55 |
| 15 Marių St. | 50–55 | 50–55 | 45–50 | 55–60 |
| 17, 19, 21, 23, 25, 27, 29, 31, 33, 35 Marių St. | 50–55 | 50–55 | 45–50 | 55–60 |
| Zūklės St. 20 | 50–55 | 50–55 | 45–50 | 55–60 |
| 22 Zūklės St. | 50–55 | 50–55 | 45–50 | 55–60 |
| 17 Zūklės St. | 50–55 | 50–55 | 45–50 | 55–60 |
| 19 Zūklės St. | 50–55 | 50–55 | 45–50 | 50–55 |
| 21 Zūklės St. | 50–55 | 50–55 | 45–50 | 50–55 |
| 23 Zūklės St. | 50–55 | 50–55 | 45–50 | 50–55 |
| 25 Zūklės St. | 50–55 | 45–50 | 45–50 | 50–55 |
| 27 Zūklės St. | 50–55 | 50–55 | 45–50 | 55–60 |
| 45 Jurbarko St. | 50–55 | 50–55 | 45–50 | 55–60 |
| 47 Jurbarko St. | 50–55 | 45–50 | 45–50 | 50–55 |
| 49 Jurbarko St. | 50–55 | 50–55 | 45–50 | 55–60 |
| 51 Jurbarko St. | 50–55 | 50–55 | 45–50 | 55–60 |
| 53 Jurbarko St. | 50–55 | 45–50 | 45–50 | 50–55 |
| 55 Jurbarko St. | 50–55 | 45–50 | 45–50 | 50–55 |
| 57 Jurbarko St. | 50–55 | 45–50 | 45–50 | 55–60 |
| 59 Jurbarko St. | 50–55 | 50–55 | 45–50 | 55–60 |
| 61 Jurbarko St. | 50–55 | 50–55 | 45–50 | 55–60 |
| 63 Jurbarko St. | 50–55 | 50–55 | 45–50 | 55–60 |
| 65 Jurbarko St. | 50–55 | 50–55 | 45–50 | 55–60 |

The main factors determining the background noise level in these areas are noise generated by transportation and industrial activities. The current background noise level in the assessed residential

exceed the maximum permissible noise limit values according to the requirements of HN 33:2011, when assessed against the values applicable to industrial facilities.



4.12.2.2.1 Fig. Excerpt from the Klaipėda City Municipality's predicted noise maps
(Source: www.geoportal.lt/savivaldybes/klaipeda)

Dominant noise sources for the assessed PŪV alternatives

Noise generated during the construction/implementation of the PŪV

Alternative 0

The noise level of this alternative in the assessed environment reflects the current situation, an overview of which is provided above.

Project alternatives 2A, 3A, and 4A

The planned works and the machinery expected to be used during them, which may have the most significant impact on the existing noise level in the immediate surroundings, would be as follows:

- equipment used during dredging works: a backhoe and a dredger barge;
- equipment used during site formation and construction works: pile driver, dredger barge, trucks, cranes, bulldozers, excavators, and various other auxiliary machinery (platforms, etc.).

It is not possible to avoid noisy work during the construction/implementation of the PŪV facilities, but the dredging and site preparation works are temporary and will not be carried out simultaneously.

Each piece of construction equipment may generate different levels of noise depending on its power, model, and technical condition. The specific equipment to be used for implementing the PŪV solutions is not known at this stage; this will depend on the contractor's selection and aspects of work organization. Therefore, at this stage of the EIA assessment and preparation of the EIA report, noise emission levels and work organization aspects are adopted, which the contractor must follow.

The main dominant noise sources and their noise emissions adopted in this assessment are (Table 4.12.2.2.2):

- *Excavator* – noise emissions were determined based on actual measurements of acoustic noise emitted by these machines conducted in 2015 within the KVJU territory during deepening works. The maximum equivalent noise level measured while the dredger was operating reached 91.4 dBA (Textual Appendix 7). Measurements were taken near the dredger while it was operating at a distance of 150–160 m from the northern pier (breakwater) of the entrance gate. It is worth noting that the dredgers' technological and ventilation equipment is installed below deck (underwater). Given this, the dredgers operating in the KVJU area are not a dominant noise source; therefore, the noise generated during their operations is not assessed within the scope of this project. When assessing the dredging works in the area, a stationary noise source was considered, with a total noise level (dredger and barge-dredger) of 91.4 dBA and operating hours of 24 hours a day.
- The maximum noise power of the pile driver is assumed to be 116 dBA. The noise power of the floating crane is assumed based on STR 2.01.08:2003 "Management of Noise Emitted into the Environment by Equipment Used in Outdoor Conditions" – 101 dBA. The equivalent noise level of the barge-dredger is determined in accordance with Lithuanian Hygiene Standard HN 113:2001 "Ships. Hygiene Standards and Rules"—the noise level on the ship's open decks must not exceed 70 dBA. When assessing the site preparation (piling) works, a stationary noise source was adopted, with a total (piling, barge-dredger, and crane) noise level of 116 dBA, operating during the day and evening. As an area-wide noise source, the work zone of various other machinery temporarily used during site preparation

(construction) work, the work zone of other various machinery temporarily used during these works was assessed up to the boundary of the PŪV territory. When assessing these construction works based on the noise calculation program's database, a noise power of 70 dBA⁵per square meter was adopted for this area, with operating hours during the day and evening. The approximate area where various machinery may be used will be about 267 ha.

4.12.2.2.2 Table: Main dominant noise sources and their noise emissions adopted in this assessment for all PŪV alternatives

| Noise source | Site excavation works, noise level, dBA | Site development (construction work), noise level, dBA |
|---|---|--|
| Excavator | 91.4 (at the installation site) | - |
| Polyacrylate | - | 116 |
| Barge – dredger | 70 | 70 |
| Floating crane | - | 101 |
| Various other mechanisms (separate area source) | - | 70 (dBA/m ²) |
| Total noise level* | 91.4 | n 4) 116 |

* - total noise level calculated using the formula $L = 10 \log_{10} (\sum_{i=1} 10^{L_i/10})$.

Other data

The environment of the assessed noise sources is in a built-up area; existing structures act as noise barriers, so they are also taken into account in the noise propagation model.

Simulation software and methodologies used

Noise propagation modeling was performed using the *CadnaA (Computer Aided Noise Abatement)* software program. *CadnaA* is used to predict and assess noise emitted by various sources in the environment. It calculates and determines noise levels at any locations or points on horizontal or vertical planes. The acoustic noise emitted by certain noise sources is also distinguished based on technical parameters.

According to HN 33:2011, the following methodology is used for noise determination calculations:

- For point noise sources – in accordance with ISO 9613-2: “Acoustics. Attenuation of sound in free fields. Part 2. General calculation method.”

The following noise indicators were used for the calculations: L_{day} , $L_{evening}$, L_{night} , which are defined as:

Daytime noise indicator (L_{day}) – an indicator of noise-induced annoyance during the day (from 7:00 a.m. to 7:00 p.m.), i.e., the average long-term A-weighted sound level determined for a one-year period during the day.

Evening noise indicator ($L_{evening}$) – an indicator of noise-induced annoyance during the evening (from 7:00 p.m. to 10:00 p.m.), i.e., the average long-term A-weighted sound level determined for a one-year evening period.

⁵ According to the “Impact Assessment of the Project for the Improvement (Dredging and Widening) of the Outer and Inner Navigation Channels of the Klaipėda State Seaport, reconstruction (construction) of the southern and northern breakwaters, and reinforcement of part of the Curonian Spit slope and construction of the southern port gates,”

The **night-time noise indicator** (L_{night}) is an indicator of noise-induced annoyance during the night (from 10 p.m. to 7 a.m.), i.e., the average long-term A-weighted sound level determined for a one-year night-time period.

Acoustic noise limit values are specified in HN 33:2011, which establishes noise limit values for residential and public buildings and their surroundings and is applied when assessing the impact of noise on public health (Table 4.12.2.2.3).

4.12.2.2.3 Table. Permissible noise limit values in the surroundings of residential and public buildings

| Name of facility | $L_{\text{Aeq,T}}$, dBA | $L_{\text{Aeq,T}}$, dBA | $L_{\text{Aeq,T}}$, dBA |
|--|-----------------------------|------------------------------|---------------------------|
| | 7 a.m.–7 p.m., (Daytime) | 7:00–10:00 p.m. (Evening) | 10 p.m.–7 a.m. (Night) |
| In the vicinity of residential buildings (houses) and public buildings (excluding food service and cultural buildings) affected by noise from stationary noise sources | 55 | 50 | 45 |

Based on the calculated and entered parameters, a noise map of the area was created, using the following input and evaluation parameters:

- noise level calculation height – 2 m;
- contour lines are displayed at 5 dBA (decibels) intervals;
- air temperature +10°C, relative humidity 70%;
- specific conditions defined in the ISO 9613-2 calculation methodology were applied for the following physical factors: downwind sound propagation conditions (where the wind always blows toward the noise receiver), geometric divergence, atmospheric absorption, ground surface attenuation, reflections from surfaces, and screening by obstacles;
- the noise level from earthmoving and pile driving operations was assessed as a point noise source at a height of 4 m;
- when assessing the noise generated by pile-driving during site preparation (construction) works, the worst-case scenario was adopted, in which 3 pile-drivers would be operating simultaneously for all PŪV alternatives;
- The assessment considers the maximum possible operational scenarios, where all construction (reconstruction) work continues around the clock, except for pile drivers, which are not scheduled to operate at night.

Noise propagation modeling results

The predicted acoustic noise generated during the construction/implementation of the PŪV is assessed based on the L_{day} , L_{evening} , and L_{night} noise indicators. The calculated noise indicators are compared with the noise limit values established by HN 33:2011 for the surroundings of residential and public

buildings, excluding catering and cultural buildings, in the surrounding area, excluding traffic noise.

The equivalent noise level caused by the assessed noise sources in the vicinity of the nearest residential buildings, calculated for each PŪV alternative, is presented in Tables 4.12.2.2.4 and 4.12.2.2.5. This table also indicates the calculated projected total noise level, taking into account the existing and planned equivalent noise levels in the environment. Acoustic noise propagation modeling diagrams are presented in Graphical Appendix 4.

4.12.2.2.4 Table. Equivalent noise level caused by assessed noise sources near the nearest residential environment

| Address of residential/public environment | Dredging works in the southern port gate area | | | |
|---|--|--|---------------|-------------|
| | Project noise level according to L_{day} , $L_{evening}$, and L_{night} noise indicators, dBA | Project and existing (total) noise levels according to the results of the Klaipėda City Municipality's maps of the projected combined impact (total) of various noise sources, dBA | | |
| | | L_{day} | $L_{evening}$ | L_{night} |
| Alternatives 2A, 3A, 4A | | | | |
| <i>Nemuno St. 175</i> | 38 | 65–70 | 60–65 | 60–65 |
| <i>1 Senoji Smiltelės St.</i> | 32 | 55–60 | 55–60 | 50–55 |
| <i>Marių St. 1</i> | 35 | 50–55 | 50–55 | 45–50 |
| <i>3 Marių St.</i> | 35 | 50–55 | 50–55 | 45–50 |
| <i>5 Marių St.</i> | 35 | 50–55 | 50–55 | 45–50 |
| <i>7 Marių St.</i> | 35 | 50–55 | 50–55 | 45–50 |
| <i>9 Marių St.</i> | 35 | 50–55 | 50–55 | 45–50 |
| <i>11 Marių St.</i> | 35 | 50–55 | 50–55 | 45–50 |
| <i>13 Marių St.</i> | 35 | 50–55 | 50–55 | 45–50 |
| <i>15 Marių St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>17, 19, 21, 23, 25, 27, 29, 31, 33, 35 Marių St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>Žuklės St. 20</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>22 Žuklės St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>17 Žuklės St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>19 Žuklės St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>21 Žuklės St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>23 Žuklės St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>25 Žuklės St.</i> | <30 | 50–55 | 45–50 | 45–50 |
| <i>27 Žuklės St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>45 Jurbarko St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>47 Jurbarko St.</i> | <30 | 50–55 | 45–50 | 45–50 |
| <i>49 Jurbarko St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>51 Jurbarko St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>53 Jurbarko St.</i> | <30 | 50–55 | 45–50 | 45–50 |
| <i>55 Jurbarko St.</i> | <30 | 50–55 | 45–50 | 45–50 |
| <i>57 Jurbarko St.</i> | <30 | 50–55 | 45–50 | 45–50 |
| <i>59 Jurbarko St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>61 Jurbarko St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>63 Jurbarko St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>65 Jurbarko St.</i> | <30 | 50–55 | 50–55 | 45–50 |
| <i>1 Alksnynės St., Neringa</i> | <30 | - | - | - |

4.12.2.2.5 Table. Equivalent noise levels caused by assessed noise sources near the nearest residential area

| Address of residential/public environment | Planned development works in the southern gate area of the port | | | |
|--|---|--|----------|--------|
| | Noise level of the PUV according to Lday and Lnight noise indicators, dBA | Project and existing (total) noise levels according to strategic industrial facility noise (Ldvn), dBA | | |
| | | Lday | Lvakaras | Lnight |
| Alternative 2A | | | | |
| 175 Nemuno St. | 45 | 65-70 | 60-65 | - |
| Old Smiltelės St. 1 | 48 | 55-60 | 55-60 | - |
| Marių St. 1 | 48 | 50-56 | 50-56 | - |
| 3 Marių St. | 47 | 50-56 | 50-56 | - |
| 5 Marių St. | 45 | 50-55 | 50-55 | - |
| 7 Marių St. | 44 | 50-55 | 50-55 | - |
| 9 Marių St. | 46 | 50-56 | 50-56 | - |
| 11 Marių St. | 47 | 50-56 | 50-56 | - |
| 13 Marių St. | 47 | 50-56 | 50-56 | - |
| 15 Marių St. | 47 | 50-56 | 50-56 | - |
| 17, 19, 21, 23, 25, 27, 29, 31, 33, 35 Marių St. | 49 | 50-56 | 50-56 | - |
| Žūklės St. 20 | 49 | 50-56 | 50-56 | - |
| 22 Žūklės St. | 43 | 50-55 | 50-55 | - |
| 17 Žūklės St. | 45 | 50-55 | 50-55 | - |
| 19 Žūklės St. | 46 | 50-56 | 50-56 | - |
| 21 Žūklės St. | 46 | 50-56 | 50-56 | - |
| 23 Žūklės St. | 40 | 50-55 | 50-55 | - |
| 25 Žūklės St. | 41 | 50-55 | 45-51 | - |
| 27 Žūklės St. | 47 | 50-56 | 50-56 | - |
| 45 Jurbarko St. | 40 | 50-55 | 50-55 | - |
| 47 Jurbarko St. | 40 | 50-55 | 45-50 | - |
| 49 Jurbarko St. | 41 | 50-55 | 50-55 | - |
| 51 Jurbarko St. | 41 | 50-55 | 50-55 | - |
| 53 Jurbarko St. | 41 | 50-55 | 45-51 | - |
| 55 Jurbarko St. | 40 | 50-55 | 45-50 | - |
| 57 Jurbarko St. | 40 | 50-55 | 45-50 | - |
| 59 Jurbarko St. | 40 | 50-55 | 50-55 | - |
| 61 Jurbarko St. | 40 | 50-55 | 50-55 | - |
| 63 Jurbarko St. | 40 | 50-55 | 50-55 | - |
| 65 Jurbarko St. | 40 | 50-55 | 50-55 | - |
| 1 Alksnynės St., Neringa | 41 | 41 | 41 | - |
| Alternative 3A | | | | |
| 175 Nemuno St. | 45 | 65-70 | 60-65 | - |
| Old Smiltelės St. 1 | 48 | 55-60 | 55-60 | - |
| Marių St. 1 | 48 | 50-56 | 50-56 | - |
| 3 Marių St. | 47 | 50-56 | 50-56 | - |
| 5 Marių St. | 45 | 50-55 | 50-55 | - |
| 7 Marių St. | 44 | 50-55 | 50-55 | - |
| 9 Marių St. | 46 | 50-56 | 50-56 | - |
| 11 Marių St. | 47 | 50-56 | 50-56 | - |
| 13 Marių St. | 47 | 50-56 | 50-56 | - |
| 15 Marių St. | 47 | 50-56 | 50-56 | - |
| 17, 19, 21, 23, 25, 27, 29, 31, 33, 35 Marių St. | 49 | 50-56 | 50-56 | - |
| Žūklės St. 20 | 49 | 50-56 | 50-56 | - |
| 22 Žūklės St. | 43 | 50-55 | 50-55 | - |
| 17 Žūklės St. | 45 | 50-55 | 50-55 | - |
| 19 Žūklės St. | 46 | 50-56 | 50-56 | - |
| 21 Žūklės St. | 46 | 50-56 | 50-56 | - |
| 23 Žūklės St. | 40 | 50-55 | 50-55 | - |
| 25 Žūklės St. | 41 | 50-55 | 45-51 | - |
| 27 Žūklės St. | 47 | 50-56 | 50-56 | - |
| 45 Jurbarko St. | 40 | 50-55 | 50-55 | - |
| 47 Jurbarko St. | 40 | 50-55 | 45-50 | - |

| Address of residential/public environment | Planned development works for the southern gate area of the port | | | |
|---|---|--|---------------|-------------|
| | Noise level of the development project according to L_{night} and L_{day} noise indicators, dBA | Projected and current (total) noise levels according to strategic industrial facility noise (L_{dvn}), dBA | | |
| | | L_{day} | $L_{vakaras}$ | L_{night} |
| <i>Jurbarko St. 49</i> | 41 | 50-55 | 50-55 | - |
| <i>51 Jurbarko St.</i> | 41 | 50-55 | 50-55 | - |
| <i>53 Jurbarko St.</i> | 41 | 50-55 | 45-51 | - |
| <i>55 Jurbarko St.</i> | 40 | 50-55 | 45-50 | - |
| <i>57 Jurbarko St.</i> | 40 | 50-55 | 45-50 | - |
| <i>59 Jurbarko St.</i> | 40 | 50-55 | 50-55 | - |
| <i>61 Jurbarko St.</i> | 40 | 50-55 | 50-55 | - |
| <i>63 Jurbarko St.</i> | 40 | 50-55 | 50-55 | - |
| <i>65 Jurbarko St.</i> | 40 | 50-55 | 50-55 | - |
| <i>1 Alksnynės St., Neringa</i> | 42 | 42 | 42 | - |
| Alternative 4A | | | | |
| <i>175 Nemuno St.</i> | 45 | 65-70 | 60-65 | - |
| <i>Old Smiltelės St. 1</i> | 48 | 55-60 | 55-60 | - |
| <i>Marių St. 1</i> | 48 | 50-56 | 50-56 | - |
| <i>3 Marių St.</i> | 47 | 50-56 | 50-56 | - |
| <i>5 Marių St.</i> | 45 | 50-55 | 50-55 | - |
| <i>7 Marių St.</i> | 44 | 50-55 | 50-55 | - |
| <i>9 Marių St.</i> | 46 | 50-56 | 50-51 | - |
| <i>11 Marių St.</i> | 47 | 50-56 | 50-51 | - |
| <i>13 Marių St.</i> | 47 | 50-56 | 50-51 | - |
| <i>15 Marių St.</i> | 47 | 50-56 | 50-51 | - |
| <i>Marių St. 17; 19; 21; 23; 25; 27; 29; 31; 33; 35</i> | 49 | 50-56 | 50-56 | - |
| <i>Žūklės St. 20</i> | 49 | 50-56 | 50-56 | - |
| <i>22 Žūklės St.</i> | 43 | 50-55 | 50-55 | - |
| <i>17 Žūklės St.</i> | 45 | 50-55 | 50-55 | - |
| <i>19 Žūklės St.</i> | 46 | 50-56 | 50-56 | - |
| <i>21 Žūklės St.</i> | 46 | 50-56 | 50-56 | - |
| <i>23 Žūklės St.</i> | 40 | 50-55 | 50-55 | - |
| <i>25 Žūklės St.</i> | 41 | 50-55 | 45-51 | - |
| <i>27 Žūklės St.</i> | 47 | 50-56 | 50-56 | - |
| <i>45 Jurbarko St.</i> | 40 | 50-55 | 50-55 | - |
| <i>47 Jurbarko St.</i> | 40 | 50-55 | 45-50 | - |
| <i>49 Jurbarko St.</i> | 41 | 50-55 | 50-55 | - |
| <i>51 Jurbarko St.</i> | 41 | 50-55 | 50-55 | - |
| <i>53 Jurbarko St.</i> | 41 | 50-55 | 45-51 | - |
| <i>55 Jurbarko St.</i> | 40 | 50-55 | 45-50 | - |
| <i>57 Jurbarko St.</i> | 40 | 50-55 | 45-50 | - |
| <i>59 Jurbarko St.</i> | 40 | 50-55 | 50-55 | - |
| <i>61 Jurbarko St.</i> | 40 | 50-55 | 50-55 | - |
| <i>63 Jurbarko St.</i> | 40 | 50-55 | 50-55 | - |
| <i>65 Jurbarko St.</i> | 40 | 50-55 | 50-55 | - |
| <i>1 Alksnynės St., Neringa</i> | 42 | 42 | 42 | - |

Results of the noise assessment for the construction works at the southern port gate

Following an assessment of noise propagation from the planned land development works in the southern port gate area in accordance with the adopted parameters, it was determined that the equivalent noise level generated during the site development works does not exceed the maximum permissible noise levels for all project alternatives, based on daytime and evening noise indicators, near the nearest residential/public buildings and their surroundings. The pile driving works would be carried out only during the day and in the evening, and the maximum noise level emitted by the pile driver must not exceed 116 dBA.

Based on the data from the Klaipėda City Municipality's 2019 strategic noise mapping (Council Decision No. T2-52) and the maps of the predicted total noise propagation from various sources

based on the maximum values of daytime (L_{day}) and evening ($L_{evening}$) noise indicators, as well as the results of the PŪV study, the conditional maximum total noise level in the vicinity of the assessed residential buildings was calculated. It was determined that during the operation of the wind turbine, the background (existing) environmental noise level in the vicinity of most of the assessed residential buildings would likely increase by up to 1 dBA based on daytime (L_{day}) and evening (L_{night}) noise indicators, calculated from the maximum values obtained through noise mapping. Such a change in the background noise level is considered insignificant, as the smallest change in noise level that the human ear can distinguish is 1 dBA, and only when the two levels are heard immediately one after the other (Lithuanian Road Administration, 2002). It is important to note that the background noise level in the vicinity of the assessed residential buildings was determined based on the results of the strategic noise mapping predictive calculation model, which are measured at a height of 4 m. For the planned construction works, the noise propagation assessment was performed for the worst-case scenario, where, in the case of all PŪV alternatives, three pile-driving rigs would be operating simultaneously and continuously without interruption. Once the development of the southern port gate area is complete, there will be no remaining sources of noise in the vicinity.

Upon receiving substantiated complaints regarding noise from residents living near the project area, the contractor must conduct noise measurements in accordance with the provisions of HN 33:2011 and, based on the results, control the operating mode of the construction equipment to ensure compliance with the requirements of Lithuanian Hygiene Standard HN 33:2011.

The equivalent noise level caused during the site excavation works for all project alternatives does not exceed the maximum permissible noise levels according to the daytime, evening, and nighttime noise indicators at the nearest residential area under assessment. During the deepening works, the background (existing) environmental noise level will remain unchanged.

An assessment of the noise generated by the planned construction works was also conducted for the planned residential area located on Draugystės St., Kairių Village, Priekulė Parish. At the time of the EIA, there were no residential buildings registered in this area. It should be noted that HN 33:2011 specifies that “Noise limit values apply to residential buildings, public buildings, and the surroundings of these buildings—excluding catering and cultural facilities—within a radius of no more than 40 meters from the building walls.” In this case, it is impossible to assess the noise level in specific residential buildings and their surroundings, as neither the buildings nor their surroundings exist, since they have not been constructed. Therefore, the assessment of this planned residential area is conditional, with the protected environment of residential buildings assumed to extend to the outer plot boundaries (Fig. 4.12.2.2.2)

The change in sound level that the human ear can detect is 1 dBA, and only when two levels are heard immediately one after the other; however, during the dredging work in the water area, the background (existing) ambient noise level will remain unchanged. Upon completion of the development works in the southern part of the port, there will be no remaining sources of noise in the vicinity.

Following an assessment of the noise generated by the planned construction works for the planned residential area located on Draugystės St., Kairių Village, Priekulės sen., it was determined that, regardless of the chosen development project alternative, no excessive noise from construction work is expected to affect this area.

During the construction of the PŪV facilities, the noise manager must comply with the obligations specified in Article 14 of the Noise Management Act (No. IX-2499 of October 26, 2004). During the land development (construction) works, it is necessary to comply with the requirements of the Klaipėda City Noise Prevention in Public Places Rules, approved by Klaipėda City Municipal Council Decision No. T2-321 of December 21, 2017, and the Klaipėda City Municipality Noise Prevention Action Plan for 2019–2020, approved by Decision No. T2-241 of July 25, 2019. 25 July 2019, No. T2-241: when carrying out construction and reconstruction works on port quays, contracts with contractors must include restrictions on the operating hours of noise sources during nighttime and on weekends. When carrying out dredging works in the area, the organizer of economic activities must comply with the Klaipėda City Municipal Council's , which approved the Klaipėda City Municipality Noise Prevention Action Plan for 2019–2023 2.1.2: When dredging the port basin, contracts with contractors must stipulate the selection of noise sources that generate less noise.

4.12.2.3 Assessment of chemical and physical water pollution

Potential impact on the groundwater resources and quality of Klaipėda City's III water supply area

To protect sources of groundwater and natural mineral water from pollution and to ensure the safety and quality of drinking water supplied to consumers, each water supply area must have designated protection zones (hereinafter referred to as VAZ). Issues regarding the establishment of VAZ are regulated by the "Procedures for Establishing Protection Zones for Groundwater Water Sources," approved by Order No. D1-778 of the Minister of the Environment of the Republic of Lithuania on December 28, 2021 [57].

The PŪV territory does not fall within the protection zones of the nearest water source—Klaipėda City Water Source No. III—but the PŪV territory is located 1,355 m southeast of the aforementioned water source; therefore, the EIA report examines the potential impact on the quality of drinking water extracted from Klaipėda City's III water supply area.

Currently, consumers in Klaipėda are supplied with drinking water from two water supply areas: No. 1 and No. 3. The majority of this extracted volume (about 2/3) consists of infiltrated groundwater extracted from Klaipėda's No. 3 water supply area. All drinking water supplied to consumers complies with the requirements of Lithuanian Hygiene Standard HN 24:2023 "Requirements for the Safety and Quality of Drinking Water" [58].

Klaipėda City Water Supply Area III has been supplying groundwater to the city of Klaipėda since 1967. The volume of exploitable resources in the aquifer at Water Supply Area III is approximately 80,000 m³/day. An artificial recharge system has been installed at the water supply area for water extraction. The water supply area's flow rate is approximately 45,410 m³/day. In practice, approximately 22,000 m³/day^{of} drinking water is supplied to consumers.

The water source is classified as subgroup IIIb²—an open infiltration-type water source. The geological index of the exploited aquifer is Q(mIV). The groundwater aquifer exploited at the water supply facility consists of deposits from the marine Litorina terrace, composed of layers of sand and gravel of varying coarseness. The filtration coefficient (kf) of sand and gravel ranges from 17 to 28 m/day (Z. Šonta, V. Krikščiūnas, 1964). The thickness of the aquifer next to the King William Canal reaches 10–12 m, and up to 22 m toward the Curonian Lagoon. The depth of the King William Canal is about 3 m.

The water source's infiltration system consists of the King William Canal and three infiltration ditches, each 3.1 km long. The catchment system consists of 10 horizontal drains. The boreholes have been decommissioned and are not in use since 2010. The entire water supply area covers 170 ha (Fig. 4.12.2.3.1).

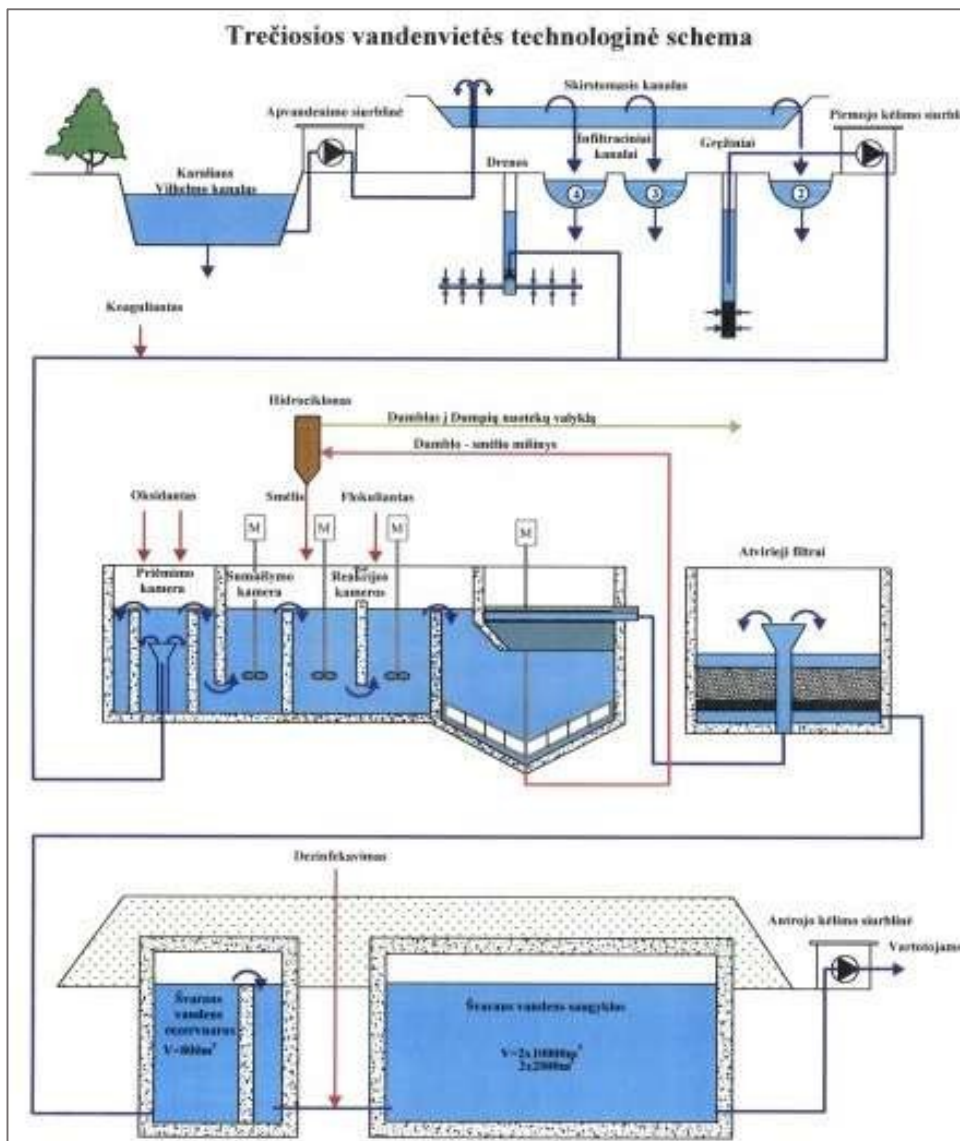


4.12.2.3.1 Fig. Klaipėda City Water Supply Area No. 3

The water, which flows in via the Minija River and the King Wilhelm Canal (approximately 80% of the water resources come from the King Wilhelm Canal), is treated using physical and chemical methods. First, water is pumped from the King William Canal into a distribution canal via irrigation pumps, and from there it enters infiltration channels—ditches approximately 3 km long where the flowing water is filtered through water-permeable sand and gravel soil. This maintains a high water level. The water, which has been partially purified in the underground sand and gravel layers and collected by drains, is pumped to the water treatment plant (Fig. 4.12.2.3.2).

At the water treatment plant, the water undergoes a two-stage treatment process:

- Chemical treatment, using oxidation, cracking, and flocculation processes, which cause pollutants are “bound” into flocs, which are then settled and removed. To accelerate the clarification process, microsand is continuously fed into the reaction chambers, which adds weight to the flocs. The clarified water is fed to the filters.
- Filtration, where the clarified water is filtered through open rapid filters using a multi-layer bed of sand and gravel.



4.12.2.3.2 Fig. Technological diagram of Klaipėda City's 3rd Water Supply System

The treated water is disinfected with a sodium hypochlorite solution. The drinking water prepared in this way is stored in reservoirs and pumped from there into the city's water supply networks.

Impact on the water resources and drinking water quality of Klaipėda City's 3rd Water Supply Area

When assessing the potential impact of the PŪV, the following aspects are taken into account:

- the potential for contamination of the water in the King William Canal in the southern part of the KVJU during the implementation of the PŪV solutions;
- the possibility of contaminating groundwater in the vicinity of the King William Canal and Klaipėda's third water supply area during the implementation of the PŪV solutions.

In both cases, the potential for pollutants to enter and spread in the aforementioned surface and groundwater bodies is limited due to the following factors:

- No PŪV works are planned in Malkų Bay. Water flows through the King William Canal from the Minija River into the Curonian Lagoon (the water flows out into Malkų Bay), therefore, even if potentially contaminated water enters Malkų Bay, its ability to flow and spread against the current is very limited to a very small area (the flow in the canal at the water intake boundary is regulated by locks) and during limited periods (when the current flows through the strait from the Baltic Sea into the Curonian Lagoon);
- groundwater flow also discharges largely into the Curonian Lagoon. On the western side of the water source area, there is a natural groundwater flow divide, at which the groundwater flow splits into different directions; part of it flows westward and discharges into the Curonian Lagoon, while the other part flows eastward and northward toward the King William Canal and Malkų Bay. In this case, the entry of pollutants from the Curonian Lagoon into the groundwater layer and into the area of the water supply system is minimal. It should also be noted that the water extracted from the water supply area is treated by physical and chemical means before being supplied to consumers, and its quality is constantly monitored. In all cases, the quality of drinking water supplied to consumers must meet the established requirements.

Conclusion: In summary, it can be noted that the PŪV will have no negative impact on the water resources extracted from the Klaipėda III water source or on the quality of drinking water for all PŪV alternatives.

Potential impact on the physical (silt particles) and chemical (harmful substances) quality of the water at Melnragė I Beach

Beach water quality is regulated by Lithuanian Hygiene Standard HN 92:2018 “*Beaches and the Water Quality of Their Bathing Areas*” (hereinafter – HN 92:2018) [59]. Under HN 92:2018, the assessment of bathing water quality is based on a dataset of two microbiological parameters (intestinal enterococci and *E. coli*) (at least 16 water samples), which consists of monitoring data; water transparency is also measured, and chlorophyll “a” tests are conducted when indicated; HN 92:2018 does not regulate other physicochemical parameters of bathing water.

The solutions being implemented in the project area (dredging of the water area, extension of the channel, land reclamation, etc.) are associated with the management of dredged soil, i.e., its transport to the designated soil disposal (dumping) area and the disposal of the soil. The relationship between the disposal (dumping) of excavated soil in the Baltic Sea and the physical (silt particles) and chemical (harmful substances) pollution of seawater at soil disposal sites is thoroughly assessed in the Environmental Impact Assessment Report on New Marine Soil Disposal Sites [13] You also mentioned the impacts analyzed in the report on the water quality of bathing areas at beaches along the Baltic Sea coast: the dispersion of petroleum products, heavy metals (As, Cd, CrVI, Pb, Hg) in the dredged sediment (modeling performed) and their impact on relevant water quality parameters at the bathing areas, the dispersion of sediment particles (modeling performed), and the impact on water transparency. Conclusions presented: when removing soil of the most common Contamination Class II (according to LAND 46A-2002) in Dumping Zones “0” and “1” of the Baltic Sea, with winds blowing in any direction at a speed of 15 m/s, potentially harmful chemical substances (petroleum products, heavy metals As, Cd, Cr, Pb, Hg) and sediment particles in the dredged soil will not reach the Baltic beaches and their bathing areas and will not have a negative impact on the water quality of the bathing areas. When the soil is dumped in the PŪV area, most of the soil would quickly settle on the seabed at the dumping sites,

Some of the fine-grained particles would disperse in the water, but the impact would be temporary and would occur only during the dumping of soil; therefore, no significant impact on beach water quality is anticipated.

The measures being implemented in the project area (dredging of the water area, extension of the channel, land reclamation, etc.) are associated with increased surface water turbidity during dredging/excavation. More detailed information on the potential impact on surface water is provided in Section 4.1 “Water” of the PŪV EIA report

Section 4.1 “*Water*.” Increased water turbidity due to the works is expected throughout the entire construction period for all project alternatives; however, water turbidity will be local and episodic, depending on the specific location and time of the works; no significant impact on public health due to the water quality of Melnragė I Beach or other beaches in the city of Klaipėda is anticipated.

Summary conclusion:

1. Noise propagation modeling has determined that, for all PŪV alternatives, the limits specified in Lithuanian Hygiene Standard HN 33:2011 “*Noise Limit Values in Residential and Public Buildings and Their Surroundings*,” the limit values for noise emissions will not be exceeded at any time of day (daytime, evening, night) near the nearest residential/public buildings and their surroundings at any time of the day (daytime, evening, night), and during site formation works (when operating pile drivers, barges—dredgers, cranes, and other various machinery), they will not be exceeded during the daytime and evening. Site development work will not be carried out at night. The background (existing) environmental noise level in the vicinity of most of the assessed nearby residential buildings is likely to increase by up to 1 dBA (such a change in background noise level is considered insignificant, since the smallest change in noise level that the human ear can distinguish is 1 dBA and only when the two levels are heard immediately one after the other), and during dredging works in the water area, the background (existing) environmental noise level will remain unchanged. Upon completion of the southern port expansion works, there will be no remaining sources of noise in the vicinity.
2. Emissions during the construction/implementation of the PŪV and during the maintenance of the port’s water area will not cause significant changes in ambient air quality. It is recommended to apply the mitigation measures specified in Section 4.2.3. The solutions under Project Alternative 2A would have the least impact, while those under Project Alternative 3A would have the greatest impact.
3. Increased water turbidity due to the works is expected throughout the entire construction period for all PŪV alternatives. However, the increase in water turbidity would be local and episodic, depending on the specific location and time of the works; no significant impact on public health due to the water quality of Melnragė I Beach or other beaches in the city of Klaipėda is anticipated. During periodic dredging of the seabed to remove accumulated sediments as part of the project activities, the sediment must be dredged/pumped and managed/disposed of in accordance with the requirements of the regulatory document LAND 46A-2002 “*Rules for Dredging in Marine and Seaport Water Areas and for the Management of Dredged Sediments*,” and no significant impact on public health is anticipated.
4. The PŪV will not have any negative impact on the water resources extracted from the Klaipėda III water intake area or on the quality of drinking water in any of the PŪV alternatives.

The impact on public health during the implementation of the solutions and the operation of the PŪV facilities should be considered as direct and indirect, short-term (temporary during construction work) and long-term (periodic during water area maintenance), and of minor significance (will not exceed limit values in residential and public areas). In terms of increasing impact, the PŪV alternatives are ranked as follows: 4A < 3A < 2A (taking into account the scope of works).

4.12.3 Measures to prevent, reduce, and compensate for significant adverse environmental impacts

Proposed measures to prevent and reduce impacts on public health:

- measures to help prevent and reduce the negative impact of the PŪV related to ambient air pollution, as specified in Section 4.2.3, *“Measures to prevent, reduce, and compensate for significant adverse environmental impacts.”*
- Upon receiving substantiated complaints regarding noise from persons residing near the project site, the contractor must conduct noise measurements in accordance with the provisions of HN 33:2011 and, based on the results obtained, control the operating mode of the equipment used in construction to ensure compliance with the requirements of Lithuanian Hygiene Standard HN 33:2011.
- During site preparation work, the contractor must ensure that the maximum noise level emitted by the backhoe does not exceed 116 dBA, and that the maximum noise level of the excavator does not exceed 91.4 dBA.
- When carrying out construction work on the PŪV facilities, the noise manager must comply with the obligations specified in Article 14 of the Noise Management Act (No. IX-2499 of October 26, 2004). When carrying out land development (construction) works, it is necessary to comply with the requirements of the Klaipėda City Municipality Council’s Rules on Noise Prevention in Public Places, approved by Decision No. T2-321 of the Klaipėda City Municipal Council, and the requirements of the Klaipėda City Noise Prevention Plan for 2019–2023, approved by Decision No. T2-241 of July 25, 2019
T2-241 of July 25, 2019: when carrying out construction and reconstruction works on port quays, contracts with contractors must include restrictions on the operating hours of noise sources during nighttime and on weekends. When carrying out dredging works in the area, the organizer of economic activities must comply with the Klaipėda City Municipality Council’s Decision No. T2-241 of July 25, 2019
, which approved the Klaipėda City Municipality Noise Prevention Action Plan for 2019–2023, Measure 2.1.2: When dredging the port basin, contracts with contractors must stipulate the selection of noise sources that generate less noise.

4.13 Risk analysis and assessment

The PŪV provides for the filling of part of the port basin and the formation of new land areas, the construction of new quays, and the dredging of the basin. The project solutions for all project alternatives are planned in an area through which the underground main gas pipeline of AB “Klaipėdos nafta” runs—a high-pressure (P = 60 bar) 700 mm diameter pipeline for the supply of vaporized liquefied natural gas from the LNG terminal to the AB “Amber Grid” main gas pipeline.

Since the PŪV solutions may pose a risk to the existing gas pipeline, an assessment of the potential impact of the PŪV on the existing 700 mm diameter MD was conducted, along with a quantitative risk assessment of major accidents in the MD that could result from such PŪV impacts during the construction and operation of the PŪV facilities. The assessment was performed by F. Anusauskas, an expert in the assessment of potential accident risks. The full version of the quantitative risk assessment report is provided in Textual Appendix 8.

Methodology applied to the assessment

The quantitative risk assessment of the high-pressure gas pipeline was performed in accordance with the guidelines of the technical standard IGEM/TD/2 “Assessing the risks from high-pressure natural gas pipelines” issued by the Institute of Gas Engineers and Managers (IGEM), 2nd edition, June 2015.

The quantitative risk assessment of accidents on the underground main gas pipeline was performed using the latest versions of Gexcon software: assessment of consequences using EFFECTS 12.1.0, and modeling of individual and societal risks using RISKCURVES 12.1.0.

During the quantitative risk assessment:

- Based on the design data for D700 P = 60 bar MD, the standard methodology of IGEM/TD/2 “Risk Assessment of High-Pressure Natural Gas Pipelines,” and the latest report from the EGIG (European Gas Pipeline Incident Data Group) database of pipeline incidents covering the period 1970–2019 incidents, as well as the latest report from the United Kingdom Onshore Pipeline Operators Association (UKOPA), covering incidents from 1262 to 2020, a probabilistic analysis of potential damage to and complete rupture of main gas pipelines was performed;
- Impact assessment criteria were selected in accordance with the recommendations approved by the Fire and Rescue Department under the Ministry of the Interior of the Republic of Lithuania, and, using the EFFECTS 12.1.0 software, the impact zones of the gas fireball and flash fire, as well as the dispersion zone of the lower flammability limit (LFL) of the flammable gas cloud, were calculated;
- In accordance with the recommendations approved by the Fire and Rescue Department under the Ministry of the Interior of the Republic of Lithuania, select individual risk acceptability criteria using location-specific individual risk (*Location-specific Individual Risk*) is defined as the probability that a statistically average unprotected person (not shielded by building structures) located at a specific site will be fatally injured in the event of an accident or extreme event at a hazardous facility. Individual risk is typically expressed as the probability of a fatal event at a specific location over a one-year period (LSIR indicator);
- D700 P = 60 bar MD individual risk was modeled using Gexcon’s Riskcurves 12.1.0 software and presented in the form of individual risk contour maps;
- In accordance with the criteria approved by the Fire and Rescue Department under the Ministry of the Interior of the Republic of Lithuania and IGEM/TD/2 “Risk Assessment of High-Pressure Natural Gas Pipelines,” social risk—defined as the probability that many people will die in the event of an accident—was calculated using Gexcon’s Riskcurves 12.1.0 software. Social risk is often described using FN curves (*Frequency Number Curve*), where F is the frequency of the event per year, and N is the number of casualties.

Assessment Conclusions

The assessment determined:

1. D700 P = 60 bar In the event of a complete rupture of the MD pipeline, the following hazardous impact zones would be created:

- a. Fireball (diameter – 397 m, duration – 21 s) hazard zones:
 - i. 100% mortality 53 kW/m² – 309 m;
 - ii. High mortality, chain reactions 375 kW/m² – 379 m;
 - iii. Equipment damage, high mortality 12.5 kW/m² – 673 m;
 - iv. Isolated fatalities, severe injuries 7 kW/m² – 890 m
 - v. Irreversible health damage 5 kW/m² – 1,043 m;
- b. Danger zones for a horizontal fire:
 - i. 100% mortality 53 kW/m² – 332 m;
 - ii. High mortality, chain reactions 375 kW/m² – 373 m;
 - iii. Equipment damage, high mortality 12.5 kW/m² – 541 m;
 - iv. Isolated fatalities, severe injuries 7 kW/m² – 658 m
 - v. Irreversible health damage 5 kW/m² – 734 m;
- c. Areas where hazardous concentrations are exceeded:
 - i. Lower flammability limit 33-352 mg/m³ – 332 m
2. D700 P = 60 bar MD analysis of local specific risk (LSRI) contours shows that throughout the entire project area, **the port basin, and the adjacent industrial and storage areas, the site-specific risk is < 1.00E-05 and is acceptable for these areas.**
3. **In the Kairių Street area**, south of D700 P=60 bar MD, where a marina for small and recreational vessels and a residential neighborhood are planned, **the site-specific risk is <1.00E-06 and is acceptable for residential areas.**
4. **The social risk** of D700 P = 60 bar MD does not exceed **the boundaries of the contour recommended** by the Fire and Rescue Department under the Ministry of the Interior of the Republic of Lithuania, **but falls within the ALARP zone, where Lithuanian regulatory documents mandate the application of financially justified risk mitigation measures.**
5. The most widely used ALARP measures in gas pipeline operations are:
 - a. Measures to warn and inform nearby residents, including information boards and warning signs at intersections with roads, railways, and other utility corridors;
 - b. Training and information on how to act in the event of accidents, emergencies, gas leaks, and other similar situations, including what and how to report, and where to evacuate and take shelter in case of danger;
 - c. Covering the gas pipeline with a reinforced concrete slab;
 - d. Protective barriers for people in open areas who are not protected by building structures (residents or company employees, if at least part of the work is carried out outside buildings);

- e. Various best practice guides and recommendations outline measures that emerge following extreme events, where, when assessing the consequences of accidents, a commission determines which measures could have mitigated the consequences of the accident.
6. Best practices are recognized risk management decisions and measures used by leading companies and recommended by competent organizations for managing known hazardous events during operations. Best practices are presented in various forms, including:
 - a. Practical guides and codes of practice issued by national authorities;
 - b. Standards developed by responsible authorities and organizations (HSE (Health and Safety Authority), CER (Commission for Energy Regulation), etc.);
 - c. Guides prepared by international institutions and organizations, or by consulting firms commissioned by them (Purple Book, etc.);
 - d. Reports on past accidents whose findings have not yet been incorporated into operational manuals, standards, and other documents.

Planned measures

1. The technical design for the construction of the PŪV facilities must include the necessary fire safety, environmental protection, occupational safety, and health and safety measures, taking into account the main gas pipeline located within the PŪV territory.
2. Any construction work on the PŪV facilities within the MD protection zone must be coordinated with specialists from AB "Klaipėdos nafta," the operator of the MD.
3. When preparing technical designs for the construction of PŪV facilities and carrying out construction work on PŪV facilities, attention must be paid to the following aspects:
 - When preparing technical designs for the dredging of the Kiaulės Nugaros Island section and the installation of quays and protective walls, the designer must assess the potential hazards identified in the EIA report and its Textual Annex 8, as well as the requirements set forth in the letter No. (4.6)KN dated July 2020 from AB "Klaipėdos nafta" (hereinafter "KN") in its letter No. (4.6)KN dated July 2020, which are established in accordance with the provisions of the Main Gas Pipeline Protection Rules, which require obtaining the written consent (consent) in cases where activities (actions) are planned in any area located within 200 meters or less of the main gas pipeline network;
 - When preparing the technical design for the PŪV structures, geodetic data must be updated, and local topographic and bathymetric plans must be refined to the accuracy required by the designers, including seabed depths at the planned work site. After assessing possible changes in seabed depths and the island's shoreline, it is recommended to update the as-built drawings of underground utilities when preparing topographic data. Based on this material, the technical design preparer must prepare a vertical cross-section of the MD line, indicating the excavation zone, solutions for the installation of quays and shore reinforcement walls, and other information, and coordinate the planned construction works with the KN during the technical design coordination. The adopted design solutions may be refined during the working design stage, if necessary.
 - During construction, it is mandatory to comply with the provisions of the Rules for the Protection of Main Gas Pipelines and the additional procedures and conditions set forth in Article 42 of these Rules when constructing port infrastructure and/or superstructure within the MD protection zone. All construction work is carried out only after consultation with and approval by KN. The necessary measures are discussed and

coordinated during the works; if necessary, KN representatives monitor the stages of work within the MD protection zone; marking the MD route is mandatory when performing works within the MD protection zone. On land, marking with stakes is recommended; in the water, marking with anchored buoys is recommended. It is recommended to maintain the route marking in the water until the completion of the work.

- When preparing the project for the reconstruction of the Marios–Juodkrantė section of the 110 kV overhead power transmission line, it is necessary to follow the previously provided recommendations and update the topographic data and as-built photographs within the MD zone, prepare a vertical cross-section of the MD indicating the location of the power cable's intersection with the MD, and coordinate the planned solutions and construction work with KN. If possible, it is recommended to lay the power cable in an open trench prior to the intersection with the MD, in accordance with the provisions of the Main Gas Pipeline Protection Rules within the MD protection zone. During construction work, whether laying the cable in an open trench or installing it on the lagoon bottom via horizontal directional drilling, it is necessary to mark the MD and its protection zone at the intersection point or obtain KN's approval that marking is not necessary.
- When preparing the technical design and designing pile foundations for the quay at the MD location and within its protection zone, it is necessary to use updated topographic data and revised as-built drawings of underground networks with updated MD depths. Above the MD and approximately 3–5 m on both sides of the pile foundations, alternative solutions should be designed that would not degrade the MD's operating conditions, remove additional loads from the MD, and distribute them to adjacent pile foundations; the design must be coordinated with the KN. To avoid vibration loads during pile driving, the possibility of installing large-diameter bored piles in the immediate vicinity of the MD (3–5 m on either side of the MD) should be evaluated. When constructing access roads within the project area, including temporary ones for construction purposes, to prevent heavy traffic loads on the MD pipeline at a depth of 1–1.5 m, the upper portion of the road base should be designed using high-strength concrete slab paving, which absorb vehicle loads and distribute them across the entire area of the concrete slab pavement, thereby reducing direct loads on the MD. Concrete slabs, as a means of reducing traffic loads and distributing them evenly over a larger area, should also be provided above the MD when installing the foundations for port cranes and railway tracks. The use of concrete slabs as an ALARP measure to protect against the impact of MD accidents is also recommended in the IGEM (Institution of Gas Engineers and Managers) technical standard IGEM/TD/2 "Risk Assessment of High-Pressure Natural Gas Pipelines."

In 2023, at the request of KVJUD, specialists from the Lithuanian Maritime Academy conducted "A Research Study on the Assessment of Navigational Conditions on a Navigation Bridge Simulator While Maneuvering Vessels of Various Types and Sizes During the Development of the Southern Part of the Port of Klaipėda" and prepared a report [61] presenting their conclusions and recommendations. The conclusions of the aforementioned study state that:

- The test results showed that the solutions for all three PŪV alternatives (2A, 3A, and 4A) are suitable for accommodating the largest container ships with a length of 400 m and a maximum draft of 15.3 m. However, given the navigational conditions of the PŪV alternatives, different hydrometeorological restrictions would apply to each of them.
- In all three PŪV alternatives, the navigational situation near the LNG terminal (berth No. 157) is equally complex, especially when two gas carriers are berthed. At this location, to avoid significant interference from passing vessels to moored vessels, due to the relatively short passing distance of 30–80 m, vessels would have to navigate at a speed of no more than 4 knots.

When sailing at this speed, 400-meter-long vessels would require at least 3 tugs to ensure their safety, and, with two LNG carriers at berth, additional hydro-meteorological restrictions would be necessary.

- In the case of EIA Alternative 2A, in addition to the aforementioned problematic area near the LNG terminal where two gas carriers are moored, entering the southern part of the planned new container terminal through other ships moored at the terminal's quays would also be navigationally challenging. In the event of a strong current and strong crosswinds, it would be difficult to keep the vessel in the middle of the waterway between the two planned new quays, as the short distances to the moored vessels would severely restrict the operation of tugboats, and therefore, in most cases, the vessel being piloted would pass at an unsafe distance from the moored vessels. Given this, when piloting vessels of this size, it would be necessary to halt the loading of vessels moored at the quays. In the case of this PŪV alternative, vessels were safely piloted at current speeds of up to 1.5 knots and wind speeds of up to 14 m/s, using tugboats not at maximum capacity. In the event of stronger currents and winds, both the tugboats and the ship's engines would be operating at maximum capacity during navigation, and any technical or human error would be irreparable, potentially leading to a shipwreck. Additionally, in the case of this PŪV alternative, it is not possible to extend the ship turning basin, which would be highly relevant for reducing future restrictions on the largest ships due to the strong currents that form.
- In the case of PŪV alternative 3A, in addition to the aforementioned problematic area near the LNG terminal where two gas carriers are moored, the S-shaped approach channel to the planned new container terminal is also unfavorable from a navigational perspective. In the presence of a strong current and a crosswind, and when maneuvering the vessel at low speed, the additional turns required and the resulting change in the current angle relative to the vessel would make vessel control very difficult and, in many cases, impossible without the assistance of tugs. The parameters of the vessel turning areas and the water area in front of the quays are the most favorable for vessel turning among all PŪV alternatives. However, the direction of the quay line is the least favorable for vessel mooring among all PŪV alternatives. The quay is positioned at an angle such that it is constantly affected by the outflow from the port, and in the event of a stronger current and a crosswind, four tugs would be unable to ensure the safe mooring and unmooring of a vessel. In the case of this PŪV alternative, ships were safely guided and moored at current speeds of up to 1.0 knots and wind speeds of up to 14 m/s, without the tugs operating at maximum capacity. At a current speed of 1.5 knots and a wind speed of 14 m/s, both the tugs and the ship's engines would be operating at maximum capacity during ship handling, and even at maximum capacity, the ship's safety could not be ensured during mooring and unmooring. In such a case, vessel maneuvering safety could be increased by adding more tugs, but not all vessels have the capacity to accommodate additional tugs, and the number of tugs available in the port may be limited. **From a navigational perspective, this is the least favorable PŪV alternative**, and in this case, the strictest hydrometeorological restrictions should be applied to ships.
- In the case of PŪV alternative 4A, in addition to the aforementioned problematic area near the LNG terminal where two gas carriers are moored, there is only one other area that is more complex from a navigational perspective, at buoy 37 marked on the plan, where, when passing by, a turned-around vessel, with a current speed of 2 knots and a crosswind speed of 14 m/s, may pass at an unsafe distance from vessels moored at the quay. In the case of this PŪV alternative, vessels were safely guided and moored at current speeds of up to 2.0 knots and wind speeds of up to 14 m/s, using tugs not at maximum capacity. At a current speed of 2.0 knots and a wind speed of 18 m/s, during vessel maneuvering, both the tugboats and the vessel's engines would operate at maximum capacity, and any technical or human

error would be difficult to correct and could lead to a ship accident. In such a case, the safety of ship handling could be increased by adding more tugs, but not all ships have the capacity to accommodate additional tugs, and the number of tugs available in the port may be limited. **From a navigational perspective, this is the most favorable alternative for the PŪV.**

The recommendations state:

- In the event of the implementation of any of the PŪV alternatives (2A, 3A, and 4A), at least one current meter and a meteorological station must be installed in the newly developed southern part of the port.
- In the event of the implementation of any of the PŪV alternatives (2A, 3A, and 4A), the eastern edge of the navigation channel should be dredged to the northern end of the pier at berths No. 146/147 and to the corner of berths No. 148/149.
- In the case of implementing any of the PŪV alternatives (2A, 3A, and 4A), the possibility of angling the pier of berths No. 146/147 should be evaluated, thereby forming a wider channel and increasing the safety of ships moored at the LNG terminal.
- **For any of the alternatives (2A, 3A, and 4A), when two LNG carriers are berthed at the LNG terminal, restrictions should be established for the pilotage of large container ships: wind speed—no more than 14 m/s, current speed—no more than 1 knot, 4 tugs for vessel pilotage and a speed not exceeding 4 knots. After conducting several vessel pilotage operations, the restrictions should be reassessed.**
- In the case of PŪV Alternative 2A, when guiding ships past ships moored at the planned new container terminal, the loading of the moored ships and any loading equipment that may obstruct the passing ship should be suspended.
- In the case of PŪV Alternative 3A, the possibility of installing a protective engineering structure on the western edge of the water area should be assessed to shield the quays of the planned container terminal from the outgoing current.
- For PŪV Alternative 3A, the possibility of deepening the southern part of the planned container terminal's navigation basin to 16.5 m should be evaluated to expand the space for vessels to moor at the farther quay and when unmooring.
- In the case of PŪV alternative 4A, the water area in the southern part near the container terminal should be expanded by deepening it directly from buoy No. 35 to No. 39 as marked on the plan, to ensure the safe operation of the entire terminal without interrupting cargo handling.
- For PŪV alternatives 3A and 4A, the possibility of extending the turning basin should be evaluated, which would be highly relevant for reducing future restrictions on the largest ships due to strong currents.

4.14 Analysis and evaluation of alternatives

4.14.1 Selection of the optimal PŪV alternative

In the previous sections, PŪV alternatives 2A, 3A, and 4A were examined in detail to select the most optimal implementation options, taking into account the potential environmental impact of the PŪV solutions during the construction of facilities/implementation of solutions and during operation/use.

In this section, based on the conclusions of the expert assessments and other considerations, three project alternatives—2A, 3A, and 4A—are compared, with the most optimal and recommended alternative selected for project implementation. During the EIA for the PŪV, experts in various fields assessed the potential impact of the PŪV on specific environmental components for all PŪV alternatives and compared these alternatives, identifying the priority alternative for PŪV implementation based on their respective areas of expertise. Most of these assessments are based on qualitative expert evaluation. The impact of the PŪV on certain environmental components was also assessed using clear quantitative measures (e.g., based on the amount of pollutants emitted, the volume of soil excavated, etc.).

The PŪV alternatives were compared based on:

- their environmental impact during construction and operation;
- the project facilities planned for their implementation and the parameters of their solutions.

4.14.2 Comparison of PŪV alternatives based on their environmental impact

The comparison and prioritization of the PŪV alternatives was carried out by evaluating the summarized expert conclusions. Tables 2.14.2.1 and 2.14.2.2 present a summary comparison of the potential impacts of the PŪV alternatives on objects during construction and operation, as well as the prioritization based on expert assessment.

4.14.2.1 Table. Comparison of the potential impacts of the PŪV alternatives during the construction of the facilities

| No. | Impact Object | Priority of alternatives with lower impact as determined by expert assessment (P) | | |
|---|--------------------------|---|---|---|
| | | Construction and installation phase | | |
| | | 2A | 3A | 4A |
| Natural environment components | | | | |
| 1 | Surface water | - | - | P |
| 2 | Ambient air | P | - | - |
| 3 | Climate | P | - | - |
| 4 | Soil | - | P | - |
| 5 | The Earth's interior | - | - | P |
| 6 | Shores | P The impact is equivalent; applying the proposed measures will reduce | P Impact is equivalent to that achieved by implementing the proposed measures to reduce | P The impact is equivalent to that achieved by applying the proposed measures to reduce |
| 7 | Landscape | - | - | P |
| 8 | Protected Areas | - | - | P |
| 9 | Vegetation | P Impact equivalent | P Impact equivalent | P Impact equivalent |
| 10 | Fauna: | | | |
| 10.1 | Birdlife | - | P | - |
| 10.2 | Ichthyofauna | - | - | P |
| 10.3 | Benthic habitats | - | P | - |
| Components of the social environment | | | | |
| 11 | Cultural heritage values | P | - | - |
| 12 | Tangible assets | P The effect is equivalent when applying the proposed | P The effect is equivalent when applying proposed | P The effect is equivalent when applying the proposed |

| | | measures reduce | measures to reduce | measures to reduce |
|--------------------------------|---------------------|-----------------|--------------------|--------------------|
| 13 | Public health | - | - | P |
| 14 | Impact of Impact | P(PN) | P(PN) | P(PN) |
| 15 | Cross-border impact | P(PN) | P(PN) | P(PN) |
| Relative priority score | | 8 | 8 | 11 |

Note: PN – no impact or insignificant impact; P – priority is assigned to this alternative

4.14.2.2 Table. Comparison of the potential impacts of PŪV alternatives during the operation of the facilities

| No. | Impact Object | Priority (P) of the alternative with the lowest impact as determined by expert assessment | | |
|---|--------------------------|---|-------------------------------|-------------------------------|
| | | Operation phase | | |
| | | 2A | 3A | 4A |
| Natural environment components | | | | |
| 1 | Surface water | - | - | P |
| 2 | Ambient air | P | - | - |
| 3 | Climate | P(PN) | P(PN) | P(PN) |
| 4 | Soil | P(PN) | P(PN) | P(PN) |
| 5 | Subsurface | P(PN) | P(PN) | P(PN) |
| 6 | Shores | - | P | - |
| 7 | Landscape | - | - | P |
| 8 | Protected Areas | P(PN) | P(PN) | P(PN) |
| 9 | Vegetation | P Impact equivalent | P Impact equivalent | P Impact equivalent |
| 10 | Fauna: | | | |
| 10.1 | Birdlife | - | P | P |
| 10.2 | Ichthyofauna | P | - | - |
| 10.3 | Benthic habitats | - | P | - |
| Components of the social environment | | | | |
| 11 | Cultural heritage values | - | - | P |
| 12 | Tangible assets | P(PN) | P(PN) | P(PN) |
| 11 | Public health | P(PN) | P(PN) | P(PN) |
| 13 | Impact of Impact | P(PN) | P(PN) | P(PN) |
| 14 | Cross-border impact | P(PN) | P(PN) | P(PN) |
| Relative priority score | | 11 | 12 | 13 |

Note: **PN** – no impact or insignificant impact, **P** – priority is given to this project alternative

The assessment showed that the greatest negative impact on the environment would occur during the construction and installation phase of the project, but in most cases it would be short-term and temporary. In the case of Project Alternative 4A, the environmental impact would be lower than in the cases of Project Alternatives 2A and 3A. Project Alternative 4A is prioritized as the alternative with the lowest impact based on the results of most expert assessments (11 out of 17 cases) (Table 2.14.2.1).

The operational period of the PŪV facilities will not have a significant negative impact on most environmental elements. For most of the assessed environmental elements, there will be no impact at all during the operation of the PŪV facilities, or the impact will be insignificant and, in the case of all PŪV alternatives, more or less

equivalent. At this stage of the project, the PŪV may have a more significant impact on surface water (due to the sedimentation of dredged sediment in the sea during the maintenance of water bodies), on the shoreline (due to long-term hydrodynamic changes), and on ambient air (due to the need to clean up sediment accumulated in water bodies). When comparing all PŪV alternatives with one another, PŪV alternative 4A would again be slightly more favorable.

In summary, it should be noted that the greatest impact of the PŪV on the natural and social environment would occur during the construction phase of the PŪV facilities. At this stage, based on the expert assessment, the priority of the alternative identified as having a lower environmental impact is applied to PŪV Alternative 4A. During the operational phase of the PŪV facilities, all PŪV alternatives are similar in terms of their total cumulative impact.

4.14.3 Comparison of PŪV alternatives based on the PŪV facilities planned for their implementation and their parameters

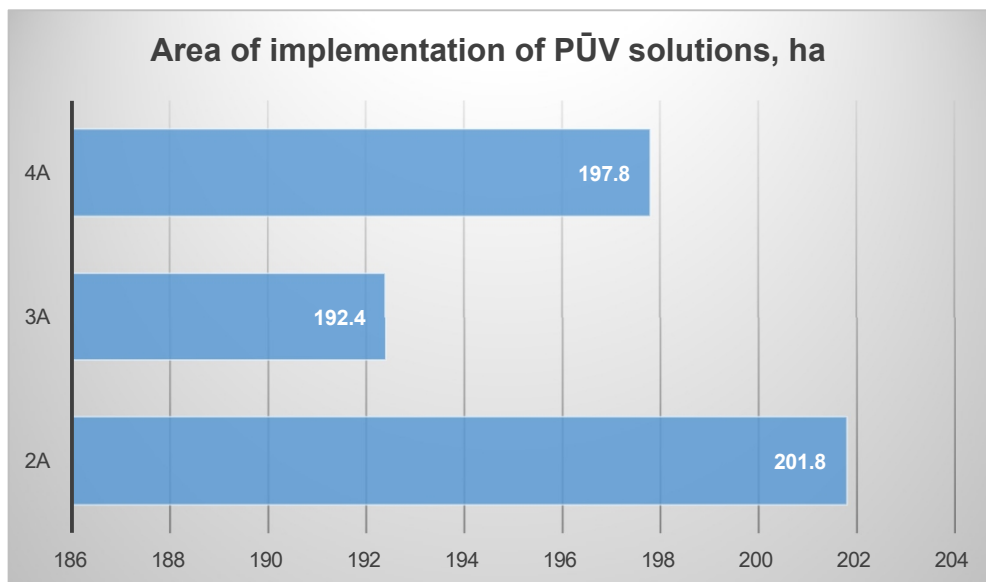
A comparison of the alternatives based on the PŪV facilities planned for their implementation and some of their design parameters is provided in Table 4.14.3.1.

4.14.3.1 Table. Comparison of alternatives based on the PŪV objects planned for their implementation and the indicative parameters of their solutions

| PŪV object/parameter | Alternative 2A | Alternative 3A | Alternative 4A |
|---|-----------------------|-----------------------|-----------------------|
| <i>Stage of implementation of the PŪV solutions</i> | | | |
| Area of the territory where the main PŪV solutions are implemented, ha | 201.8 | 192.4 | 197.8 |
| Area of the dredged water area, ha | 95.2 | 114.8 | 96.4 |
| Water area to be dredged to, m | 16.5–17.0 | 11.0–17.0 | 16.5–17.0 |
| Area of Kiaulės Nugaros Island to be dredged, ha | 13.4 | 13.2 | 13.6 |
| Volume of excavated soil, million m ³ | 11.97 | 12.3 | 11.68 |
| Area of backfilled territory, ha | 106.6 | 77.6 | 101.4 |
| Area of the water body to be filled, ha | 81.6 | 60.5 | 83.4 |
| Area of land to be filled, ha | 24.9 | 17.1 | 17.9 |
| Area of land and water to be reclaimed, ha | 106.6 | 77.6 | 101.4 |
| Amount of soil required for the area to be formed, million m ³ | 5.43 | 3.88 | 5.14 |
| Excess soil volume, million m ³ | 6.54 | 8.42 | 6.54 |
| Length of quays to be constructed, m | 1,803.0 | 1,665.0 | 1284.0 |
| Length of retaining walls to be constructed, m | 470.0 | 470.0 | 470.0 |
| Length of the 110 kV EEPOL to be upgraded, km | 6.61 | 6.61 | 6.61 |
| Length of 110 kV power cable being laid, km | 3.76 | 3.76 | 3.76 |
| <i>Operation phase of the PŪV facilities</i> | | | |
| Sediment accumulation in the PŪV water area during wet years, thousand m ³ /year | 200,714 | 391,676 | 328,751 |

Implementation phase of the PŪV solutions

Based on the area where the main PŪV solutions would be implemented, the largest area would be in the case of Alternative 2A, with Alternative 4A differing only slightly (the difference between them is 4.0 ha), and the smallest area is for Alternative 3A (Fig. 4.14.3.1, Table 4.14.3.1).



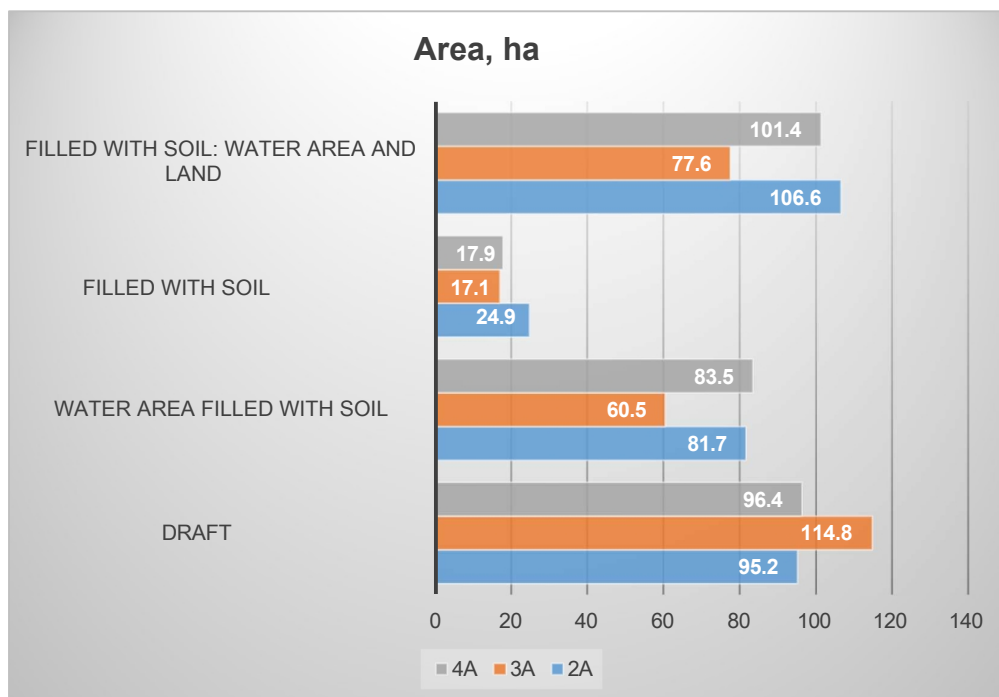
4.14.3.1 Fig. Comparison of the area of the main PŪV solution implementation zones (dredged and backfilled) for all PŪV alternatives

The difference is more pronounced when comparing PŪV alternatives based on the area of the dredged water body. While PŪV alternatives 2A and 4A are very similar in this respect (the difference between them is about 1.2 ha), in the case of Alternative 3A, dredging works are planned for an area approximately 18.4–19.6 ha (or about 16–17%) larger than in the other aforementioned PŪV alternatives. Conversely, regarding the area to be filled, in this respect Alternative 3A has the smallest filled area and differs from the other two PŪV alternatives by approximately 21.5–22.9 ha (or by approximately 25.9–27.5%) (Fig. 4.14.3.2, Table 4.14.3.1).

Accordingly, these solutions determine the volumes of excavated soil and the needs and possibilities for its use. The largest volume of excavated soil would be in the case of Alternative 3A, but the need for its use in this alternative would be the smallest. The other two alternatives, 2A and 4A, would be similar to each other in terms of these parameters.

In terms of the length of the quays to be constructed, Alternative 2A leads and differs from the other two PŪV alternatives by 138 m, or about 7.3% (from Alternative 3A), and 519 m, or about 28.8% (from Alternative 4A). In terms of cargo handling capacity, Alternative 2A would be the most beneficial. In terms of the total area of land created for the Port's needs, Alternatives 2A and 4A are the most beneficial, differing from each other by only 5.0 ha. Thus, in terms of the maneuvering water area created, Alternative 3A would be the most beneficial, while in terms of the area of quays and land territory created for the Port's needs (cargo handling and storage), Alternatives 2A and 4A would be the most beneficial (Fig. 4.14.3.2, Table 4.14.3.1).

Some parameters (the dredged area of Kiaulės Nugaros Island, the length of the 110 kV EEPOL to be reconfigured, the length of the 110 kV power cable to be laid, and the length of the retaining walls) would be very similar for all PŪV alternatives (Table 4.14.3.1).



4.14.3.2 Fig. Approximate distribution of territories where the main solutions of the PŪV will be implemented
distribution of territories where the main solutions of the PŪV will be implemented
for all PŪV alternatives

Indirect factors also include the costs necessary for the production of additional materials and their transportation to the construction site, as well as potential emissions into the environment associated with these activities.

Operation phase of the PŪV facilities

During the operation of the PŪV facilities, the majority of maintenance work in the PŪV water area (sediment removal and restoration of the water area’s design depth) would be required in the case of Alternative 3A. Based on the amount of sediment accumulated and removed during wet years, Alternative 3A would be higher than the other two PŪV alternatives, 2A and 4A, by approximately 63–191 thousand m³/year (or approximately 16–48.8%) (Table 4.14.3.1).

Selection of the Optimal Project Alternative

When comparing the PŪV alternatives based on the solutions and facilities required for their implementation, it is evident that Alternative 2A stands out with the highest indicators, while Alternative 4A would have fewer limiting parameters.

After evaluating the results of the impact assessment and parameter comparison of the PŪV alternatives, the following final conclusions can be drawn:

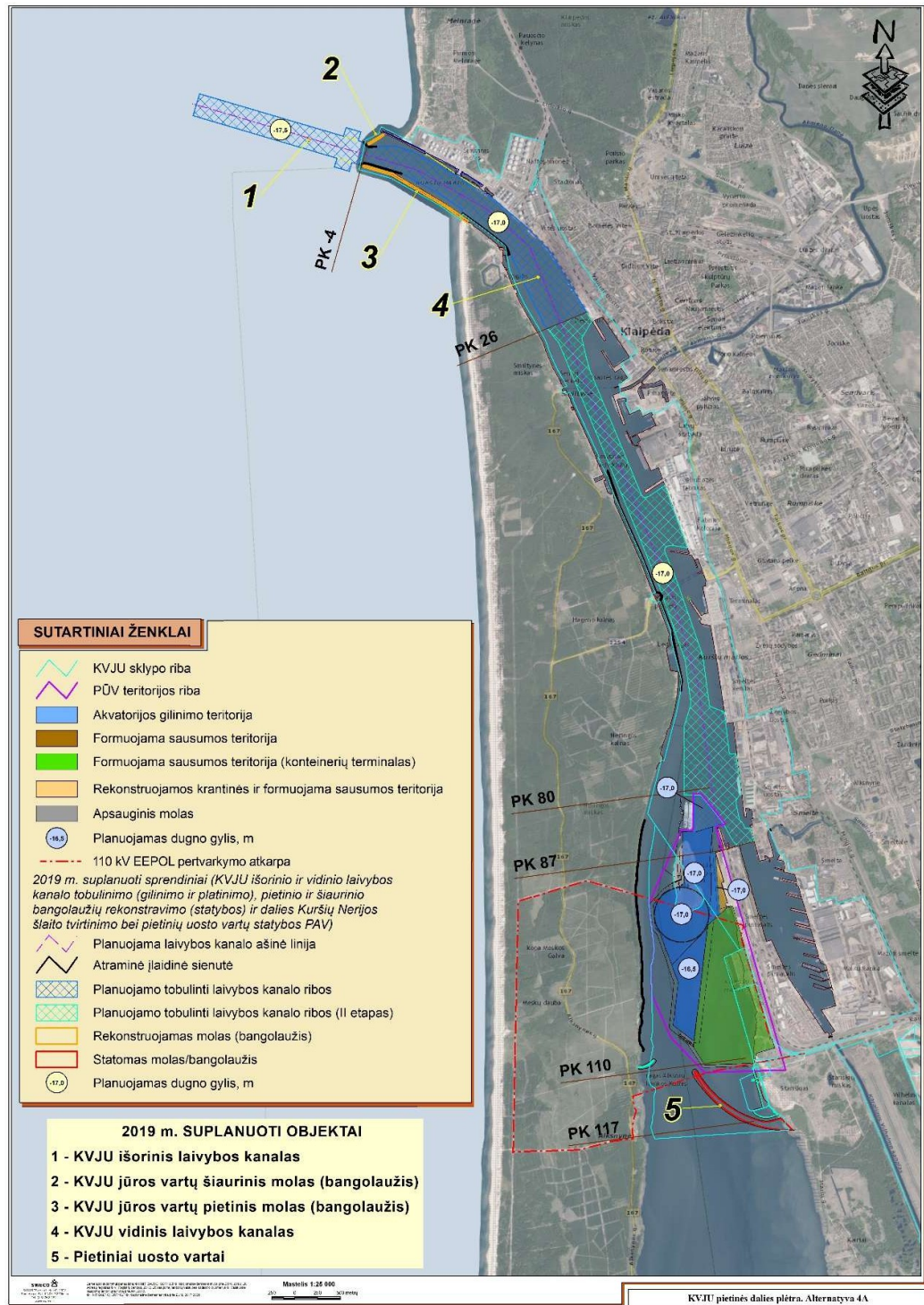
- All of the assessed PŪV alternatives could be implemented, but their implementation circumstances, potential impacts, and implementation timelines would differ;
- The greatest negative impact on the environment would occur during the construction and installation phase of the PŪV facilities, but in many cases it would be short-term and temporary. In the case of PŪV Alternative 4A, the environmental impact would be less than in the cases of PŪV

Alternatives 2A and 3A;

- During the operational phase of the planned facilities, provided that the proposed preventive and environmental impact mitigation measures are implemented during the construction phase, there would be no negative impact at all or only an insignificant one on most of the environmental elements assessed. During this operational phase, the EIA may have a certain level of impact on surface water, shorelines, the landscape, and biodiversity. After comparing the PŪV alternatives for this operational phase, all three alternatives are quite similar in terms of their total cumulative impact, with Alternative 4A having a slightly lower impact.
- Based on the EIA facilities planned for their implementation and the parameters of their solutions, EIA Alternative 4A is slightly superior to EIA Alternatives 2A and 3A;

A summary of the results of the assessment and comparison of the PŪV alternatives indicates that PŪV Alternative 4A is the most optimal for implementation (Fig. 4.14.3.3), with its solutions planned to be implemented in a single phase by 2034. During and after the implementation of the PŪV solutions, it is necessary to apply the proposed measures for the prevention, mitigation, and compensation of impacts (Table 4.14.3.2).

Upon implementation of the environmental impact and public health mitigation and monitoring measures proposed in the EIA report, the impact of the PŪV on the natural, residential, and social environment, as assessed by the scope parameters, would be acceptable, and the PŪV could be implemented and operated at the planned location.



4.14.3.3 Fig. Proposed alternative 4A for the PŪV

4.14.3.2 Table. Summary list of measures to prevent, mitigate, and compensate for the potential impacts of the proposed PŪV

| No. | Impact element | Proposed measures during the implementation of the PŪV solutions | Proposed measures during the operation of the PŪV facilities |
|-----|----------------|---|---|
| 1 | Surface water | <ul style="list-style-type: none"> Responsible for the use of low-pollution equipment (dredgers, dredging barges, pile drivers, vehicles, machinery, etc.) during the implementation of solutions (dredging of water bodies, land reclamation, soil transportation, and disposal). | <ul style="list-style-type: none"> Responsible and timely execution of dredging and disposal of sediments accumulated on the bottom of water bodies in accordance with established requirements. Implementation of sustainable solutions and technologies in the development and expansion of economic activities within the KVJU territory, enabling a reduction in water consumption and the volume of wastewater generated; Responsible management of generated wastewater, ensuring the necessary wastewater collection and treatment capacity. Monitoring of wastewater discharges and their impact on surface water |
| 2 | Ambient air | <ul style="list-style-type: none"> Use of low-emission vehicles and machinery (barges—dredgers, excavators, pile drivers, vehicles, machinery, etc.) during construction work; Optimal organization of material and soil transport, construction, and loading operations (e.g., use of larger-capacity dredgers for). | <ul style="list-style-type: none"> Use of low-emission vehicles and machinery (dredgers and/or suction dredgers, barges—dredgers) during waterway maintenance works. |
| 3 | Climate | <ul style="list-style-type: none"> Use of low-emission vehicles and machinery (dredgers, dredging barges, pile drivers, vehicles, machinery, etc.) during construction work; Optimal organization of material and soil transport, construction, and loading operations (e.g., use of larger-capacity dredging barges for). | <ul style="list-style-type: none"> It is not necessary to apply additional mitigation measures due to the PŪV |
| 4 | Soil | <ul style="list-style-type: none"> Sustainable design solutions (optimally designing solutions and planning areas to minimize the size of potentially affected areas). Efficient organization of work, selecting the most optimal areas for construction and service zones, as well as transportation routes, to minimize the size of the potentially affected area. Temporary storage and reuse of the removed fertile soil layer. Upon completion of construction work, part of the stored soil would be used for landscaping the site and, where possible, for the reclamation of adjacent areas that may have been directly disturbed during the implementation of the project solutions. Use of excess soil for the reclamation of other damaged areas (outside the project area). | <ul style="list-style-type: none"> It is not necessary to apply additional mitigation measures for the PŪV. |

| | | | |
|---|------------|--|--|
| | | <ul style="list-style-type: none"> • Strict and timely compliance with environmental protection requirements during the construction and operation of facilities to prevent chemical pollution (emergency) from mobile vehicles and technological equipment. | |
| 5 | Subsurface | <ul style="list-style-type: none"> • Before implementing the solutions, detailed engineering geological surveys are required (where they have not yet been conducted), to identify potential risk zones and, accordingly, to plan the necessary technical solutions to prevent or control the threat of subsidence processes, ensure the stability of the banks, and substantiate the technical parameters of other structures; • In accordance with the requirements of LAND 46A-2002 "Rules for Soil Excavation in Marine and Seaport Water Areas and the Management of Excavated Soil," bottom sediment studies must be conducted to the extent specified in the aforementioned document prior to commencing dredging works in the water area; • When carrying out dredging works within the projected Gintaras area, it is recommended that a geologist-expert capable of identifying the resource; • Optimal targeted use of dredged material for land reclamation and beach nourishment, minimizing the amount of material disposed of in landfills, in accordance with LAND 46A-2002 "Rules for Dredging in Marine and Seaport Waters and the Management of Excavated Soil." Planned and recommended solutions: 1) use the dredged soil from the water areas being deepened for the formation of new land areas planned under the PŪV solutions (indicative requirement, depending on the selected PŪV alternative, is approximately 3.88–5.43 million m³, it is recommended to use clayey rock soil as a first priority); 2) use the sandy soil of suitable for the Melnragė–Giruliai | <ul style="list-style-type: none"> • It is not necessary to apply additional mitigation measures regarding the PŪV. |

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| | | <p>for replenishment works of the coastal seabed and shoreline deposits in the Melnragė–Giruliai 3) To replenish the sediment in the shallow part of the foreshore on the eastern coast of the Curonian Spit, from the shoreline to the 1–1.2 m isobaths, from Alksnynė to the existing pier, 4) Storing excavated and temporarily unused sandy soil of pollution classes I–II at a temporary storage site in the southern part of the Smeltė Peninsula outside the port territory (until the need for its intended use arises) (estimated volume: approximately 5.6–5.9 million m³) and subsequently use as needed for shoreline management works.</p> | |
| 6 | Shores | <ul style="list-style-type: none"> • In all PŪV alternatives, stabilize the reinforcement of the remaining (unexcavated) section of the Kiaulės Nugaros Island’s foreshore with a retaining wall (similar to Malkų Bay on the Smeltė Peninsula) on all sides. • In the case of implementing PŪV alternatives 2A and 4A, the entire section, from the end of the wharf to the planned protective embankment near Alksnynas (a section of approximately 3,570 m), the lower part of the foreshore at a depth of about 1.0–1.2 m (as this is where the foreshore slope typically begins in this section) should be reinforced with an underwater retaining wall. In the case of Alternative 3A, the bank should be reinforced in this manner in the section from the planned Alksnynė dam to approximately PK85 (at the 2,450 m mark). It should be noted that in this case, a local 30–100 m long section of eroded bank will form beyond the end of the wall. Therefore, this section should be reinforced with a stone revetment. Since the wall will be submerged most of the time, its location in the water (for navigation safety) should be marked with warning signs. • The underwater retaining wall in this section should be constructed such that the optimal distance from the average long-term lagoon water level | <ul style="list-style-type: none"> • Once the PŪV solutions are implemented and observations at the 3 MŽ station at its current location cease, it is proposed to relocate it south of the protective breakwater at the port’s southern gate and continue observations. • Speed limits for vessels should be enforced in the southern port gate section. • If, following the planned construction of the port’s southern gate, coastal erosion processes begin to intensify in this section, then the shoreline section from the protective breakwater at Alksnyne to Alksnių Ragas (approximately 600 m) should be reinforced. It is likely that, to reinforce the shoreline in this section, it would suffice to form a stone berm along the shoreline. |

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| | | <p>The distance from the wall to the shore (at the wall, from the bottom of the breakwater to its top) should be filled with material excavated during dredging that meets quality requirements</p> <p>The space between the wall and the shore (along the wall from the bottom of the slope to its top) should be filled with sand excavated during dredging that meets quality requirements</p> | |
| 7 | Landscape | <ul style="list-style-type: none"> • Use of optimal techniques during construction work; • Harmonious integration of the project's solutions with the existing landscape and their utilization to create areas attractive to the public; • Additional shoreline management measures (underwater retaining walls, replenishment of the shoreline with sand) designed to mitigate the impact on the adjacent Curonian Spit area and its landscape (to ensure shoreline stability by protecting it from erosion, landslides, etc.), compensatory measures aimed at biodiversity conservation (creation of new bird nesting sites on the island). | <ul style="list-style-type: none"> • It is not necessary to apply additional mitigation measures due to the PŪV. |
| 8 | Protected Areas | <ul style="list-style-type: none"> • Impact avoidance and mitigation measures for environmental elements constituting protected areas, such as surface water, shorelines, landscape, and biodiversity, are described in more detail in Sections 4, 6, 7, and 9 | <ul style="list-style-type: none"> • No additional mitigation measures are required for the PŪV. |
| 9 | Biodiversity | | |
| 9.1 | Vegetation | <ul style="list-style-type: none"> • After completion of the works, the affected areas on the Curonian Spit should be recultivated and planted with vegetation characteristic of the area, with solutions in coordination with the Curonian Spit National Park Directorate. | <ul style="list-style-type: none"> • No additional mitigation measures are required for the PŪV. |
| 9.2 | Fish | <ul style="list-style-type: none"> • During the main migratory periods of migratory fish in the Klaipėda Strait, restrictions on dredging and deepening works must be imposed from January 1 to March 1, from April 15 to June 15, and from August 15 to October 31. On the other hand, due to varying meteorological conditions, fish migration periods may differ from year to year; therefore, it would be advisable to monitor fish migration during the implementation of the solutions and to restrict works during the most intense migration periods, which may be shorter than the theoretical periods indicated above. • These dates must also be taken into account when carrying out construction work in the water area where dredges are used. | <ul style="list-style-type: none"> • When clearing the water area of sediment, it is necessary to focus on times of the year when the impact on the migration of both migratory and protected fish species will be minimal. • Once the PŪV solutions have been implemented, measures should be applied to reduce pollution caused by port operations. |

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| 9.3 | Birds | <ul style="list-style-type: none"> On the undeveloped part of Kiaulės Nugaros Island, create open sandy habitats by clearing the reed beds and covering the island's surface with a layer of local soil (excavated during the island's clearing or waterway dredging) at least 0.5 m thick. At least 5 artificial nesting sites for cave-nesting ducks shall be installed on the island. Do not carry out dredging work on Kiaulės Nugaros Island during the bird breeding season, i.e., March–July. The filling of Kiaulės Nugaros Island with soil and vegetation management shall be carried out during the period from August to February, i.e., outside the bird breeding season. Do not carry out the filling of the KVJU water area with soil to form dry land during the period from December to February, when, after the Curonian Lagoon freezes over, wintering great crested grebes and other waterbird species congregate in these areas. | <ul style="list-style-type: none"> Every year in September–October, mow and remove overgrown vegetation on Kiaulės Nugaros Island. Every year, before the bird breeding season (February–March) and after the breeding season (September–October), the island's surface must be raked to maintain an open surface and prevent vegetation from growing. At least once every three years, the surface of Kiaulės Nugaros Island must be topped with a layer of sand no less than 10 cm thick. To protect birds from invasive predators (e.g., Canadian beavers) during the breeding and rearing seasons, measures to deter and/or neutralize (e.g., traps) these invasive predators must be implemented on the island. The measures must be selected in accordance with the recommendations of specialists in this field. As a compensatory measure for the reduction in feeding areas for birds that feed on vegetation and benthic biota following the implementation of the PŪV solutions (filling in part of the water area), it is proposed to carry out periodic reed cutting and removal work in the Curonian Lagoon water area, in the lagoon coastal zones agreed upon with the KNPP Directorate, thereby exposing additional feeding areas for the birds. The total area of the managed water area should be approximately 22 ha (corresponding to the area of feeding waters lost), and the specific management sites, timelines, and issues related to the organization and financing of the work should be coordinated by the project organizer with the KNNP Directorate during the technical design phases of the project. It is recommended to cut and remove reeds in the selected water areas in the spring and at the end of summer for two consecutive years until their complete eradication and the formation of new feeding water areas as well as foreshore and shoreline habitats. Repeat maintenance work after 3–5 years, depending on the condition of the treated water area (possible re-overgrowth). |
| 10 | Cultural Heritage Assets | <ul style="list-style-type: none"> The solutions for alternatives 2A, 3A, and 4A of the PŪV may impact unidentified underwater heritage; therefore, the following mitigation measures are proposed: archaeological surveys must be conducted during earthwork operations to deepen the waterway. During these archaeological surveys, any potential anthropogenic objects or artifacts located beneath the sediment layer—which could not be detected during side-scan sonar surveys or visual inspections of the seabed—would be documented. Watercraft recorded in the PŪV area (objects No. 16, 19, 32) may be recovered during earthmoving operations under supervision of a specialist. | |

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| 11 | Tangible assets | <ul style="list-style-type: none"> • Redemption or compensation in other ways for real estate located within the project area and hindering the implementation of the project solutions, on terms mutually acceptable to the owners. • Consent/compensation agreements regarding the establishment of special conditions with landowners whose plots (or parts thereof) will fall within the protection zone of the newly planned 110 kV underground power cable line. • If violations occur and damage is caused during the implementation of the project (during the construction of facilities), land plot owners will be compensated for the damage caused, and the violations will be rectified. | <ul style="list-style-type: none"> • Solutions for the use and maintenance of the newly formed KVJU territory must be planned, evaluated, and designed so that the development of the territory complies with the decision in row 272 of Table 1 of the Implementation Program for the General Plan of the Territory of the Republic of Lithuania (approved on 20 September 2023, No. 741), namely that “the existing transport network of the city of Klaipėda is not sufficiently efficient and sustainable, [...], therefore, in conjunction with the port’s expansion by 2030, land transport infrastructure should be developed to disperse and redirect freight flows away from the city’s territory,” and in subsequent design stages, to present possible/planned measures for implementing these solutions, along with their feasibility and timelines. • All economic activities planned in this newly formed territory under the KVJU must comply with the requirements of valid spatial planning documents and must be assessed and planned in accordance with the requirements of the Law on Environmental Impact Assessment of Planned Economic Activities of the Republic of Lithuania, i.e., EIA procedures are conducted or not depending on whether the planned activities fall within the lists of activities specified in Annexes 1 and 2 of the aforementioned law, and the provisions of other legal acts regulating the protection of the environment and public health. All future development projects to be implemented in this area must, after assessing their nature, location, and environmental impact, comply with the requirements of environmental protection, public health, immovable cultural heritage, fire safety, and civil protection. |
| 12 | Public Health | <ul style="list-style-type: none"> • Upon receipt of substantiated complaints regarding noise from persons residing near the project area, the contractor shall conduct noise measurements in accordance with the provisions of HN 33:2011 and, based on the results obtained, shall control the operating mode of the equipment used for construction work to ensure that the requirements of Lithuanian Hygiene Standard HN 33:2011 are not violated. • While carrying out the formation of new land areas and dredging works, the contractor must ensure that the maximum noise level emitted by pile drivers does not exceed 116 dBA, and that the maximum noise level of dredgers does not exceed 91.4 dBA. • When carrying out construction work on the PŪV facilities, the noise manager must comply with the obligations set forth in Article 14 of the Noise Management Act (No. IX-2499 of October 26, 2004). When carrying out land development (construction) works, it is necessary to follow the Klaipėda City Municipality Council’s Decision No. T2-321 of December 21, 2017 | <ul style="list-style-type: none"> • When carrying out work to clear the water area of debris, the contractor must ensure that the maximum noise level of the dredger does not exceed 91.4 dBA. |

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| | | <p>the requirements of the Klaipėda City Rules on Noise Prevention in Public Places and Measure 2.1.3 of the Klaipėda City Municipality Noise Prevention Action Plan for 2019–2023, approved by Decision No. T2-241 of July 25, 2019: when carrying out construction and reconstruction works on port quays, contracts with contractors must include restrictions on the operating hours of noise sources during nighttime and on weekends. When carrying out dredging works in the area, the organizer of economic activities must comply with the Klaipėda City Municipality Council's Decision No. T2-241 of July 25, 2019</p> <p>, which approved the Klaipėda City Municipality Noise Prevention Action Plan for 2019–2023, Measure 2.1.2: when dredging the port basin, contracts with contractors must provide for the selection of noise sources that generate less noise.</p> | |
| 13 | Neighboring countries | <ul style="list-style-type: none"> • No additional mitigation measures are required for the PŪV . | <ul style="list-style-type: none"> • It is not necessary. |

4.15 Monitoring

Current status

The following environmental monitoring activities are currently being carried out in the area where the PŪV solutions are being implemented:

- State environmental monitoring;
- Environmental monitoring of the Klaipėda State Seaport;
- Environmental monitoring of the operations of companies operating within the territory of the Klaipėda State Seaport (individual companies conduct monitoring in accordance with environmental monitoring programs approved for their operations).

Pursuant to Resolution No. 996 of the Government of the Republic of Lithuania, adopted on October 3, 2018, "On the Approval of the 2018–2023 State Environmental Monitoring Program," the 2018–2023 State Environmental Monitoring Program was approved. Implementation plans for the measures of the 2018–2023 program have been prepared and approved in accordance with the provisions of this program. State monitoring of the Baltic Sea and the Curonian Lagoon is carried out by the Marine Research Department of the Environmental Protection Agency in accordance with monitoring plans approved by order of the Minister of the Environment of the Republic of Lithuania. Measurements are taken at a total of 48 monitoring sites in the Baltic Sea and the Curonian Lagoon; of these, measurements are taken at 31 monitoring sites in the Baltic Sea (including continuous measurements at 3 coastal hydrometeorological observation/measurement stations) during a specific period. During monitoring of the Curonian Lagoon, measurements are taken at 17 monitoring sites (including continuous measurements at 2 hydrometeorological observation/measurement stations). The following water quality parameters of the Baltic Sea and the Curonian Lagoon are monitored: hydrodynamic regime, physical-chemical quality parameters (including salinity), artificial radionuclides, and biological quality parameters [60].

The Klaipėda State Seaport Authority (KVJUD) conducts environmental monitoring in accordance with the environmental monitoring program for the period 2018–2023, prepared in 2018 and coordinated with the Klaipėda Regional Department of Environmental Protection under the Ministry of the Environment. Monitoring area: the Klaipėda Strait from Kiaulės Nugaros Island to the Klaipėda Port entrance to the sea; the Baltic Sea at the port entrance and in the active dredging (dumping) area. KVJUD conducts:

- Water monitoring. Hydrological and meteorological studies, as well as hydrochemical studies, are conducted in the Klaipėda Strait. Hydrological and hydrochemical studies are conducted in the Baltic Sea.
- Seabed sediment monitoring. Parameters monitored in the Klaipėda Strait and the Baltic Sea include: granulometric analyses of seabed sediments, petroleum products, metals, polyaromatic hydrocarbons, and other chemical substances. Monitoring of the seabed topography and sediment distribution in the dredged area is also conducted.
- Biota monitoring. In the Klaipėda Strait and the Baltic Sea, the following hydrobiological objects are monitored: fish and macrozoobenthos, as well as studies of invasive species.
- Coastal monitoring. The beaches and dune slopes of the Curonian Lagoon surrounding the port's water area are monitored; as are the beaches of the Curonian Spit and the mainland coast within the port's impact zone, along with the slope of the protective dune ridge.
- Research in the Smeltė Botanical Reserve, the primary objective of which is to conduct an inventory of the reserve's biotopes, collect data, and assess the status of rare plant populations, emerging threats, and prospects for their survival.
- Observations of the morphological dynamics of the underwater slope of the Curonian Spit. Observations are conducted in Koppalis, the ship graveyard area, and the coastal zone of the Smeltė Botanical Reserve.

The measurement and observation area covers the port's water area, its approaches, and the dumping area at sea, as well as the shores of the sea and the Curonian Lagoon within the port's impact zone. The measurements were carried out by a service provider that won the KVJUD tender and meets the requirements for this type of work.

Enterprises and companies located in the territories of the city of Klaipėda and the KVJU, depending on the nature of their activities, carry out systematic measurements of pollutants emitted into the environment from pollution sources at the economic entity level in accordance with separate monitoring programs and monitor the impact of pollutants on environmental components.

Following the assessment of the potential environmental impact of the proposed development in this EIA, it is necessary to conduct environmental monitoring of the KVJU in accordance with the approved monitoring program and the types and scope specified therein, and the following is additionally planned:

Subsurface

Before commencing the implementation of the project's solutions (dredging works for the navigation channel and water areas), it is necessary to conduct bottom sediment and soil investigations in the dredging zones in accordance with the requirements set forth in LAND 46A-2002, Section III, and Appendices 1–3.

Shores

It will be appropriate to optimize the monitoring network for shoreline dynamics at the Port of Klaipėda once the selected PŪV alternative has been finalized and implementation of the PŪV solutions has begun. In the near future, the KVJU shoreline monitoring should be supplemented with underwater slope measurements, integrating them with shoreline measurements at the 1MN, 2MN, 3MN, and 4MN shoreline profile locations. Further optimization of the underwater slope monitoring network should be carried out after the implementation of the PŪV solutions.

Ichthyofauna

When implementing the PŪV, all three PŪV alternatives may have an impact on ichthyofauna both during the implementation of the solutions (impact on migratory fish populations, increased water turbidity and pollution) and during the operational phase following the port reorganization (changes in the inflow of seawater). Impacts are possible both in the Curonian Lagoon (changes in the distribution of saline water) and in the Baltic Sea due to increased water pollution in the coastal zone. In the event of significant disruption to migration, there may be an impact on diadromous fish populations. As port activity intensifies, the likelihood of incidents related to water pollution also increases. To assess the potential impact on ichthyofauna, monitoring must be conducted in both the Curonian Lagoon and the coastal waters of the Baltic Sea. Monitoring of fish communities must be carried out in accordance with the methodology recommended by Thoresson (1993) and updated by HELCOM (2015). Monitoring must be conducted annually. To ensure that the data can be compared with data from previous studies and to assess potential changes, it is recommended to use a set of gillnets whose parameters correspond to the standardized nets used to date for monitoring fish communities in the Curonian Lagoon and the Baltic Sea. Monitoring of the fish community in the Curonian Lagoon should be conducted in the northern part of the lagoon during the warm season, both during the implementation of the PŪV solutions and during operations, in accordance with the approved monitoring program and the scope of biota impact monitoring specified therein (there is no additional need to expand the scope of monitoring due to the PŪV).

Avifauna

In the remaining part of Kiaulės Nugaros Island, after the implementation of the PŪV solutions, the planned nature management activities as set out in Section 4.9.3 must be carried out continuously, along with annual monitoring of breeding, migratory, and wintering birds.

Upon implementation of the PŪV solutions and if the need arises, the scope of monitoring of existing and previously recommended KVJU activities from earlier projects and the EIA may be expanded and specified by adjusting the KVJU monitoring program.

5 TRANSBOUNDARY IMPACT

The EIA process for the planned economic activity in a transboundary context is regulated by several legal acts, of which the following are relevant to this planned economic activity:

- The Law of the Republic of Lithuania on the Ratification of the 1991 Convention on Environmental Impact Assessment in a Transboundary Context;
- The Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991).

The provisions of the UNECE Convention on Environmental Impact Assessment in a Transboundary Context apply when the planned economic activity is included in the list specified in Annex I to the Convention, or when the planned economic activity, is not included in that list, may cause significant adverse transboundary effects.

The project area is located in the part of the Baltic Sea coast that is considered part of central Lithuania, 45 km from the territory of the Republic of Latvia and 42 km from the territory of the Russian Federation (Fig. 5.1).

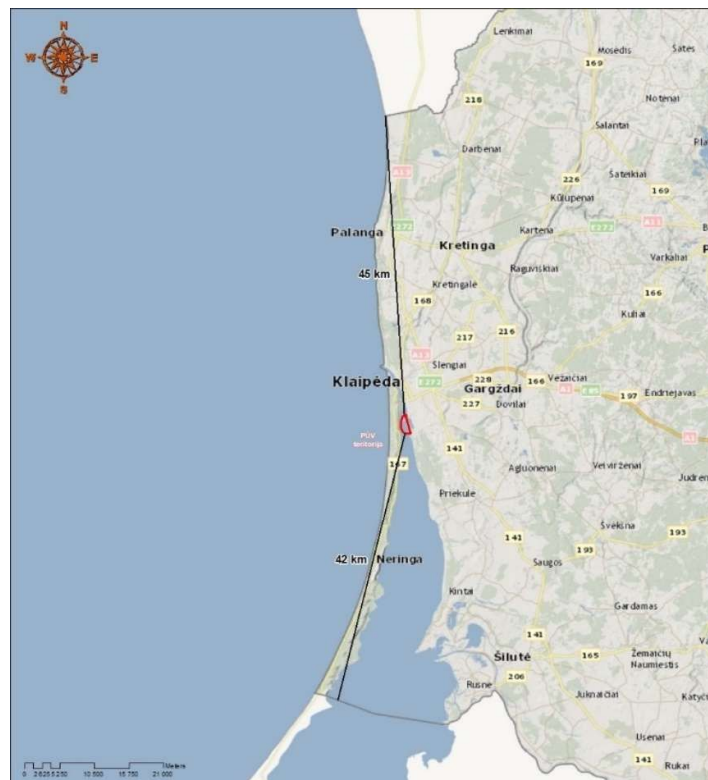


Fig. 5.1. The project area in relation to the territories of the nearest foreign countries

According to the conclusions of the EIA for the PŪV and other previous assessments [8, 11, 12, 19], no adverse impacts on the territories of neighboring foreign states, their natural and social environment, or public health are expected during or after the implementation of any of the project alternatives.

Pursuant to Article 10(4) of the EIA Law [2], *“Upon commencing the environmental impact assessment and establishing the circumstances specified in paragraph 3 of this article, the competent authority shall, within 10 working days of the date of receipt of the program*

or the date of receipt of the notification of the commencement of the EIA, shall contact the coordinating authority requesting a conclusion as to whether the planned economic activity requires the application of transboundary environmental impact assessment procedures. The coordinating authority, having examined the information received and taking into account the nature, scale, location, and environmental characteristics of the planned economic activity, shall, within 5 working days of receiving the information, provide a conclusion as to whether transboundary environmental impact

to the competent authority, the organizer of the planned economic activity, and the preparer of the environmental impact assessment documents.” The preparer of the EIA documents for the planned economic activity did not receive, within the established

time, the preparer of the EIA documents for the planned economic activity did not receive a conclusion from the Coordinating Authority (the Ministry of the Environment of the Republic of Lithuania) that necessary to apply transboundary environmental impact assessment procedures, and the Environmental Protection Agency approved the EIA program for the planned economic activity by letter No. (30-2)-A4E-929 dated January 27, 2023.

6 DESCRIPTION OF FORECASTING METHODS AND EVIDENCE USED TO IDENTIFY AND ASSESS SIGNIFICANT ENVIRONMENTAL IMPACTS, INCLUDING ISSUES

The following is carried out during the environmental and public health impact assessment process:

- analysis of existing information on the state of the environment and public health;
- modeling of pollution (air pollution, noise), identification of impacts, and predictive assessment;
- analysis of environmental pollution and other values obtained during modeling and research, and comparison with permissible levels;
- design of measures to reduce negative impacts on the environment and health and establishment of conditions, modeling of pollution (physical, chemical) with planned pollution reduction measures;
- Preparation of diagrams and maps showing the potential dispersion of pollution (air pollution, noise).

The following software was used for modeling as needed:

- ESRI ArcGIS (map preparation);
- AutoCAD (preparation of technical drawings);
- Surfer (terrain modeling);
- CadnaA (noise modeling);
- Custom MS Excel spreadsheets (risk analysis, dispersion modeling).

EIA methodology, types, and rationale for method selection

EIA, as part of the EIA process for planned economic activities, is carried out in accordance with the Law on Environmental Impact Assessment of Planned Economic Activities of the Republic of Lithuania [2] and the requirements of the Procedure for Environmental Impact Assessment of Planned Economic Activities [3].

The methods applied in the presented EIA are as follows:

- collection and processing of statistical and health information data;
- modeling of air pollution and noise;
- analysis of environmental pollution and other values obtained during modeling and research, and comparison with permissible levels.

These methods allow for an objective assessment of the impact and the potential to mitigate negative effects. The objectivity of the health impact assessment is achieved by comparing the levels of pollution factors determined during pollution modeling with the corresponding levels regulated in public health safety legislation (hygiene standards) and other normative legal acts, i.e., the limit values that are safe for health and permitted in the living environment.

The overview of the public health status was prepared based on the Public Health Monitoring Information System [54] as well as statistical data, publications, and reviews provided by the Institute of Hygiene. In reviewing the public health status, indicators of the public health status of the Klaipėda city

population, which are compared with the national average and data from Klaipėda County and its municipalities. The impact on public health was assessed based on the results of air pollution and noise dispersion modeling.

Noise modeling was performed using the CadnaA 2020 software. CadnaA (Computer Aided Noise Abatement) is software designed for the calculation, visualization, assessment, and prediction of noise impacts. CadnaA evaluates four main groups of noise pollution sources (in accordance with Directive 2002/49/EC), to which the relevant methodologies and standards in force in the EU and Lithuania are applied. Specifically, stationary noise sources were assessed, with noise levels calculated in accordance with ISO 9613.

More detailed descriptions of the research and assessment methods used by the EIA document preparer's partners and subcontractors during the EIA of the PŪV are provided in Chapter 4, in separate sections of the assessment, and in separate reports attached as textual appendices.

The EIA document preparer for the PŪV—UAB “Sweco Lietuva”—holds a license to assess impacts on public health (License No. VSL-86) and a permit to conduct subsurface investigations (Permit No. 115). Copies of the aforementioned permits are provided in Textual Appendix 1 of the PŪV EIA report.

Inaccuracies and errors in the assessment are possible if the project organizer provided incomplete or inaccurate information about current and planned economic activities, as well as due to inaccuracies and inadequacies in pollution modeling.

The analysis and comparison of alternatives is conducted by assessing potential significant positive/negative, direct/indirect, short-term/medium-term/long-term impacts on environmental components. Expert assessment is one of the most important aspects of the assessment.

The EIA document preparer did not encounter any significant problems while conducting the EIA for the PŪV and preparing the environmental impact documentation.

7 SUMMARY OF THE NON-TECHNICAL ASPECTS OF THE EIA FOR THE PROJECT

By consistently planning and implementing the long-term plans for the Klaipėda State Seaport, KVJUD envisages the development of the southern part of the port, the objective of which is – to create conditions for the expansion of cargo terminals by forming additional land areas, with the possibility of providing value-added services and accommodating BALTMAX-class vessels with maximum parameters, i.e., up to 430 m in length (eventually up to 490 m), up to 60 m in width (eventually up to 70 m), and with a draft of up to 15.5 m.

To assess the environmental impact of the planned solutions, KVJUD announced a public tender, which was won by a consortium of companies operating on a joint venture basis, consisting of UAB “Sweco Lietuva” (lead partner), the Lithuanian Energy Institute, and Klaipėda University. On August 3, 2022, this consortium signed Public Procurement Contract No. 34-2022-269 with the State Enterprise “Klaipėda State Seaport Authority” to provide the following services: “to conduct an environmental impact assessment and related procedures for the planned economic activity (the development of the southern part of the Klaipėda State Seaport).”

In November 2022, UAB “Sweco Lietuva” and its partners prepared the “Environmental Impact Assessment Program for the Development of the Southern Part of the Klaipėda State Seaport,” which was published in accordance with established procedures, coordinated with EIA stakeholders, and approved by the AAA.

Following the necessary studies and expert assessment, the **“Environmental Impact Assessment Report for the Development of the Southern Part of the Klaipėda State Seaport”** was prepared. The EIA report for the planned economic activity was prepared in accordance with the requirements of the Law on Environmental Impact Assessment of Planned Economic Activities of the Republic of Lithuania and in accordance with the “Procedures for the Environmental Impact Assessment of Planned Economic Activities” and the approved EIA program for the planned economic activity.

The EIA was conducted in accordance with the following provisions:

- The EIA for the planned economic activity is conducted in accordance with the Law on Environmental Impact Assessment of Planned Economic Activities of the Republic of Lithuania, the Procedure for Environmental Impact Assessment of Planned Economic Activities, and other applicable laws and regulations of the Republic of Lithuania and the European Union, recommendations, and methodologies, and taking into account the final solutions planned in other KVJUD projects that may affect the PŪV, as well as the information provided by KVJUD.
- The PŪV solutions are described and justified based on the report on the development of the southern part of the KVJU, prepared by the company “Moffatt and Nichol” and submitted by KVJUD;
- The PŪV area covers approximately 270 ha of the southern part of the KVJU territory, with conditional boundaries ranging from PK80 (north) to PK111 (south), and from the western part of the Smeltė Peninsula (east) to the western boundary of the port territory (west).
- The EIA for the PŪV was conducted for the following stages of the PŪV project implementation: construction of facilities and facility operation (use). The assessment of the facility operation (use) stage covers only the environmental impact assessment directly related to the operation and maintenance of the facilities (the shipping channel, the developed areas, etc.) and does not directly address shipping and cargo handling activities carried out in the port. The EIA does not specify a decommissioning period; therefore, an assessment of this phase is not conducted.
- The current state of the environment is described primarily based on the situation in 2021. The 2021 situation is classified as the “baseline” condition, i.e., it is assumed that if the PŪV were not implemented, environmental indicators would correspond to the 2021 situation. Data from 2022 is used only partially for the assessment, as

report, it was not yet possible to obtain all the necessary summary information for that year.

- The assessment was conducted for the following alternatives:
 - **Alternative 0** – The PŪV solutions would not be implemented, and the environmental conditions would correspond to the situation in 2021–2022 and would not be affected by the PŪV;
 - **Alternative 2A** – the PŪV solutions are implemented (expansion of the southern part of the port: extension of the inner navigation channel by approximately 1.7 km and construction of a turning basin, dredged to a depth of 17.0 m, construction of quays (approx. 1,803 m) and formation of new land area within the water area (approx. 81.7 ha), dredging of the water area near the new quays to a depth of 16.5 m, reconstruction of quays No. 151–152 to a design depth of 16.5 m and dredging of the water area near quays No. 149–152 to a depth of 16.5 m, and reconstruction of the power transmission line branch to the Curonian Spit.
 - **Alternative 3A** – implementation of the PŪV solutions (expansion of the southern part of the port: extension of the inner navigation channel (approx. 2.4 km) and construction of a turning basin, dredged to a depth of 17.0 m, construction of quays (approx. 1,665 m) and formation of new land area within the water area (approx. 60.5 ha), dredging of the water area near the new quays to a depth of 11.0–16.5 m, reconstruction of quays No. 151–152 to a design depth of 16.5 m and dredging of the water area near quays No. 149–152 to a depth of 16.5 m, and the reconstruction of the power transmission line to the Curonian Spit.
 - **Alternative 4A** – implementation of the PŪV solutions (expansion of the southern part of the port: extension of the inner navigation channel (approx. 1.7 km) and construction of a turning basin, dredging to a depth of 17.0 m, construction of quays (approx. 1,284 m) and formation of new land area within the water area (approx. 83.5 ha), dredging of the water area near the quays to a depth of 16.5 m, reconstruction of quays No. 151–152 to a design depth of 16.5 m and dredging of the water area near quays No. 149–152 to a depth of 16.5 m, and the reconstruction of the power transmission line to the Curonian Spit.

Additionally, the PŪV alternatives should analyze and evaluate alternative technological and environmental solutions for specific design options.

- The EIA solutions are conditionally divided into “primary” and “secondary” solutions. Primary solutions are directly related to the activities of KVJU, i.e., all solutions described in the EIA alternatives, except for the reconstruction of the 110 kV EEPOL Marios–Juodkrantė section (dismantling of the existing line section and laying of a new underground power cable). The latter solutions are classified as “secondary.”
 - The assessment of the PŪV alternatives also integrated solutions already planned and implemented or currently being implemented in other previous projects, specifically the improvement of the outer and inner navigation channels of the Klaipėda State Seaport (dredging and widening), the reconstruction (construction) of the southern and northern breakwaters, and the stabilization of part of the Curonian Spit slope and the construction of the southern port gates, approved by the AAA in 2019. Some of the aforementioned solutions (e.g., the southern port gates, shoreline management measures) were refined during the EIA for this project.
 - Currently, the reconstruction of KVJU quays No. 149, No. 150, and No. 151, which fall within the project area, and the dredging of the water area to a depth of 10 m are planned, and the screening for the EIA procedure for this project has already been completed. These planned solutions were also taken into account during this EIA, and it is expected that they will be implemented before the start of the project.
 - The existing KVJU contaminated soil storage site is located within the project area, and a new contaminated soil storage site of approximately 6.6 ha is planned to be established adjacent to it. EIA screening procedures were carried out for this planned

economic activity, EIA screening procedures were carried out, and on 05/09/2022, the Environmental Protection Agency (EPA) adopted Screening Conclusion No. (30-5)-A4E-9865, stating that an environmental impact assessment of the project is mandatory. In conducting the EIA for the development of the southern part of the KVJU, the impact of existing and planned contaminated soil storage sites will not be assessed separately; rather, it is assumed that by the time the project's solutions are implemented, operations at the contaminated soil storage sites will have ceased, i.e., the sites will be backfilled, the contaminated soil treated and stabilized, and the area prepared for backfilling, covering, and subsequent adaptation for use for another purpose (landfill).

- During the EIA for the PŪV, the necessary environmental field studies and assessments were conducted:
 - Bottom habitat surveys (conducted by KU specialists led by Dr. D. Daunys)
 - Bird surveys on Kiaulės Nugaros Island and in the northern part of the Curonian Lagoon (conducted by LOD specialists);
 - Surveys of the shoreline and nearshore areas (conducted by Dr. G. Žilinskas);
 - Seabed scanning using side-scan sonar (conducted by KU specialists);
 - Underwater archaeological surveys (conducted by KU specialists).
 - Ichthyological assessment (conducted by Dr. L. Ložys)
- During the assessment of the EIA program for the PŪV, the Environmental Protection Agency and the coordinating authority (the Ministry of the Environment of the Republic of Lithuania) did not conclude that the PŪV required the implementation of transboundary environmental impact assessment procedures.

The EIA for the PŪV found that:

Impact on surface water

- When assessing the PŪV area and comparing the periods 1991–2020 and 1961–1990, the following changes in hydrometeorological data were identified: air temperature is 1.3 °C higher, precipitation is 55 mm greater, wind speed is 1.0 m/s lower, the annual water temperature and salinity of the Curonian Lagoon (at Juodkrante) are higher by 0.9°C and 0.43‰, respectively, the water level is 8 cm higher, the duration of ice cover is 27 days shorter, and the ice is 5 cm thinner. These changes occurred due to both natural and anthropogenic factors.
- Upon implementation of the solutions of Alternative 2A of the PŪV, the throughput of the Klaipėda Strait would decrease significantly compared to Alternative 0 (from –9.3% to –10.8% for the flow from the Curonian Lagoon to the Baltic Sea and from –2.5% to –3.3% for the flow from the sea to the lagoon). The flow capacity would decrease due to the narrowing of the waterway between the southern port gates planned for 2019 and the planned land reclamation.
- In the case of Alternative 3A, the channel's capacity would increase significantly compared to Alternative 0 (10.6–11.6% when the current flows from the lagoon to the sea and 13.0–13.2% when the current flows from the sea to the lagoon). This increase in capacity would result from a significant deepening of the Curonian Lagoon water area north of the planned southern port gates toward Kiaulės Nugaros Island, as well as the deepening of the eastern channel near Kiaulės Nugaros Island to 17 m. The solutions of Alternative 4A would be intermediate between Alternatives 2A and 3A, and in this case, with the flow from the lagoon to the sea, the flow capacity would increase by 4.8–5.9%, and by 11.3–11.5% when the flow is from the sea to the lagoon, compared to Alternative 0.

- When the flow is from the Curonian Lagoon to the Baltic Sea, in the case of Alternative 2A, flow velocities would increase in the water area near the Curonian Spit coast from the planned southern port gates to the western channel of Kiaulės Nugaros Island and in the western channel, compared to Alternative 0. This would cause bottom erosion between the planned southern port gates and the Curonian Spit coast. In terms of increasing impact, the PŪV alternatives are ranked as follows: 2A < 4A < 3A.
- Upon implementation of the solutions under Alternatives 3A and 4A, flow velocities would also increase significantly compared to Alternative 0 in the water area from the planned southern port gates toward Kiaulės Nugaros Island (in 0.6- and 1.2-km-long sections, respectively) and in the eastern channel. A decrease in current velocities and eddy-like current movement would be observed at the planned vessel turning areas. This would create additional sediment accumulation sites in the aforementioned water areas. In terms of increasing impact, the PŪV alternatives are ranked as follows: 4A < 3A < 2A.
- From the perspective of sediment balance, Alternative 3A would be the least favorable, as such PŪV solutions would cause the greatest sediment accumulation in the northern part of the Curonian Lagoon. The least sediment accumulation was observed in the case of Alternative 2A, however, the long, narrowed channel between the Curonian Spit coast and the newly formed landmass on the eastern shore, along with the installed vessel turning area, would cause significant flushing and accumulation of suspended sediments in the northern part of the Curonian Lagoon. The most environmentally favorable option would be port expansion according to Alternative 4A, as its impact would not drastically alter sediment transport processes, unlike the other alternatives. In terms of increasing impact, the PŪV alternatives are ranked as follows: 4A < 2A < 3A.
- The changes in salinity identified in the northern part of the Curonian Lagoon (at the boundary of the southern port basin) would be insignificant (up to 0.32 ‰) for any of the port development alternatives when implemented under low flow conditions. At high flow rates (1,725 and 3,200 m³/s), the differences in salinity between Alternative 0 and the analyzed PŪV alternatives would be up to 0.80 ‰. Such changes in water salinity would be rare and short-lived (on average 15 days per year) and would not affect the Curonian Lagoon ecosystem. In terms of increasing impact, the PŪV alternatives are ranked as follows: 2A < 4A < 3A.
- The highest waves in the northern part of the Curonian Lagoon, from the planned southern port gates to Kiaulės Nugaros Island, would occur in Alternatives 3A and 4A when a strong P-direction wind is blowing. Higher waves would also be observed near the Curonian Spit coast in these alternatives (the diffraction coefficient ranges from 0.2 to 0.3). Alternative 2A would be the most favorable in terms of wave dispersion, as the incoming waves passing through the planned southern port gates would propagate more evenly and subside more quickly than in Alternatives 3A and 4A. In terms of increasing impact, the PŪV alternatives are ranked as follows: 2A < 3A < 4A.
- Due to the formation of an ice cover in the water area of the port's southern gates, a water backwater would form in the water area beyond the planned southern gates of the Port toward Kiaulės Nugaros Island. In the case of Alternatives 3A and 4A, the height of the water backwater would be half that of Alternatives 0 and 2A (at a flow rate of 2,700 m³/s, the backwater height would be 0.05 m and 0.10 m, respectively). In terms of increasing impact, the PŪV alternatives are ranked as follows: 3A < 4A < 2A.
- After evaluating the results of modeling hydrodynamic changes, sediment transport processes, salinity, and wave dispersion, it was determined that the solutions of PŪV Alternative 4A would be the most favorable for the aquatic environment.

- Upon implementation of the PŪV solutions for any of the PŪV alternatives, the risk of flooding of the newly formed land areas, taking climate change into account, would be unlikely.
- Due to the PŪV solutions (filling the lagoon area with soil), the area of the lagoon within the territory of the Republic of Lithuania would decrease by 93.2 ha (or approximately 0.24%) in the case of Alternative 2A, by 64.4 ha (or approximately 0.17%) in the case of Alternative 3A, and by 87.8 ha (or approximately 0.23%) in the case of Alternative 4A. In terms of increasing impact, the PŪV alternatives are ranked as follows: 3A < 4A < 2A.
- The creation of additional port land areas will result in additional surface runoff volumes, which will need to be collected and managed accordingly. It is preliminarily estimated that in the case of Alternative 2A, approximately 681,281 m³/year would be generated, in the case of Alternative 3A – approximately 495,492 m³/year, and in the case of Alternative 4A – approximately 648,048 m³/year. In terms of increasing impact, the PŪV alternatives are ranked as follows: 3A < 4A < 2A.
- During the operation of the PŪV facilities, the greatest amount of maintenance work in the PŪV water area (sediment removal and restoration of the water area's design depth) would be required for Alternative 3A (approximately 391,700 m³/year). Based on the volume of sediment accumulated and removed during wet years, Alternative 3A would be higher than the other two PŪV alternatives, 2A (approximately 200,700 m³/year) and 4A (approximately 328,800 m³/year) by approximately 63–191 thousand m³/year (or approximately 16–48.8%). In terms of increasing impact, the PŪV alternatives are ranked as follows: 2A < 4A < 3A.

Summary conclusion: The PŪV solutions for port development plan to create new land and deepen the water area in the northern part of the Curonian Lagoon within the KVJU territory. In the case of Alternative 2A, this would be approximately 81.6 ha and 95.2 ha, in the case of Alternative 3A—approximately 60.5 ha and 114.8 ha, respectively, and in the case of Alternative 4A—approximately 83.4 ha and 96.4 ha, respectively. Due to these PŪV solutions, the implementation of any of the PŪV alternatives would have a direct and indirect impact on surface water bodies during the construction of the facilities (due to increased water turbidity during dredging and soil deposition). The impact would be short-term (only during construction), interactive (may affect other environmental elements, e.g., ichthyofauna), and of minor negative significance. Once the solutions are implemented, the impact during facility operation would be long-term (throughout the entire operational period), interactive (may affect other environmental elements, e.g., biodiversity), ranging from minor to moderate negative (due to hydrodynamic processes, sediment transport, salinity and wave dispersion, changes in the reservoir area, the risk of flooding, and increased surface runoff). When comparing the PŪV alternatives, the least impact on the aquatic environment would be observed in the case of PŪV alternatives 4A and 3A. During the construction and operation of PŪV facilities, it is necessary to implement measures to prevent, reduce, and/or compensate for the negative impacts of the PŪV.

Impact on Ambient Air

During the construction of PŪV facilities and the implementation of solutions, the ambient air would be polluted by emissions from vehicles (trucks, cranes, forklifts, excavators, bulldozers, ships, dredgers, and others) and equipment (backhoes and excavators, drilling rigs, pile drivers, generators, and other machinery) due to pollutants emitted into the ambient air by internal combustion engines (combustion products: NO_x, CO, CH₄, SO_x, LOJ) emitted into the ambient air by internal combustion engines of machinery (excavators, bulldozers,

When transporting excavated soil to sites for targeted use and disposal (in the event that all excess soil is deposited in landfills), it is estimated that

: approximately 1,177 t for Project Alternative 2A, approximately 1,489 t for Project Alternative 3A, and in the case of PŪV Alternative 4A – approximately 1,185 tons of ambient air pollutants per year (construction work is expected to last up to 5 years). Ambient air pollutants will be generated during the construction of the facilities while carrying out other activities (e.g., installing quays, retaining walls, transporting and transshipping materials, performing other construction works). The calculations for the aforementioned work groups (transporting soil by barge, transporting raw materials and other materials) are only approximate and are intended for a preliminary comparison of the potential impact on ambient air of different project alternatives.

In the event of the implementation of the proposed project alternatives, there would be a direct impact on ambient air during the construction of the facilities (due to the emission of pollutants). The impact would be short-term, temporary (only during construction work), interactive (may affect other environmental elements, e.g., the climate), and of minor negative significance. Once the solutions are implemented, the impact during the operation of the facilities would be long-term, intermittent (only during water area maintenance work), interactive (may affect other environmental elements, e.g., climate), and of minor negative significance. In terms of increasing impact, the PŪV alternatives are ranked as follows: 2A < 4A < 3A. During the construction and operation of the PŪV facilities, it is necessary to apply measures to prevent, reduce, and/or compensate for the negative impacts of the PŪV.

Impact on the climate

During the implementation of the PŪV solutions, greenhouse gases (GHGs), i.e., CO₂, will be released into the ambient air along with other pollutants from the internal combustion engines of the vehicles (ships, etc.) and equipment (machinery and other technological facilities) used. In the event of the implementation of alternative solutions to the PŪV, there would be an indirect impact on the climate during the construction of the facilities (due to pollutant emissions). The impact would be short-term, temporary (only during construction work), interactive (may affect other environmental elements, e.g., ambient air), and insignificant. Upon implementation of the solutions during the operation of the facilities, the impact would be long-term, intermittent (only during water area maintenance work), interactive (may affect other environmental elements, e.g., ambient air), and insignificant. In terms of increasing impact, the PŪV alternatives are ranked as follows: 2A < 4A < 3A. During the construction and operation of the PŪV facilities, it is necessary to apply measures to prevent, reduce, and/or compensate for the negative impacts of the PŪV.

Impact on soil

When implementing the PŪV solutions in different locations within the PŪV area, the soil layer may be disturbed across an area of approximately 3.5 ha (on the Curonian Spit, by dismantling the existing 110 kV EEPOL section and laying a new 110 kV underground power cable section), destroyed on Kiaulės Nugaros Island (approximately 13.2–13.6 ha), and excavated over an area of approximately 8.86–9.97 ha in the southwestern part of the Smeltė Peninsula. The impact on the soil during the implementation of the solutions should be treated as direct and negative, with synergistic effects (it may also affect other environmental elements, e.g., biodiversity), on the Curonian Spit – of medium duration and minor significance, on Kiaulės Nugaros Island – long-term and irreversible (the soil layer is destroyed), on the Smeltė Peninsula – long-term and irreversible, but of minor significance (the excavated soil layer is preserved and reused elsewhere). A negative impact on the soil during the operation of the PŪV facilities is unlikely. In terms of increasing impact, the PŪV alternatives are ranked as follows: 3A < 4A < 2A. During the construction and operation of the PŪV facilities, measures to prevent, reduce, and/or compensate for the negative impact of the PŪV must be implemented.

Impact on Subsurface

It is estimated that the implementation of the PŪV solutions may result in the excavation of approximately 11.97 million m³ of soil for Alternative 2A, approximately 12.3 million m³ for Alternative 3A, and approximately 11.68 million m³ for Alternative 4A. Most of it will be sand (about 55%), with the remainder consisting of morainic loam and sandy loam, silt, etc. Most of the excavated soil, after assessing its lithological composition and contamination, is planned to be purposefully used for the formation of new areas envisaged by the PŪV solutions (depending on the selected PŪV alternative, approximately 3.88–5.43 million m³ or 32–45% of the total excavated soil). The remaining portion will be used for shoreline management and environmental protection works and/or disposed of in landfills.

In certain areas of the deepened water areas, sandy aquifers may be exposed, which could increase the risk of undesirable phenomena (underwater seepage) during the construction of quays; therefore, it is recommended to apply the mitigation measures specified in this report.

The solutions for any of the PŪV alternatives will not have a negative impact on the water resources extracted in the Klaipėda III water supply area.

Construction of the PŪV facilities may require loose construction materials (sand, gravel), which may need to be brought in from the nearest quarries (if the soil of the required fraction and contamination level excavated and stockpiled during the dredging of the shipping channel and water areas is insufficient). The existing surveyed resources within the territory of the Klaipėda District Municipality would be sufficient to meet the needs of the PŪV.

The impact on the subsurface during the implementation of the solutions should be considered direct, long-term, and interactive (it may also affect other environmental elements, e.g., water, soil, and ambient air), and of moderate significance (large volumes of work, but most of the excavated soil will be used for the development of other areas). A negative impact on the subsurface during the operation of the PŪV facilities is unlikely. In terms of increasing impact, the PŪV alternatives are ranked as follows: 4A < 2A < 3A. During the construction and operation of the PŪV facilities, it is necessary to implement measures to prevent, reduce, and/or compensate for the negative impacts of the PŪV.

Impact on Shores

Negative changes in the condition of the banks following the implementation of the PŪV solutions may be caused by reduced water permeability, and, consequently, increased flow velocity, increased amplitude of water level fluctuations, a possible increase in the frequency of ice jam formation, and, due to intensified shipping, increased and more frequent wave action.

The mainland shore of the Curonian Lagoon. Upon implementation of the PŪV solutions for all PŪV alternatives, the spatial position of the shoreline in the PŪV area will change significantly due to the formation of new land area (this is envisaged for all PŪV alternatives; only the extent and location will differ). However, both north and south of the PŪV territory, this will have no negative impact on the Curonian Lagoon mainland coast, or the impact will be local and insignificant.

Kiaulės Nugaros Island. Upon implementation of the PŪV solutions, the area of Kiaulės Nugaros Island will decrease by more than three times in all PŪV alternatives due to its dredging. Consequently, the position of the shoreline in space will change significantly; it will shorten and be straightened on the eastern and southern sides.

The coast of the Curonian Spit. Upon implementation of the PŪV solutions, in all PŪV alternatives, the greatest impact on the Curonian Spit coast will be on the northern (due to the deepening of the channel to 17 m) and

southern parts (due to the reduction of the waterway, the formation of new land, and the planned construction of protective dikes for the southern port gates on the eastern and western (near Alksnynas) shores) of the project area's shoreline. It is likely that the impact on the spit's shoreline in the central section of the stretch will be relatively smaller.

The impact on the shores during the implementation of the solutions should be treated as direct (on the Curonian Lagoon mainland shore—the shoreline is altered) and indirect (on the Curonian Spit shore—due to hydrodynamic changes), long-term, interactive (may affect other environmental elements, e.g., water), and of moderate significance (due to altered hydrodynamic conditions). During the operation of the PŪV facilities, the impact would be indirect, long-term, and of minor negative significance. In terms of increasing impact, the PŪV alternatives are ranked as follows: 3A < 4A < 2A. During the construction and operation of the PŪV facilities, measures to prevent, reduce, and/or compensate for the negative impacts of the PŪV must be implemented.

Impact on the landscape

During the implementation of the main solutions of the PŪV (dredging of water bodies and land formation, dredging of part of Kiaulės Nugaros Island, construction of quays, installation of slope stabilization measures, soil transport, etc.), the following impacts are expected: direct (physical work being carried out), interactive (the impact will affect various environmental elements), temporary (only during the implementation of the solutions), and moderately significant negative impact (due to the visual impact of the equipment used and the changing environment) on the landscape.

If any of the proposed alternatives were implemented, the waters of the northern part of the Curonian Spit would undergo significant visual changes, i.e., part of the existing open lagoon landscape would be replaced by the technogenic landscape of the port's land area with its characteristic infrastructure and superstructure. As a result of changes to the area of the Smeltė Peninsula, the port's land area would move closer to the Curonian Spit. The area of Kiaulės Nugaros Island would be reduced by about three-quarters. Secondary solutions related to the PŪV (110 kV EEPOL restructuring) would improve the visual landscape of the Curonian Spit and free up additional land areas for recreational activities. Upon implementation of the PŪV solutions, the PŪV's impact on the landscape would be direct (the appearance of the local environment would change, new land would be formed), long-term and permanent (solutions implemented permanently), interactive (solutions would affect other environmental elements), and moderately significant negative (a large area would be affected). In terms of increasing impact, the PŪV alternatives are ranked as follows: 3A < 4A < 2A. During the construction and operation of PŪV facilities, measures to avoid, reduce, and/or compensate for the negative impact of PŪV must be applied.

Impact on Protected Areas

None of the main solutions for the PŪV alternatives are planned within the European ecological network Natura 2000 BAST and PAST or other protected areas. "Secondary" solutions for the PŪV are planned within the KNNP and its BAST and PAST areas, as well as in the Alksnynė Landscape Reserve—specifically, the reconstruction of the 110 kV EEPOL Marios–Juodkrantė section. These solutions (dismantling the existing approximately 4 km section of the EEPOL line) will have a positive impact on the landscape and biodiversity of the KNNP territory. To neutralize and compensate for the potential indirect impacts of the project, it is proposed to implement shoreline management measures on the eastern coast of the Curonian Spit (replenishing the foreshore with sand) and to maximize the adaptation of the remaining part of Kiaulės Nugaros Island for bird nesting sites. The planned

measures should be considered as mitigating the environmental impact of the PŪV in the assessed aspect (the dredging of part of Kiaulės Nugaros Island and the destruction of part of the existing bird nesting grounds).

The impact of all project alternatives on protected areas would be similar.

Impact on biodiversity

Impact on vegetation

Currently, a significant portion of the southwestern part of the Smeltė Peninsula is overgrown with shrubs and scattered stands of trees or their stumps. Upon implementation of the PŪV solutions, the aforementioned vegetation would be cut down and removed, and the existing grass cover would be removed along with the displaced soil. In this part of the PŪV area, regardless of the PŪV alternative chosen, shrubs, vegetation, and grass-covered areas cover approximately 11 ha. There are no valuable or protected plant species identified in this area, except for a recorded site of the saltmarsh aster (SRIS data) on the lagoon shore near the southern boundary of the contaminated soil storage site. The reclaimed land area will be covered with artificial surfaces.

On Kiaulės Nugaros Island, if the PŪV solutions are implemented, all vegetation in the excavated part of the island will be destroyed for all PŪV alternatives, while in the remaining part of the island, it will be mowed and covered with sand to create open sandy habitats for bird nesting sites. The area of potential impact on vegetation is approximately 18 ha.

On the Curonian Spit, at the site of direct construction work (during the dismantling of EEPOL supports and the excavation of the electrical trench), existing herbaceous vegetation and scattered shrubs will be destroyed. Upon completion of the work, the affected areas must be recultivated and seeded with vegetation characteristic of the area. Once the solutions are implemented and the EEPOL section is dismantled, the area will be available for recreational use and/or for planting vegetation in accordance with the needs and plans of the Curonian Spit National Park.

Implementation of the PŪV solutions (forming a new land area in the water body and deepening the water body) will destroy the aquatic vegetation in this water body: in the case of PŪV alternative 2A

- in an area of approximately 163.5 ha; in the case of Alternative 3A – in an area of approximately 162.1 ha; and in the case of Alternative 4A – in an area of approximately 164.5 ha.

- During the operation of the PŪV facilities, the navigation area will be periodically cleared of accumulated sediment, so there will be virtually no opportunity for permanent bottom vegetation to form.

In terms of impact on vegetation, the PŪV alternatives are nearly equivalent.

Impact on bottom habitats

- Nine biotopes have been identified in the PŪV area, of which 3 are in the aphotic zone and 6 in the photic zone. In the photic zone, the largest area (17% of the total PŪV territory) is occupied by a habitat of fine sediments with charales (Charales), while in the aphotic zone, the largest area (39%) is occupied by a habitat of fine sediments with chironomid larvae (Chironomidae).
- The PŪV alternatives would have different impacts based on the area of habitat destroyed within the PŪV territory. In the aphotic zone, the greatest difference in impact among the PŪV alternatives was identified for the mixed sediment habitat with diverse epifauna. This habitat, which has not been recorded in other areas of the Curonian Lagoon according to our data, would remain intact under Alternative 3A, but would lose approximately 10–12% of its area under the other two PŪV alternatives.
- The photic zone fine sediment habitat with charales (Charales) is important because it is home to a species of charale—the nest-building

(*Tolypella nidifica*). Its primary habitat has been identified in the project area, although it is likely that the habitat extends further south along the eastern shore of the lagoon. Other protected char species (*Chara baltica*, *Chara canescens*) were not found, as their habitats are most commonly found among reed beds.

- The greatest impact (area of destroyed habitat > 85%) is likely to be on the photic zone habitat of fine sediments with water plantain (*Alisma*). On the other hand, the likelihood of this habitat disappearing is low, as small *A. plantago-aquatica* habitats are found in almost all parts of the lagoon. The impact of different PŪV alternatives on this habitat is similar.
- Development carried out according to Alternatives 3A or 4A would cause the least damage to the important photic zone fine sediment habitat with Charales, although the relative size of the destroyed habitat differs by only 1% from Alternative 2A.
- The only PŪV Alternative 3A will have no impact on the rarest habitat and will also have no greater impact on the area of protected habitats within the PŪV territory compared to other alternatives. The PŪV alternatives are ranked in ascending order of the harm their activities cause to habitats as follows:
3A
< 4A < 2A.

Impact on ichthyofauna

During the implementation period of the PŪV solutions, in all cases of PŪV alternatives, the ichthyofauna in the port basin may be affected by increased water turbidity due to dredging works in the basin and, depending on the technology used, by noise generated. The greatest impact on fish may be caused by noise from pile-driving, especially when work is carried out in the water areas closer to the western channel. The impact of the PŪV on local fish populations in the Curonian Lagoon should be insignificant, as fish can move away from the affected water areas. Possible disruption of spawning in the southern port waters due to increased water turbidity. A minor impact is likely, as during the spawning season (April–May) for fish spawning in the northern part of the lagoon, outflows from the lagoon predominate. The impact on the ichthyofauna during the implementation of the port development solutions will depend on the scope of work carried out in the water area. In the case of Alternative 2A, the number of new quays constructed, the area of the water area to be dredged, and the reduction in the water area resulting in the formation of new land areas are similar to those in Alternative 4A. In the latter case, fewer new quays are built than in the other alternatives. In Alternative 3A, the largest area is dredged, but the water area is reduced the least.

Similar works are carried out during the implementation of all PŪV alternatives, although the scope of their different parts varies. In summary, the scope of all activities under the different alternatives is expected to have an impact of similar intensity on the ichthyofauna. By applying appropriate measures, the impact of these factors on fish can be significantly reduced.

The main factors that may affect the ichthyofauna following the implementation of the PŪV solutions are changes in the inflow of brackish water from the Baltic Sea into the Curonian Lagoon, changes in the water areas of habitats, spawning grounds, and nursery areas, changes in the scope of navigation channel dredging works, and increased port activity. It can be stated that the solutions of all PŪV alternatives will impact the ichthyofauna due to changes in the inflow of marine saline water into the Curonian Lagoon. In terms of the least adverse impact on fish, Alternative 2A would be the most favorable. In terms of increasing impact, the project alternatives are ranked as follows: 2A < 4A < 3A.

Impact on birds

For all PŪV alternatives, three groups of potential negative impacts on breeding and migratory birds are anticipated:

- loss of waterbird breeding areas and the habitats within them during the implementation of the PŪV solutions (due to the dredging of part of Kiaulės Nugaros Island) and, potentially, during the operation of the facilities (significant impact across the entire coastal region, but without a significant impact on bird species protected in adjacent SPAs);
- loss of resting and feeding habitats during the implementation of the PŪV solutions (due to the filling and dredging of the water area) (potentially significant at the local/regional level for certain bird species, without a significant impact on protected bird species in adjacent PAST areas);
- disturbance of birds during the construction and operation of the PŪV facilities (potentially significant at the local/regional level for a significant portion of the bird population, potentially having a negative impact on the great and little bitterns protected in the Curonian Lagoon SPA).

The impact on birds during the implementation of the solutions should be considered indirect (specific individuals would not be physically killed or harmed), long-term, and significantly negative (due to the destruction of a portion of habitats suitable for nesting).

In terms of increasing impact, the PŪV alternatives are ranked as follows: 3A < 4A < 2A. During the construction and operation of the PŪV facilities, it is necessary to apply the proposed measures to avoid, reduce, and/or compensate for the negative impacts of the PŪV. Upon implementation of the proposed mitigation measures, the negative impact on birds during the operation of the PŪV facilities would be minimized.

Impact on Tangible Assets

In all cases of the PŪV alternatives, infrastructure facilities located outside the KVJU territory and unrelated to the PŪV will not be destroyed or damaged during construction/implementation and operation; no significant negative impact on engineering infrastructure unrelated to the PŪV is anticipated. For all project alternatives, the implementation and operation of the project will not require the acquisition, expropriation, or damage of residents' private real estate (with the exception of unfinished boat dock structures). In all PŪV alternatives, the equipment used for the main works (barges—dredgers, suction dredgers, etc.) and their work area will not come into direct contact with recreational areas; therefore, no significant impact on recreational areas or their infrastructure is anticipated. Upon implementation of the “secondary” solutions of the PŪV (dismantling a 6.6 km section of the EEPOL and 42 supports, and lifting land-use restrictions related to the EEPOL), additional areas will become available within the Port territory—for economic activities, and within the KNNP territory—for the development of potential recreational areas. During the implementation of the solutions, it may be necessary to temporarily use additional land area(s) on state-owned land to set up temporary construction sites; such use must be coordinated with the land managers and their approval obtained. No new land use restrictions are planned during the project's operation (except for the protection zone of the 110 kV cable line section and the special land use conditions applicable therein) neither within the PŪV territory, nor within the territory assigned to the Port of Klaipėda, nor within the water area and its vicinity. For all PŪV alternatives, the implementation of the PŪV solutions is not expected to result in a decrease in the value of real estate in the surrounding areas.

The impact on tangible property during the implementation of the solutions should be considered direct and indirect, short-term, and interactive (it may also affect other environmental elements, e.g., the dismantling of the EEPOL section—biodiversity, landscape), and of minor significance. A negative impact on physical assets during the operation of the PŪV facilities is unlikely. In terms of impact, the PŪV alternatives would be equivalent.

Impact on public health

A significant impact of the PŪV on public health, in the case of all PŪV alternatives, would depend on the impact zone of the solutions, the scale of the impact, and the direct relationship with residential/public and other areas. The main risk factors associated with the PŪV are: a) air pollution by chemical substances (emissions of pollutants from the internal combustion engines of vehicles and equipment into the ambient air (combustion products: NO_x, CO, KD, SO_x, VOCs) during the transportation of materials and soil, the development of areas with necessary infrastructure, and the construction, dismantling, and demolition of hydraulic structures and facilities); b) physical pollution (noise sources (dredgers and/or excavators, barges—soil carriers, pile drivers, and noise generated by other machinery); c) potential chemical/physical pollution in the vicinity of the King William Canal and Klaipėda City Water Supply Area III, as well as at Melnragė Beach I (swimming area) (during dredging works on the KVJU shipping channel and water area, and when depositing dredged material in landfills).

During the construction of the PŪV facilities and the maintenance of the port water area, pollutants emitted into the air from pollution sources will not cause significant changes in ambient air quality. The solutions under Project Alternative 2A would have the least impact on ambient air, while those under Project Alternative 3A would have the greatest impact.

Noise dispersion modeling has determined that, for all PŪV alternatives, *the noise emission limits* specified in Lithuanian Hygiene Standard HN 33:2011 “*Noise Limit Values in Residential and Public Buildings and Their Surroundings*” will not be exceeded at any time of day (daytime, evening, night), and during the formation of new land areas (when operating pile-driving equipment, dredging barges, cranes, and other various machinery), they will not be exceeded during the day and evening. Work on the formation of new land areas will not be carried out at night. The background (existing) environmental noise level in the vicinity of most of the assessed nearby residential buildings is likely to increase by up to 1 dBA (such a change in background noise level is considered insignificant, since the smallest change in noise level that the human ear can distinguish is 1 dBA and only when the two levels are heard immediately one after the other), and during dredging works in the water area, the background (existing) environmental noise level will remain unchanged. Upon completion of the southern port expansion works, there will be no remaining sources of noise in the vicinity.

Increased water turbidity in the water area at dredging sites is expected throughout the entire construction period for all project alternatives. However, the increase in water turbidity would be local and episodic, depending on the specific location and time of the work. No significant impact on public health due to changes in water quality at Melnragė I Beach or other beaches in the city of Klaipėda is anticipated. During the periodic dredging of the seabed to remove accumulated sediments as part of the project, the dredged material must be excavated/pumped and managed/disposed of in accordance with the requirements of the regulatory document LAND 46A-

2002 “Rules for Dredging in Marine and Seaport Water Areas and for the Management of Dredged Sediments.”

The PŪV will not have any negative impact on the water resources extracted from the Klaipėda III water intake area or on the quality of drinking water for any of the PŪV alternatives.

The impact on public health during the implementation of the solutions and the operation of the PŪV facilities should be considered as direct and indirect, short-term (temporary during construction work) and long-term (periodic during water area maintenance), and of minor significance (in residential and public areas, it will not exceed the limit values). In terms of increasing impact, the PŪV alternatives are ranked as follows: 4A < 3A < 2A.

Impact on cultural heritage values

For all PŪV alternatives 2A, 3A, and 4A, no significant negative impact on Group I NKP values is anticipated during either construction or facility operation. The implementation of “secondary” solutions (dismantling the 110 kV EEPOL section), there will be a direct positive impact (two EEPOL towers will be removed from the KPV territory—the Alksnynė defensive complex (code 30540)).

In 2023, during underwater archaeological sonar surveys in the PŪV area at a depth of 2–9 m, 40 objects of anthropogenic origin were recorded, of which the 7 most significant underwater objects with potential archaeological and historical value are Nos. 16, 19, 23, 32, and 39—presumed remains of water transport (boats, ship parts), as well as presumed relic shore structures (Nos. 33, 35) (Group II NKP values). Objects No. 16, 19, 32, 33, and 35 fall within the PŪV work zones: In the case of Alternative 2A (objects No. 19, 32, 33, 35); In the case of Alternative 3A (sites No. 16, 19, 32, 33, 35);

In the case of Alternative 4A (sites No. 19, 32, 33, 35). The solutions for PŪV Alternatives 2A, 3A, and 4A may impact Group II NKP values—unidentified underwater heritage—therefore, the following mitigation measures are proposed: During dredging operations, archaeological surveys must be conducted to document any potential anthropogenic objects or artifacts located beneath the sediment layer that could not be detected during side-scan sonar surveys or visual inspections of the seabed.

After assessing the impact of the PŪV on the Group III NKP asset (World Heritage site, the Curonian Spit), three out of ten PKPV IVV characteristics and elements were identified: (1) a unique scale and overall spatial structure revealing the harmonious coexistence of people with nature; (2) characteristic panoramas and silhouettes of the Curonian Lagoon; (5) elements of maritime heritage; could be affected to varying degrees—ranging from neutral and insignificant to slightly negative—during and after the implementation of the PŪV solutions. The solutions of PŪV Alternative 4A will have a less negative impact on the attributes of the Curonian Spit’s outstanding universal value compared to the solutions of PŪV Alternatives 2A and 3A.

Risk analysis

The PŪV solutions involve the filling of part of the port’s water area and the creation of new land, the construction of new quays, and the dredging of the water area. In all PŪV alternatives, the PŪV solutions are planned in an area through which the underground main gas pipeline of AB “Klaipėdos nafta” runs—a 700 mm diameter high-pressure (P = 60 bar) 700 mm diameter pipeline for the supply of vaporized liquefied natural gas from the LNG terminal to the AB “Amber Grid” main gas pipeline.

Since the PŪV solutions may pose a risk to the existing gas pipeline, an assessment of the potential impact of the PŪV on the existing 700 mm diameter MD was conducted, along with a quantitative risk assessment of major MD accidents that could occur as a result of the PŪV's impact during the construction and operation of the PŪV facilities.

An analysis of the individual risk contours of the main gas pipeline at specific locations shows that throughout the PŪV territory, the port water area, and the adjacent industrial and storage areas, the individual risk at a specific location is $< 1.00E-05$ and is acceptable for these areas.

In the Kairių Street area, south of the main gas pipeline, where a marina for small and recreational vessels and a residential neighborhood are planned, the site-specific risk is $< 1.00E-06$ and is acceptable for residential areas.

The social risk of the main gas pipeline does not exceed the boundaries of the contour recommended by the Fire and Rescue Department under the Ministry of the Interior of the Republic of Lithuania, but falls within the ALARP zone, where Lithuanian regulatory documents mandate the application of financially justified risk mitigation measures.

Transboundary Impact

No adverse impacts on the territories of neighboring foreign states, their natural and social environments, or public health are expected during or after the implementation of any of the project alternatives.

Comparison of Alternatives

In this section, taking into account the conclusions of the expert assessments and other aspects, the three PŪV alternatives 2A, 3A, and 4A are compared, with one being selected as the most optimal and recommended for PŪV implementation. During the EIA for the PŪV, experts in various fields assessed the potential impact of the PŪV on specific environmental components for all PŪV alternatives and compared these alternatives, identifying the priority alternative for PŪV implementation based on their respective areas of expertise. Most of these assessments are based on qualitative expert evaluation. The impact of the PŪV on certain environmental components was also assessed using clear quantitative measures (e.g., based on the amount of pollutants emitted, the volume of soil excavated, etc.).

The PŪV alternatives were compared based on:

- their environmental impact during construction and operation;
- the PŪV facilities planned for their implementation and the parameters of their solutions.

After evaluating the results of the impact assessment and parameter comparison of the PŪV alternatives, the following final conclusions can be drawn:

- All of the assessed PŪV alternatives could be implemented, but the circumstances of their implementation, potential impacts, and implementation timelines would differ;
- The greatest negative impact on the environment would occur during the construction and installation phase of the PŪV facilities, but in many cases it would be short-term and temporary. In the case of PŪV Alternative 4A, the environmental impact would be less than in the cases of PŪV Alternatives 2A and 3A;
- During the operational phase of the planned facilities, provided that the proposed preventive and environmental impact mitigation measures are implemented during the construction phase, there would be no negative impact at all or it would be insignificant for most of the environmental elements assessed. During this operational phase, the PŪV

may have a certain level of impact on surface water, shorelines, landscape, and biodiversity. After comparing the EIA alternatives for the operational phase, all three alternatives are quite similar in terms of their total cumulative impact, with Alternative 4A exhibiting a slightly lower impact.

- Based on the EIA facilities planned for their implementation and the parameters of their solutions, EIA Alternative 4A is slightly superior to EIA Alternatives 2A and 3A.

A summary of the results of the assessment and comparison of the project alternatives indicates that Project Alternative 4A is the most optimal for implementation, with its solutions planned to be implemented in a single phase by 2034. During and after the implementation of the PŪV solutions, it is necessary to apply the proposed measures for the prevention, mitigation, and compensation of impacts.

Upon implementation of the environmental impact and public health mitigation and monitoring measures proposed in the EIA report, the impact of the PŪV on the natural, residential, and social environment, as assessed within the scope of the parameters, would be acceptable, and the PŪV could be implemented and operated at the planned location.

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APPENDICES

TEXTUAL ANNEXES

**1 TEXTUAL ANNEX. SUMMARY OF THE QUALIFICATIONS AND EXPERIENCE OF EIA
DOCUMENT PREPARERS**

2 TEXTUAL ANNEX. DOCUMENTS ON THE PUBLICATION AND COORDINATION OF THE EIA PROGRAM