



Appendix 1

English version of the scoping text on

Marine subjects

**(definition of the content of the environmental impact
assessment report on the marine subjects)**

Port of Esbjerg stages 5 & 6

October 2018

Content of marine subjects

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This document is based on the Danish version of the scoping, where all terrestrial and marine subjects are covered. In this English version, only the marine subjects are included.

Marine subjects

Below are the relevant marine subjects presented, and for each subject it is proposed how the subject will be addressed in the environmental impact assessment (EIA) report.

If nothing else is mentioned, the individual topics are expected to be analysed and evaluated on the basis of existing data, available for instance via the municipality of Esbjerg, relevant databases, advocacy groups etc. It is mentioned, when modelling and/or field studies are to be expected.

The following subjects are considered the most relevant in relation to potential impacts on the environment and they will be analysed in the EIA report:

- International and national protection regimes related to the Wadden Sea, including Natura 2000 areas, UNESCO and Annex IV species
- Coastal morphology, morphology and sediment transport, which includes potential consequences for tides, currents and waves by the establishing of land areas.

The project will not be completed, if significant environmental impacts are predicted.

International and national protection of the Wadden Sea

A number of protection regimes apply to the Wadden Sea, including the tidal area Grådyb. This applies to the following:

- Conservation and Wildlife Reserve (Vadehavsbekendtgørelsen)
- International nature protection areas (Natura 2000)
- Present Annex IV species
- Water management plans (Vandområdeplaner)
- The Wadden Sea National Park (Nationalparkloven)
- The Wadden Sea Plan (The trilateral cooperation for the Wadden Sea)
- Particularly Sensitive Sea Area (PSSA)
- UNESCO World Heritage Site.

The individual designations apply to different parts of the geographical area and include a number of conservation and activity considerations related to the Wadden Sea. There are, for instance, protection regimes related to natural conditions and to wildlife, and regulation of land use and activities in certain areas.

These protective regimes will be key subjects in the EIA report. In the EIA report, the project will be evaluated and analysed in relation to the protective regimes, and the involvement of national and international authorities will be described in relation to the process of planning and assessments of impacts.

It is noted that stage 5 is situated in The Conservation and Wildlife Reserve (Vadehavsbekendtgørelsen). During the EIA process, the responsible authorities will be involved so that conditions regarding dispensations/permissions in relation to The Conservation and Wildlife Reserve can be determined.

It is also noted that the proposed expansion of the Port of Esbjerg is going to take place outside the geographical boundaries covered by international protection regimes.

The future EIA report will reveal any significant impacts from the port expansion, that may affect the international protection areas. After this, it will be evaluated whether or not the port expansion can be realized.

At present, the evaluations related to Natura 2000 and to the water management plans, are specified in the section on 'Natura 2000 areas and Annex IV species' (page 7) and 'Water management plans' (page 9). Besides that, the EIA report will include all evaluations related to other national and international protection regimes.

Coastal morphology, morphology and sediment transport

Descriptions, modeling and assessments regarding changes of the wave climate, water levels and currents, coastal morphology, morphology, water influx and sediment dispersion are performed by DHI. They are to be reproduced in an EIA background report.

Monitoring has been launched on three positions, related to currents ratios, temperature conditions, salinity and turbidity; one at each end of the port area, respectively at the NW end of the port (beyond the wastewater island) and at the cable field SE of the planned Eastern port in the tidal area Grådyb, and a meter in Knudedyb. The data are to be analyzed with the purpose of updating the current knowledge of the tides and to ensure an updated model basis for describing the tide and the consequences of expanding the port.

2D and 3D model simulations of water levels, currents conditions, sediment dispersion and morphology conditions will be performed throughout the entire potentially impacted area. I.e. around the port expansion area, between the expanded area and the East coast of Fanø, East of the expanded East port and the entire tidal area East of Fanø, including the watershed area down towards Knude Dyb.

The 2D model is employed in order to optimize the port extension design, while the 3D model is applied in order to verify the impacts of the port expansion in areas where 3D effects are expected to be relevant for the assessment of sedimentation / erosion in the potentially impacted areas.

Particular attention will be paid to the possible impacts on the overall conditions of the tidal areas Grådyb and Knude Dyb – for instance, potential changes in the water balance, change of water, erosion and sedimentation conditions will be assessed. A 2D model will be employed in this case, as it is considered suitable for describing the currents conditions on shallow tidal areas.

The developer has stated that if a need to understand the dynamics of the tidal areas in 3D occurs, the measurement program is expanded to include measurements in both Grådyb and Knude Dyb.

According to information from the municipality of Esbjerg, attention should be paid to the erosion along the coast east of stage 5, as it cannot be excluded that the establishment of Esbjerg Østhavn (Eastern port) has increased the erosion along the coast and may have re-exposed buried pipelines.

However, there will be focus on assessing erosion / sedimentation throughout the field of impact. Special attention will be paid to account for potential impacts on the coasts of Fanø, including Halen and the tidal areas Næs Søjord. Likewise, the assessment will include any potential change caused by wave reflection from the new harbor island and from deepening the channel south of the island.

The simulations of the sediment transport will also be applied in order to assess the sedimentation in the Port of Esbjerg, in the construction phase as well as in the operational phase, and to assess the dispersion of disposed sediment in the North Sea from deepening in the construction phase, and from the use of existing disposal areas in the Wadden Sea in the operational phase after the port expansion.

The content of contaminants in the disposed sediment and the need to take representative samples in order to identify the composition of the contaminants will be assessed.

The dispersion calculations related to deepening and disposal will be made on a typical winter month and a typical summer month. In addition, it will be examined how extreme weather conditions, like a storm tide with an elevated water level by Fanø and strong currents, can affect equilibrium conditions in the tidal areas and the coast morphological conditions along the eastern shores of Fanø.

It should be mentioned that most of the excavated material of the expansion will be utilized. The land reclamation will occur with clean sediments and will not give rise to sediment spillage. The sediment dispersion calculations can be performed on the basis of detailed currents calculations and information on sediment characteristics in the deepening areas.

Once the model calculations have been performed and the extent of changes in physical conditions has been clarified, a delimitation will be made of which other environmental issues may potentially be affected by these changes. Environmental impacts will be addressed for all relevant topics. In advance, it is assumed that marine subjects (benthic flora and bottom fauna, Natura 2000 area, protected species and water management plans) will be relevant, but other issues that may prove relevant will also be addressed.

It is crucial for the implementation of the project that the overall physical and biological conditions in the Wadden Sea will not be significantly affected by the port expansion. If the model calculations show that the coastal morphology including the tides dynamics, morphology and the sediment transport in the Wadden Sea is significantly affected, the project will not materialize.

Natura 2000 areas and Annex IV species

The proposed project area is situated very close to the Natura 2000 area no. 89: The Wadden Sea, and descriptions and evaluations of potential impacts on the designated habitats and species of the Natura 2000 area no. 89 will therefore be one of the key issues of the EIA report. Natura 2000 area no. 89 consists of the protected habitat areas called H78, H86, H90 and H239 and bird protection areas called F49, F51, F52, F53, F55, F57, F60, F65 and F67.

Regarding the part of the project where the Ministry of Transport, Building and Housing has the authority, the assessment of impacts on international nature conservation areas will be based on BEK No. 450 of 08/05/2017: Act on Environmental Impact Assessment (EIA) of Commercial Business Ports and Copenhagen Harbor, and on the administration of international nature conservation areas and the protection of certain species as regards the construction and extension of ports. According to § 16 in this act, the Danish Transport, Construction and Housing Authority shall decide whether to carry out an appropriate assessment of Natura 2000 areas based on the information in the application and the responses received during the hearing. Due to close proximity to a Natura 2000 area, a Natura 2000 appropriate assessment must be prepared.

Regarding the part of the project, which is included in the Executive Order of the Habitats Directive (BEK No. 926 of 27/06/2016), Natura 2000 appropriate assessments will be carried out in accordance to the Executive Order and its guidelines. According to the guidelines, the initial assessments of possible impacts on a Natura 2000 area is referred to as a preliminary screening. The purpose of this preliminary screening is to clarify whether a project may have a significant impact on the designated habitats and species of a nearby Natura 2000 area. If the preliminary screening cannot exclude that a plan or project - solely or in combination with other plans or projects - will have a significant impact on a Natura 2000 area, an appropriate assessment must be made, taking into account the conservation objective of the specific area. Due to the location of the project area, it cannot be immediately ruled

out that significant impacts on the designated habitats and species of the nearby Natura 2000 area may occur. Consequently, a Natura 2000 appropriate assessment will be prepared.

The purpose of a Natura 2000 appropriate assessment is to evaluate whether the project – solely or in combination with other plans or projects – will have significant impacts on the designated habitats and species of a Natura 2000 area. If the appropriate assessment does not exclude that the project – solely or in combination with other plans or projects – will have significant impacts a Natura 2000 area, approval, dispensation or permission can only be granted in very exceptional cases. Consequently, one of the preconditions for the realization of the current project is that the project will not have significant impacts on the designated habitats and species of the nearby Natura 2000 area.

Descriptions and assessments related to Natura 2000 areas and Annex IV species, will among other things, be based on knowledge from similar projects and on existing data from the area. DCE and DOF regularly perform bird counts and counts of mammals in the Wadden Sea – including a number of areas close to the project area. Accordingly, descriptions and assessments of impacts on designated birds and marine mammals are expected to rely primarily on DCE's and DOF's monitoring and registrations in the Wadden Sea. Sporadic observations from the DOFbasen, Naturdata and Naturbasen will be included, but the assessments will primarily be based on the data from the Danish monitoring program by DCE and publications by DOF.

The most recent data for resting birds are from 2016 (Holm T., et al., 2018) and for breeding birds from 2017 (Thorup & Bregnballe, 2017). However, also previous years' data and summaries will be included (among others: Laursen & Frikke, 2013; Holm T., et al., Nature Agency, 2013; Thorup & Bregnballe, 2016). In addition, information from local birdwatchers and coordinators of bird counts in the area will be collected. If the existing data is deemed insufficient for an assessment of local impacts, registrations of resting birds will be made during the winter 2018-19. In this project, breeding birds have been registered at Halen, Fanø during the summer of 2018. Regarding marine mammals and especially seals regular registrations are carried out in the Wadden Sea. The most recent summary is from 2017 (Jensen L. F., et al.), though more recent registrations are available for harbour seals in 2017 (Galatius, et al., 2017) and for grey seal in 2018 (Brasseur, et al.). As it is the case for birds, previous reports and registrations will also be included (for instance: Galatius, A., 2017; Jensen, 2009; Hansen, J. W. (ed.), 2018).

In addition, there may be a need to register the occurrence of eelgrass in areas where sediment conditions may change.

The preliminary project design implies that the brackish water area, to which water from the stream Præstegårdsbækken runs, will be changed upon completion of the project. There will be specific focus on the impact on Natura 2000 areas from overflow events into Præstegårdsbækken.

Regarding Annex IV species, it is estimated that the relevant Annex IV species, which may potentially occur within or near the project area include otter, porpoise and houting and perhaps species of bats. Otter, porpoise and houting are all designated species in the Natura 2000 area no. 89, and therefore the description and mapping of these species will be based on the same as above.

The assessments related to international nature protection regimes will be performed in accordance to applicable legislation, legislation guidelines, and decisions by the Natur- og Miljøklagenævnet and the EU Court.

Water management plans

The Water Management Plan 2015-2021 for the water area district of Jutland and Funen, covers the Wadden Sea. In order to ensure a comprehensive description of the project in relation to the water management plans, an assessment will be elaborated as to whether the project will prevent the achievement of the ecological and chemical objectives of the current water management plan.

The overall ecological state of coastal waters in the water management plans is generally determined by means of the biological quality elements: chlorophyll-a (phytoplankton), benthic fauna (Danish Quality Index) and eelgrass (depth limit) with possible inclusion of physicochemical parameters as well as certain contaminants. In addition, attention is paid to reduce the input of nitrogen to the marine areas, and the water management plan sets the standards for the input to the Wadden Sea.

In the water management plans, the chemical state is evaluated by the following 21 EU priority substances: Lead, cadmium, mercury, nickel, BDE, benz(a)pyrene, benzo(g,h,i)perylene, benzo(b,j,k)fluoranthene, dioxins, naphthalene, nonylphenol, atrazine, anthracene, diuron, isoproturon, simazine, DEPH, PFOS, HBCDD, hexachlorobenzene and TBT (Ministry of the Environment, 2015).

The baseline conditions in the Wadden Sea will be described by existing data, including data from the basic analyses and the water management plan. The latest state-of-the-art analyses in relation to the water management plans have been prepared and published in the MiljøGIS for Water Management Plans (EnvironmentalGIS, 2016).

Marine biology

Marine biology includes a description and assessment of possible effects on the seabed, tidal surfaces, benthic flora and fauna, fish, marine mammals and birds. For instance, specific attention will be paid to the nearby shallow tidal areas, for example, used by seals, and to blue mussel banks in the area. The impact assessments are made, based among others on the assessments related to international nature conservation regimes (Natura 2000 areas and Annex IV species), water management plans, and the results of modelling and assessment of changes in waves, currents, coastal morphology, morphology and sediment dispersion (see section on Coastal morphology, morphology and sediment transport, page 6).

In addition, a study will be carried out by a diver of the seabed in the project area, in order to map the occurrence and distribution of benthic flora and fauna. HAPS samples will be taken, in order to describe the benthic fauna in the area. Finally, sedimentation, habitats, and seabed conditions will be described, photographed and – if visibility conditions allow - video recorded in a series of transects inside and outside the project area. The very dynamic sediment in the area does not allow for stony reefs in and around the project area. Thus, there is no need for a side scan study or similar analysis.

Ship traffic

The risks related to future shipping traffic are described and assessed based on the existing conditions and the experiences acquired over the years by the Port of Esbjerg, the Operative Command of the Navy (SOK) and others. The forecasting of future shipping traffic will be based upon the business potential that is created by the new areas and quays.

The forecast will be included in an analysis of potential impacts on the ferry traffic to and from Fanø, and in an analysis of whether the increased shipping traffic to and from Esbjerg Port is expected to provide increased waiting times for the ferry traffic.

In addition, aspects of the planned bridge will be assessed in relation to general passage, both for the area's users and in relation to transport to the electricity poles. It will be investigated how the future traffic near stage 6 may occur most appropriately. This applies to both the service of the electricity poles and to other commercial traffic and to leisure boats. Stakeholders related to sailing in the area will be taken into account in finding a solution. Sailing conditions, including safety of navigation, will be addressed in the construction phase as well as in the operational phase.

In order to investigate the navigational conditions, it is expected that navigation simulations will be performed for the prospected port layout at FORCE Technology.

Marine archaeology

Strandingsmuseum St. George (museum of stranding) will be involved in the decision about the need and extent of possible field surveys, if the preliminary mapping supports the need for it.

Raw materials

Extraction of raw materials from the sea territory is regulated in Executive Order no. 780 of 20 June 2017 on exploration and extraction of raw materials from the sea territory and the continental shelf. This Executive Order will form the basis for environmental assessments of raw material extraction in relation to the new port areas.

According to BEK 780 of June 20, 2017 there are three types of permits: auction permits, common area permits and developer permits. In addition, excavated, clean seabed material can be recovered and used for construction work, which typically occurs when there is material available from cleaning up fairways.

The land reclamation for the new port areas will primarily be accomplished by using sediment from cleaning up fairways in the tidal area of Grådyb. During the process of the environmental assessments, it will be examined whether further sediment is required for the filling. If this is the case, environmental assessments will be performed, and one of the three above-mentioned permits will be applied for (auction permits, common area permits and developer permits), in accordance to §20 of the Raw Materials Act, as it is described on the website of the Danish Environmental Protection Agency (<http://mst.dk/erhverv/raastoffer/raastofindvinding-on-sea/>).

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Port of Esbjerg

Port of Esbjerg stages 5 & 6

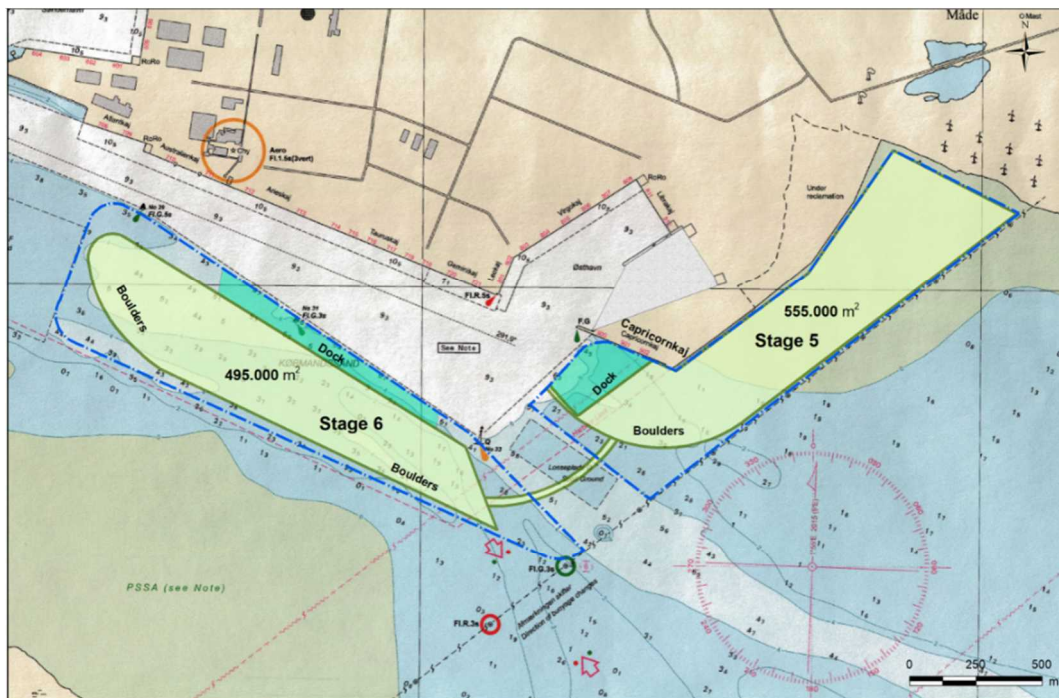
Information on planning and environmental impact assessment

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Port of Esbjerg

The Port of Esbjerg wants to undertake an expansion of their port area. This expansion will be undertaken in 2 stages (5 and 6), east and south of the latest extension of the port. Stage 5 will be established as an extension to the east while stage 6 includes establishment of an island south of the current port and connected to Stage 5 by a bridge. The total area of the project is approximately 1.0 million m² and will be established by land reclamation of the adjacent sea bed.



- Legend**
- Expansion, stage 5 & 6
 - Basic layout
 - Dredging area

Figure 1: The Port of Esbjerg and the layout of the planned expansion in stages 5 and 6.

Port of Esbjerg has expanded the port areas earlier (expansion stages 1 – 4). At present, the Port of Esbjerg is made up of approx. 4.5 million m² of port area and 14 km of docks.

The Port of Esbjerg has been undergoing positive development over the last 10 years, and has experienced a stable and profitable growth. According to Port of Esbjerg, the port is at present the market leader and competence center within offshore windfarm activities in the North Sea region.

The Port of Esbjerg is also the Danish center for the oil and gas industry and one of Denmark's largest ports for container and lorry transportation of goods (Roll On/Roll Off). The Port of Esbjerg also contains activities for ship construction and maintenance, the metal industry, fish processing, heat and power supply, gravel and stone material, luxury liners (cruises), large storage tanks, and maritime services.

The Port of Esbjerg has informed, that new port areas that have been established in recent years have been utilized as quickly as they have been available. By spring 2017, 93 % of the port area was in use.

In a market analysis, the Port of Esbjerg has investigated the development potential of 20 areas of business. The most important is within the Windfarm industry, Oil & Gas, RO-RO (roll on/roll off) transport and heavy manufacturing industry activities that require a close proximity to docks.

The market analysis predicts the growth in the amount of goods to increase by more than 1.1 million tons by 2030, which is equal to an increase of approx. 25 %. During the same period, the annual number of ships that will dock is expected to increase by 900, which is an increase of 14 %.

Table 1: total expected increase in turnover from 2016-2030.

Tonnage	2016	2020	2025	2030
RO/RO	1,700,000	1,900,000	2,100,000	2,250,000
Solid storage	1,350,000	1,350,000	1,450,000	1,450,000
Liquid storage	600,000	600,000	600,000	600,000
Windfarm components	375,000	400,000	550,000	650,000
Goods and containers	480,000	500,000	550,000	700,000
	4,505,000	4,750,000	5,250,000	5,650,000

To accommodate the current and anticipated demands for area according to the expected growth in activities, it is estimated that there will be a need for an increase in port area by approx. 1.0 million m², which is 22 % larger than the existing area. Similarly, there will be a need for an increase in docks by approx. 1.0 km.

Planning and environmental impact assessment

The planning of a port expansion requires a Local Plan and a Municipality Plan Amendment which sets the framework for use of the area of interest. The environmental impacts must be evaluated both with regard to the plans (Strategic environmental assessment – SEA) and with regard to the specific project (Environmental impact assessment – EIA).

The environmental impact assessments will be based upon the environmental factors that are defined in:

Regarding the parts of the port expansion that are located onshore:

- § 20 no. 4 and no. 5 in Environmental and Food Ministries Act on Environmental Assessment of plans and programs of specific projects (EIA) (LBK No. 448 of 10/05/2017)

Regarding the parts of the port expansion that are located offshore:

- § 2, no. 1 and no. 3 in Harbors Act (LBK no. 457 of 23/05/2012), according to § 3 no. 2 and no. 3 in Act on Environmental Impact Assessment (EIA) of Commercial Business Ports and Copenhagen Harbor, and on the administration of international nature conservation areas and the protection of certain species as regards the construction and extension of ports (BEK No. 450 of 08/05/2017).

The Danish Transport, Construction and Housing Authority is the EIA-authority for offshore parts of the project, and Esbjerg Municipality is the EIA-authority for onshore parts of the project.

The generalized EIA-process is presented in the diagram below. Currently, the EIA process on the Esbjerg Port expansion is in the initial phase of the hearings, where topics and contents of the EIA-report are determined.

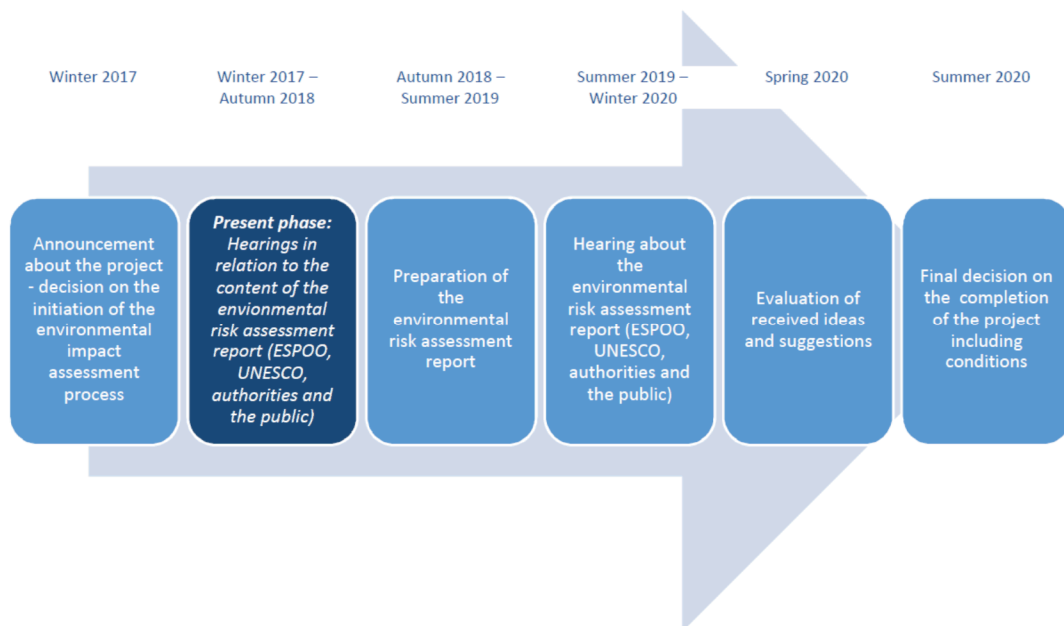


Figure 2: process diagram

The Danish Transport, Construction and Housing Authority had a public hearing about the scoping draft from November 29th to December 13th, 2017, which included hearing at relevant authorities and stakeholders. During the same period of time, Esbjerg Municipality had an internal hearing about the scoping draft. Based on the received comments, the scoping draft was adjusted and made publicly available during the public hearing, which Esbjerg Municipality had during the period of March 14th to April 18th, 2018. During this hearing, the public could read and comment on the scoping draft. After the public hearing at Esbjerg Municipality, the finalized scoping report was prepared.

Currently, an Espoo hearing in Germany and The Netherlands is carried out concerning potential transboundary impacts on the environment, and a hearing in UNESCO is carried out concerning potential impacts on the Wadden Sea's status as a World Heritage Site. Any additional requirements from the two hearings will be included in the environmental impact assessment report.

Following the above-mentioned hearings, the Danish Transport, Construction and Housing Authority is responsible for determining the content of the environmental impact assessment report, based on the ideas and suggestions received.

Subsequently, planning documents and the environmental impact assessment report are prepared.

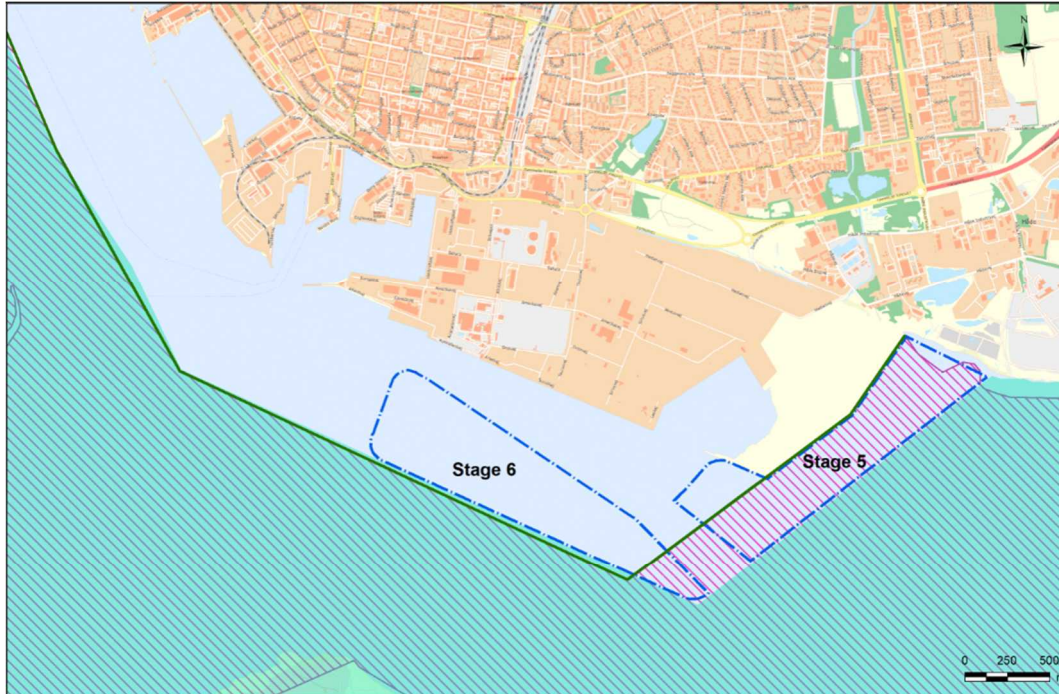
Thereafter, the environmental impact assessment report and proposals for the Municipality Plan Amendment are presented in a new public hearing, where it is possible to submit suggestions and comments regarding the project. After this public hearing, a final decision is made on the adoption of the plan proposals and permits in relation to the project.



Figure 3: Port of Esbjerg with visualisation of the planned port expansion. Stages 5 and 6 are depicted in the right hand side of the picture.

Project area

The project area will be an extension of the Port of Esbjerg to the east (Stage 5) and to the south (Stage 6). The areas of the port expansion are shown in the figure below.



Legend

- Port boundary
- Expansion, stage 5 & 6
- Natura 2000 area
- Conservation and wildlife reserve

Figure 4: Location of the planned port expansion; Stages 5 & 6, and the protected areas surrounding the Port of Esbjerg.

Stage 5 is located between the existing port boundary and the Natura 2000 site (The Wadden Sea). This stage of the project will cover an area of the Municipality Plan 2018 that is reserved for “city purposes” and which has been allocated as a potential area for future port expansion.

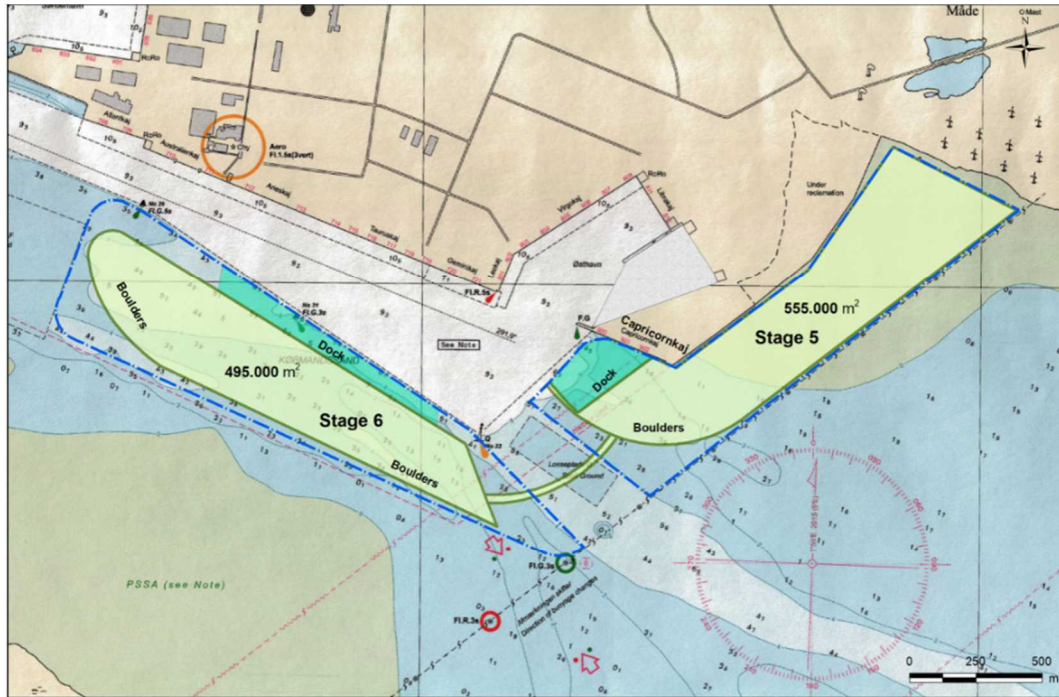
Stage 5 is located within the Conservation and Wildlife Reserve, which is based on a national act that regulates traffic, hunting, the fisheries and work within the sea area (Danish Act. No. 867 of 21/06/2007).

Stage 6 is located in an area that is within the current port boundary. This area is characterised as a shallow area between the shipping channels and the Natura 2000 site.

Although the port extensions border the Natura 2000 site, both stage 5 and stage 6 are located outside the Natura 2000 site.

Project proposal

The figure below shows an outline of the area for the planned port expansion and the current proposal for the basic layout for stages 5 and 6.



- Legend**
- Expansion, stage 5 & 6
 - Basic layout
 - Dredging area

Figure 5: The proposed outline of the planned project area (stage 5 and 6) for the port extension.

Stage 5

The largest part of the stage 5 area consists of tidal flats that are exposed at low tide. At the outer (southern) section of the area the water depth increases to just under 4 m at low tide.

The ports south-eastern boundary is displaced 300 meters in a south-easterly direction towards a row of high-voltage masts and runs more or less parallel to the existing port boundary.

A protective barrier made up of boulders extends towards the south-west and ends in an arc along the natural trench that runs approx. 300 m south-west of the existing Capricorn dock.

Towards the port basin a dock with a 50 m wide dockside at a height of 4.5 m above sea level will be established. The adjacent basin will be widened and deepened to a water depth of 7.5 m.

The internal area will be filled with sand to a height of 5.0 m above sea level, from the ongoing maintenance of the shipping channel into Port of Esbjerg or from the North Sea.

Stage 6

Stage 6 is located in an area called "Købmandssand". The water depths range between 1 and 5.5 m, thus the area is relatively shallow. Because of these shallow depths it is expected that land reclamation can be done without considerable changes to water currents and sedimentation conditions.

A dock will be established along the port basin while the remaining areas will be enclosed with protective barrier made up of boulders. Along the dock a 50 m wide dockside 4.5 m above sea level will be established. The back area is filled with sand to a height of 5.0 m above sea level from the ongoing maintenance of the shipping channel into Port of Esbjerg or from the North Sea.

The connection to land will be established by an open bridge structure passing over 2 natural channels to stage 5. The length of the bridge will be approx. 500 m and the clearance height approx. 5 m.

As with the other Esbjerg port basins, a channel approx. 50 m wide (marked in green signature in the figure above) will be established adjacent the dock along the port basin.

The total width of the channel and port basin will increase by 50 m and the channel adjacent the dock will be dredged to a depth of 10.5 m.



Figure 6: Visualisation of stage 5 and 6 in the planned port expansion. Stage 5 is on the left side of the figure and stage 6 is depicted near the top of the picture towards the island of Fanø.

Expected use of the new port

The new port areas will be used for maritime services such as shipping, industry, production purposes, workshops, storage, transportation, trading and warehousing, warehouse facilities, handling of goods, containers, trailers as well as stone and gravel material etc.

In the following is a description of how the new port area is expected to be designed and used.

Buildings that are planned to be constructed will typically be workshops, storage houses, and production facilities used for port industries such as storing goods and cargo, production of goods, crew and administration buildings as well as silos for storing liquid goods.

There are requests for the possibility of establishing buildings and silos up to 40 meters in height. The density of the buildings in the new area is not expected to be greater than already observed in current port areas.

In all port areas, high-speed mobile port equipment can be used, such as mobile cranes of approx. 80 m, special cranes of approx. 120 m in height and various transport material and equipment approx. 20 m in height.

Close to the docks, in the period between the docking of ships, there will be a possibility of placing goods and cargo of various heights. This material will be gathered and made ready so loading by shipping vessels can be done quickly. At present, windfarm towers standing 90 m tall can be placed in existing port areas. In the future, it is expected that even higher cargo can be temporarily stored and prepared for shipping.

It is expected that the same types of ships that currently use the port, will also be the same types of ships that use the port in the future.

It is expected that future port activities will be similar to current port activities. The activities at the port areas will primarily consist of loading and unloading various types of goods, storage and storage activities, assembly and preparation of wind turbine components for shipping, maritime service activities and the operation of various companies located in the port.

Loading and unloading depends on the type of cargo:

- Containers and large cargo are handled with different types of cranes (mobile cranes or cranes on tracks) and possibly with trucks, reach stackers and forklifts.
- Trailers are moved with trucks and forklifts.
- Loose bulk goods are loaded/unloaded with conveyors direct from silos and storage houses or with cranes, pneumatic suction systems or cranes with snail systems if transport to and from ships are undertaken without the need for storage.
- Goods that can be moved by pumping (liquid or airborne material) are pumped through a buried pipe system or pipelines directly between tanks/silos and ships.
- Scrap is loaded/unloaded with different types of cranes (mobile cranes and cranes on tracks) equipped with large shovels.

The companies that are expected to establish themselves in the port area may, for example, be production companies that process raw material or produce items to be shipped. Other companies may include those that deal with trailers, containers and bulk goods. Still, other companies may include ship repair shops, and suppliers to ships, including personnel and office facilities for ship brokers, as well as companies generally working in shipping and maritime activities. It is assumed that between 10-40 companies can be established in addition to general personnel and office facilities for companies with other interests in the port. Of these companies, it is expected that up to approx. 20 companies will be subject to rules or environmental guidelines in accordance with Chapter 5 of the Danish Environmental Protection Act (LBK No. 1189 of 27/09/2016).

Each business in the port needs to comply with current guidelines for noise, vibration and emissions of air pollutants etc.

Water from process plants, sanitation and water used for cleaning must be diverted to Esbjerg Municipality's water treatment plants.

Surface water runoff, depending on the activities in the area, must be diverted to municipality water treatment plants, discharged into port basins via surface runoff systems eventually with purification functions or via leaching down through port areas into the Wadden Sea. These requirements will be determined during the environmental impact assessment.

Environmental subjects

The environmental impact assessment will include all subjects that potentially may be affected by the project (see table below).

Table 2: Subjects that will be included in the environmental impact assessment.

Marine subjects	Onshore subjects
Coastal morphology, morphology and sediment distribution	Population and Health
International and national protection of the Wadden Sea	Traffic
Natura 2000 sites and Annex IV-species	Noise and vibrations
Water management plans (Implementation of the EU Water Frame Directive)	Terrestrial nature
Marine biology	Land use
Shipping /Navigation	Soil- and groundwater pollution
Archaeological cultural heritage	Discharge of surface water
Use of raw materials	Air quality and emissions
	Climate
	Landscape and cultural heritage
	Visual conditions

In the Scoping Report all subjects are described in more detail.

The following subjects are considered to be the most crucial in relation to environmental impacts, and will be taken into detailed consideration in the environmental impact assessment:

- International and national protection of the Wadden Sea including Natura 2000 sites and Annex IV-species
- Coastal morphology, morphology and sediment distribution including potential effects from the establishment of land areas on water levels, currents and waves
- Visual conditions, landscape and cultural heritage

In the following sections, these subjects will be presented in more detail.

International and national protection of the Wadden Sea

The Wadden Sea is subject to international and national protection regimes, which include the following:

- Natura 2000 site - The Wadden Sea
- Conservation and Wildlife Reserve
- Water management plans (EU Water Frame Directive)
- The Wadden Sea Plan (The trilateral cooperation for the Wadden Sea)
- The Wadden Sea National Park
- UNESCO World Heritage Site
- Particular Sensitive Sea Areas (PSSA area)
- Annex IV-species

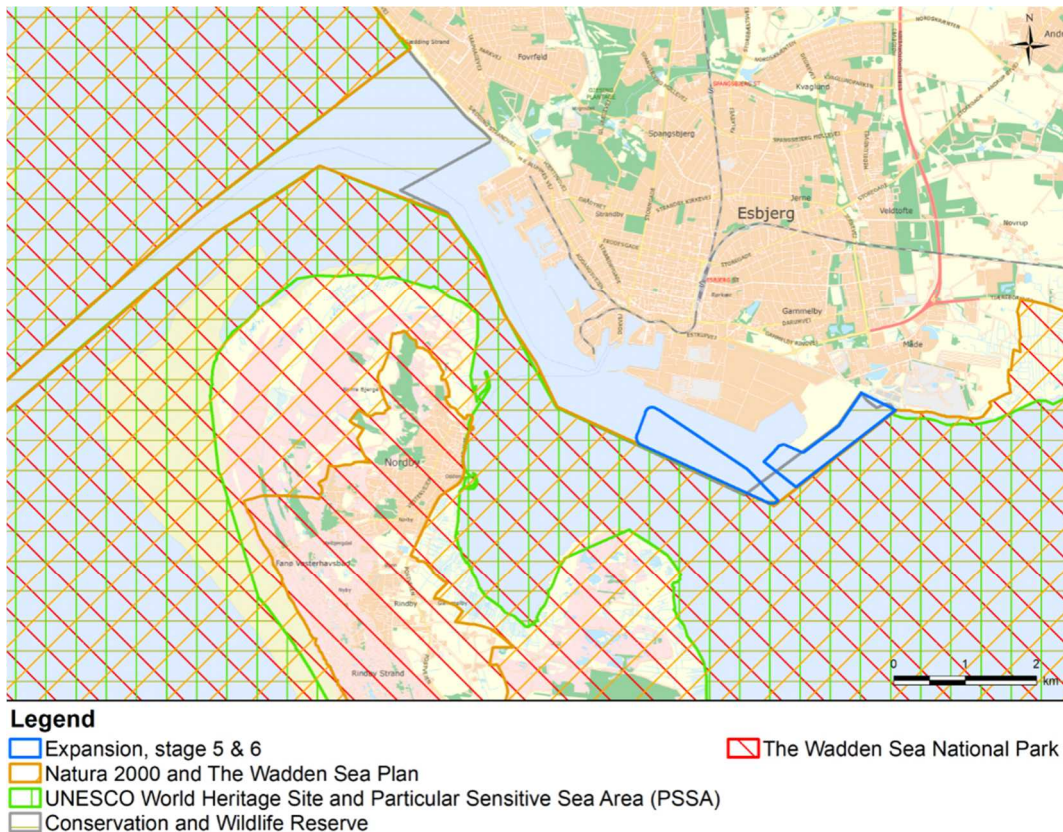


Figure 7: Protection regimes for the Wadden Sea in the vicinity of the planned port extension (outlined in blue).

The international and national protection regimes contain individual regulations and measures for the protection of the Wadden Sea. For example, there are regulations for nature and wildlife conservation, as well as regulations for activities and use of specific areas.

The geographical boundaries of the different protected areas vary. All international protection regimes are located outside the planned project area of the port expansion, while the planned project area is partly overlapping with the national Conservation and Wildlife Reserve.

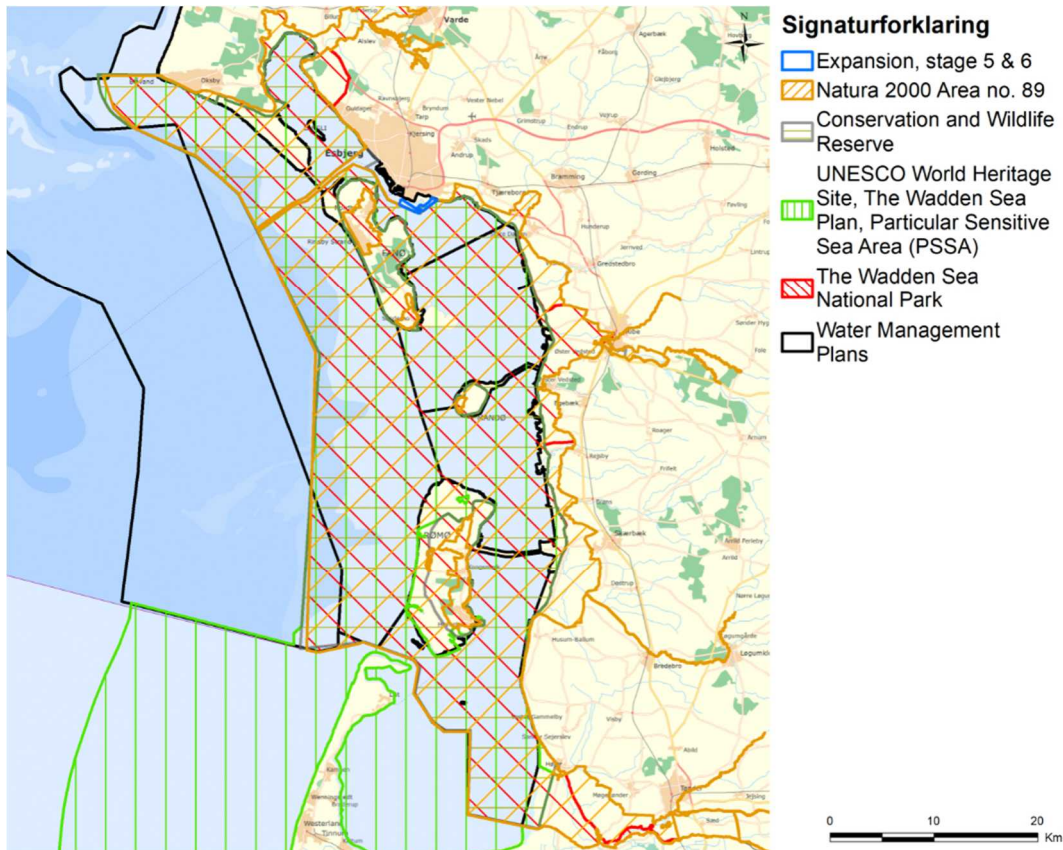


Figure 8: Regional protection regimes for the Wadden Sea (the planned port extension is outlined in blue).

These conservation interests will be central issues in the environmental impact assessment report. If the project is predicted to have significant impacts on international protection regimes including Natura 2000 sites and Annex IV species, the project will not be completed.

Coastal morphology, morphology and sediment distribution

The Port of Esbjerg is located in the Grådyb tidal area, which is a dynamic water area with strong tidal currents, large sediment transport and large natural variations in erosion and sedimentation on the tidal flats of the Wadden Sea.

It is important to investigate whether the port expansion and the establishment of land areas on tidal flats in stage 5 and 6 will impact the physical conditions in the Wadden Sea. Preliminary results from the modelling indicate, that it will be possible to establish Stage 5 and 6 without significant impacts. The potential impacts on the physical conditions will be investigated further and analysed in more detail during the environment impact assessment.

In the environmental impact assessment, changes in water currents, water levels, waves, seabed conditions, sediment transport, erosion and sedimentation on the seabed and along the coast will be investigated. Modelling will be carried out under different weather scenarios.

The tidal currents, that will flow southwest of the planned stage 6, will also be investigated to determine whether stage 6 will create and maintain a channel, that can provide access for shipping/sailing to the area east of the Port of Esbjerg. If not, access for ships etc. must be secured by other measures. It is crucial that the project does not alter the overall physical or biologic conditions in the Wadden Sea, therefore if the project is predicted to significantly impact the coastal morphology including the

water dynamics, morphology or sediment conditions in the Wadden Sea, the project will not be completed.

Visual conditions, landscape and cultural heritage

It can be expected that such an extensive project built on the flat Wadden Sea landscape cannot be realised without a certain amount of visual effects and influences on the landscape and cultural environment.

These impacts will be assessed based on the 3D-modelling showing a visual example of the port extensions. The 3D-models will form the foundation for photorealistic visualisations that will show the port before and after the port extensions.

Preliminary visualisations have been prepared, in which the stages 5 and 6 extensions have been included (see below). Final visualisations will be prepared and presented in the environmental impact assessment. The location and number of visualisations will be determined by Esbjerg Municipality and will take into account all comments from the public hearing.



Figure 9: Geographic positioning of the preliminary visualisations.



Figure 10: Current view of the Port of Esbjerg, seen from Måde at the coast of Jutland.




Figure 11: Preliminary visualisation of stages 5 and 6 in the planned port expansion, seen from Måde at the coast of Jutland. The depicted buildings show a possible scenario.



Figure 12: Current view of the Port of Esbjerg, seen from Halen at Fanø.



Figure 13: Preliminary visualisation of stages 5 and 6 in the planned port expansion, seen from Halen at Fanø. The depicted buildings show a possible scenario.



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Appendix 3 Non-technical Summary

NIRAS

Port of Esbjerg
Stage 5

DANISH TRANSPORT, CONSTRUCTION AND HOUSING AUTHORITY
ESBJERG MUNICIPALITY

DECEMBER 4, 2020

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1 Non-technical summary

The Port of Esbjerg has been a central hub for sea transport and cargo trade between Denmark and the rest of the world for more than 100 years. Today, the port is an international transport junction and an important gateway from Scandinavia to the rest of the world. The Port of Esbjerg is the base of more than 200 companies and the workplace of more than 10,000 people. Because of this, the port is of great importance to the growth and development of the surrounding area.

The Port of Esbjerg has been under continuous expansion and development in order to meet the increased demand for berths and general port areas. Most recently, the Eastern part of the port was expanded in two stages defined as Stage 3 and Stage 4.

In the coming years the Port of Esbjerg expects a great increase in activity related to existing and new business areas. For example, it is predicted that the planned offshore windfarm projects in the Northern Sea will generate large amounts of activity in the windfarm sector. To ensure that the Port of Esbjerg and its clients will be able to continue generating growth and jobs, they are investigating the possibility of expanding the port area over a period of several years set to conclude in 2026. This proposed expansion titled Stage 5 is an extension of the previous Stage 4 expansion of the eastern port.

The placement of the proposed Stage 5 expansion is shown in Figure 1.1 below.

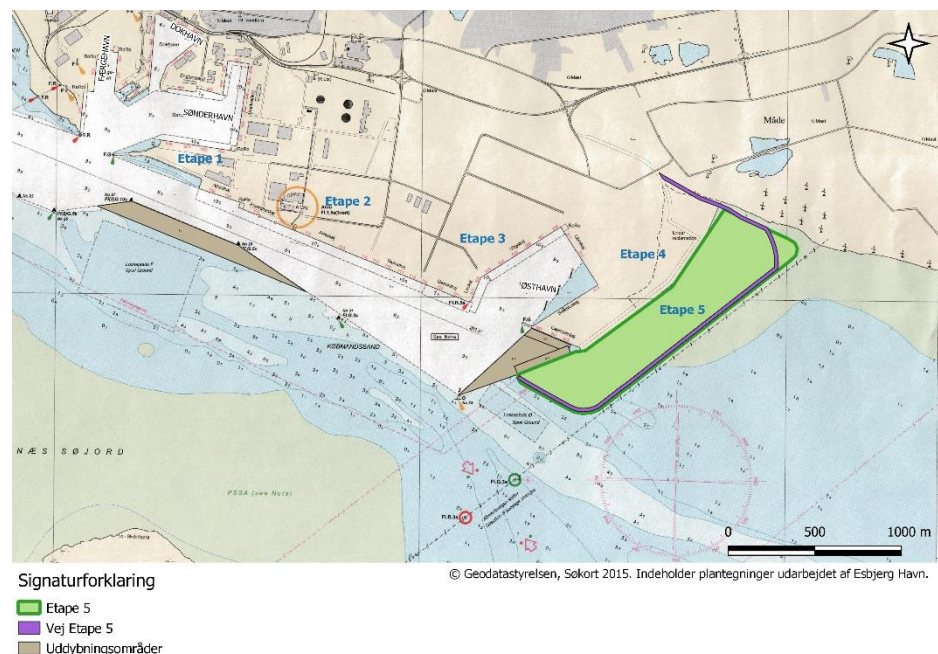


Figure 1.1: The planned expansion of the Port of Esbjerg (Stage 5).

When a project, either public or private, has the potential of causing significant impacts on the environment it becomes subject to the environmental impact assessment (EIA) law. Such a project cannot be initiated before it has been evaluated, and the builder has been given permission to initiate the project. This is the case for onshore projects as well as offshore.

The Municipality of Esbjerg and the Danish Transport, Construction and Housing Authority has, through consultation with the builder (in this case: the Port of Esbjerg), decided that an EIA is required for the construction of the proposed expansion of the port to begin. This EIA report presents the estimated impact on the environment from the proposed expansion of the Port of Esbjerg. It covers conditions on land as well as conditions on the marine environment and also serves as a strategic environmental assessment (SEA) of Appendix no. 2018.13 to the Municipal Plan 2014-2026 and Local Plan no. 01-100-0007.

1.1 Project background

The Port of Esbjerg is the market leader within offshore windfarm activities in the North Sea region and furthermore serves as a central hub for the Danish oil and gas industry. In addition, the port is one of the leading cargo transport ports in Scandinavia, and it provides the framework for a plethora of other activities, including, but not limited to: Ship construction and maintenance, the metal industry, fish processing, heat and power supply, gravel and stone material, luxury liners (cruises), large storage tanks, and maritime services.

In 2016 a market analysis was commissioned by the Port of Esbjerg to investigate the growth potential for the current and future business areas of the port projected out until 2030. This analysis showed that there are prospects of growth for several of the ports main business areas as well as potential for growth within several other business areas. Since this analysis was conducted in 2016, it has become apparent that the business areas relating to the offshore windfarm industry and shipping are undergoing a particularly positive development. It is expected that development within these business areas will be of great importance for the future development of the Port of Esbjerg.

Based on the market analysis from 2016, the Port of Esbjerg has produced a report detailing requirements for new port areas and increased berthage capacity projected out until 2030. This report provided the background for the original project proposed to the authorities by the Port of Esbjerg in November 2017. This project included both a Stage 5 (very reminiscent of the currently proposed Stage 5) and a Stage 6 extension proposal. Stage 6 (shown in Figure 1.2) was meant to be established as an artificial island south of the existing eastern port connected to the proposed Stage 5 via a bridge.

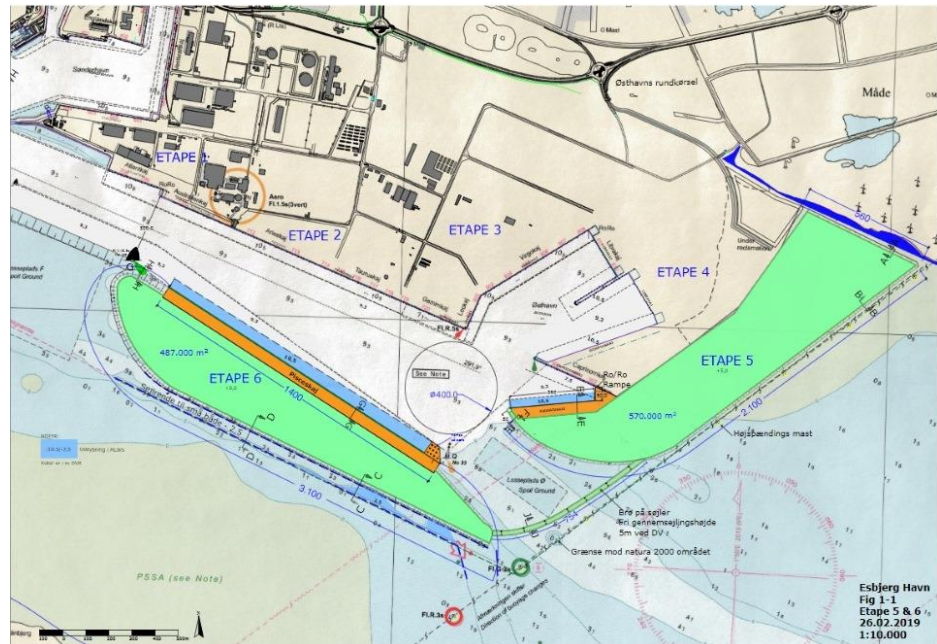


Figure 1.2: Map showing the original project with Stage 5 and Stage 6 expansion proposals. The project was subsequently revised to no longer include Stage 6.

In summer 2019 the Port of Esbjerg decided to revise the project to only include Stage 5, providing roughly 575,000 m² of new port area along with 350 m of berthage. This decision was based on the fact that the EIA of the port expansion had been delayed. Furthermore, it had become apparent that there is need for an area extension the size of Stage 5 before the end of 2026. This need has arisen earlier than expected, mainly due to the offshore windfarm industry growing much faster than expected. Such an industry requires large areas to be set aside on the main ports in order to meet the demands of the growing market.

The 2016 report detailing the need for increasing port area has shown that a further increase in area of 500,000 m² to 1,000,000 m² is needed after 2026. Other Danish ports are not expected to be able to provide new areas up to the size range needed in order to meet the demands, and thus the expansion of the Port of Esbjerg via the Stage 5 expansion is of national importance. Without it, the unloading of parts for the expanding windfarm industry will take place in ports outside of Denmark. By establishing the proposed Stage 5 expansion, the Port of Esbjerg can maintain its important role as a loading port, and thus ensure that a significant proportion of jobs and profits created by the increasing windfarm industry will be located in Denmark.

1.2 Description of the new port

The project area encompasses roughly 76 ha of the Wadden Sea, of which roughly 59 ha will become the new port area while roughly 17 ha will be dredged to become navigable waters and channels.

The Stage 5 expansion is set between the existing port boundary and Natura 2000 site no. 89: The Wadden Sea, which is also a UNESCO World Heritage Site (Figure 1.3). The proposed Stage 5 will expand into an area that has been allocated as a potential area for future port expansion cf. the Municipality Plan 2018-30. The project area is within the boundaries of the area protected by the proclamation of the

protection of the Wadden Sea (BEK no. 867 from the 21st of June 2007), but remains at least 10 m from the borders of the Natura 2000 site.

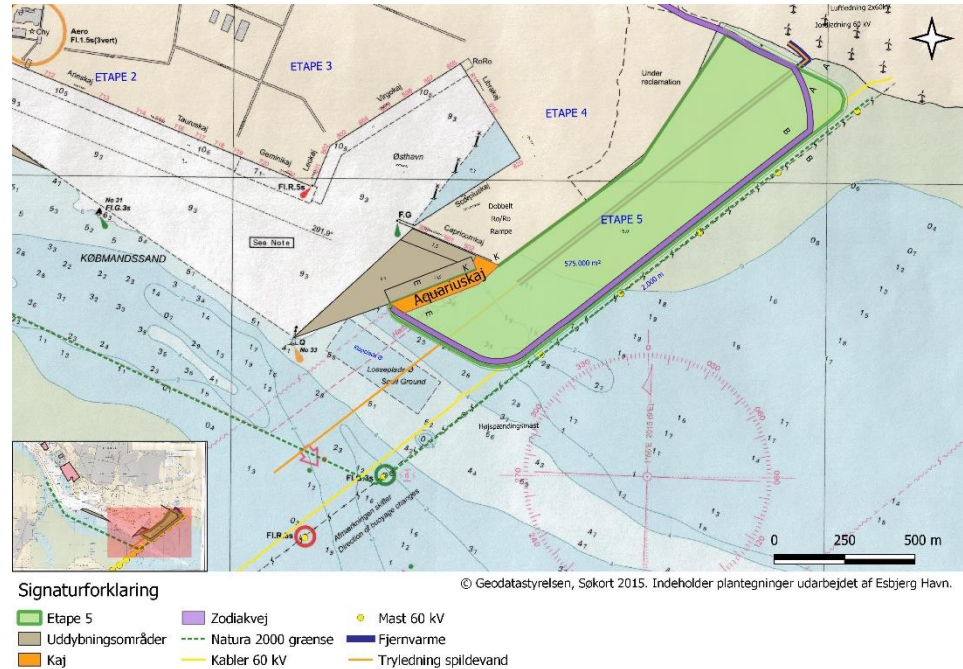


Figure 1.3: Stage 5 is shown in relation to the Natura 2000 site as well as the proclamation of the protection of the Wadden Sea (BEK no. 867).

In establishing Stage 5, the Port of Esbjerg will be expanded by roughly 575,000 m² of new port area along with 350 m of berthage capacity, and a double ramp for loading and unloading of cargo.

The reclamation of the port area for Stage 5 will run in tandem with the dredging of the channel from the North Sea into the Grådyb bar, as the reclamation process will use sand from this dredging along with sand from the 17 ha area that is dredged as part of the project. Only clean sand will be used for the reclamation.

As part of the project, the width of the channel outside the Atlantic dock (Atlantkaj) and Australia dock (Australienkaj) will be increased from 200 m to 300 m. The wider channel will improve the navigational conditions and improve conditions for moored ships along the outer docks.

The construction phase is set to begin in the second half of 2021. The entire expansion can be completed over a period of roughly five years, through which sand for the reclamation will be continuously supplied/pumped in from the dredged area. The new port area will be available for use periodically as it is completed. It is expected that roughly half of the final area will be usable by the third year of the construction process. The port expansion is expected to be fully utilized as soon as it is completed in 2026.

Most of the Stage 5 area is initially expected to be used by the windfarm industry for storage and shipping of parts. It is likely that the need for companies to establish themselves at the new port will arise, and thus the current plans include the option to build on up to 10% the new port area.

The new port area will be divided into two sections (A and B, Figure 1.4). The height of buildings on the new area cannot exceed 30 m. However, smaller parts of buildings can exceed this limit by up to 5 m. Furthermore, chimneys are allowed to be as tall as required for them to function properly regardless of these limits.



Figure 1.4: The two sections of Stage 5.

Near the docks on section B, it will be possible to store tall project goods in-between shipments, such as the 90 m tall wind turbine towers currently stored near the docks on the existing eastern Port of Esbjerg (Esbjerg Østhavn). It is expected that the height of these towers will increase in the future, and thus section B provides the capacity of storing tall goods of increasing heights, to be shipped from the adjacent Aquarius dock (Aquariuskaj). In section A, stored goods cannot exceed the maximum building height of 30 m.

Mobile machinery of any height can be used on the entirety of the new area. This includes mobile cranes roughly 80 m tall, special cranes roughly 120 m tall and assorted transport machinery roughly 20 m tall. This is equivalent to the machinery that is currently operating on the eastern Port of Esbjerg.

1.3 Alternative options for the location of the port expansion

It is required as part of the EIA report that other alternatives are investigated and considered that are relevant, and satisfy similar needs, to the chosen project.

The chosen area is the only continuous stretch of docks available for connecting with a sizeable port expansion within the current port. An expansion north of the existing port is impossible as this area is developed into a marina and beach park for recreational use. Thus, it has been decided that no further expansion northwards is possible.

As an alternative to the proposed Stage 5 expansion, it has been considered whether a similar expansion could be placed elsewhere on or near the Port of Esbjerg. In fall 2019 it was estimated that the Port of Esbjerg had roughly 200,000 m² unused space available, however this area is made up of many smaller areas of

variable size scattered throughout the port. Therefore this unused space is not comparable to the area provided by the proposed Stage 5, even if fully utilized. Furthermore, the unused areas are expected to be utilized in the coming years.

As a part of the EIA report several possible alternative locations for the port expansion were reviewed which were proposed during the first public hearing. These alternatives include the Ferry port, basin no. 6, the Fishery port, the old marina in basin no. 2, the basin for the traffic port and the extension of the Atlantkaj¹ into the channel. A review of these alternatives shows that none of them are suitable for developing the facilities that are to be developed on the proposed Stage 5. Furthermore, none of the proposed alternatives provide the opportunity to establish the necessary berthage increase. In addition, some of the alternatives will create a significant amount of heavy traffic through the city of Esbjerg.

The Esbjerg Power Plant is scheduled to shut down and be demolished within the foreseeable future. The port area made available following the demolition is roughly 190,000 m² and is expected to be utilized by the windfarm industry in addition to the area established through the proposed Stage 5 expansion. Therefore, this area cannot replace the area created by the proposed Stage 5. Instead, it is meant to supplement the proposed expansion to ensure that enough port area is available to meet the demands posed by the windfarm projects.

Another alternative which is also reviewed in the EIA report is the so-called "dry port concept". A dry port functions as a terminal for reloading of cargo for domestic transport. Municipal Plan 2014-26 includes such a dry port, planned to be located in Andrup about 5 km from the Port of Esbjerg. The higher operational costs for a business in the dry port compared to the same business on the actual port makes the prospects of establishing facilities near the dry port instead of on the actual port unattractive for all but the largest production plants. Such large plants demand much more space to establish themselves than any commercial Danish port can offer.

¹ Atlantic dock

1.4 Environmental impact

The expansion of the Port of Esbjerg could impact the environment in several different ways. It was therefore deemed necessary to undertake an introductory investigation and demarcation of the possible environmental impacts that should be included in this EIA report. This demarcation was based on input from the first hearing phase, where the impacts on the marine environment were evaluated by the Danish Transport, Construction and Housing Authority, and the impacts on the terrestrial environment by the Municipality of Esbjerg. Following the first public hearing phase the Danish Transport, Construction and Housing Authority and the Municipality of Esbjerg put forward criteria for the further planning and EIA of the project, partly based on the suggestions received.

Alongside the public hearing phase an ESPOO hearing was conducted in Germany and the Netherlands, regarding the environmental effects that could potentially have an impact across the borders. This hearing did not result in any further responses.

Furthermore, a UNESCO hearing was conducted, evaluating the potential effects on the Wadden Sea as a World Heritage Site. The EIA report includes the evaluation about the potential consequences of the project on the Wadden Sea as a World Heritage Site in section 10 and it is summarized in section 1.4.5 below. A summary of this evaluation is included in the Danish version of the non-technical summary as well. The impact assessment related to the World Heritage and the English edition of the non-technical summary have been reviewed by the UNESCO from April 2020. The review was received from UNESCO on the 8th of October 2020, where they state, that the expansion of Esbjerg harbour is considered to not cause any significant impacts on the Wadden Sea World Heritage Site, or on the surrounding landscape and adjacent wider ecosystem. Nonetheless UNESCO recommends the preparation of an environmental management plan to monitor potential impacts during construction and operation of the new harbor facility.

The following sections (1.4.1-1.4.19) provide a summary of environmental conditions that are relevant to the proposed expansion of the Port of Esbjerg.

1.4.1 Hydraulic and coastal morphology

The Port of Esbjerg is situated in the northern part of the Wadden Sea, an area highly influenced by the tide. The island of Fanø to the west of the Port of Esbjerg creates a barrier and shields the Wadden Sea from the North Sea. The tide enters and exits the inner waters of the Wadden Sea through two deep channels (Grådyb and Knudedyb) twice daily. The Danish part of the Wadden Sea is shown on Figure 1.5 with Grådyb, Knudedyb, and Juvre Dyb. The different sandy and muddy tidal flats in the tidal area are also shown. Grådyb tidal area encompasses the tidal area from the bottom of Ho bay to the boundary to Knudedyb tidal area south of the Port of Esbjerg.

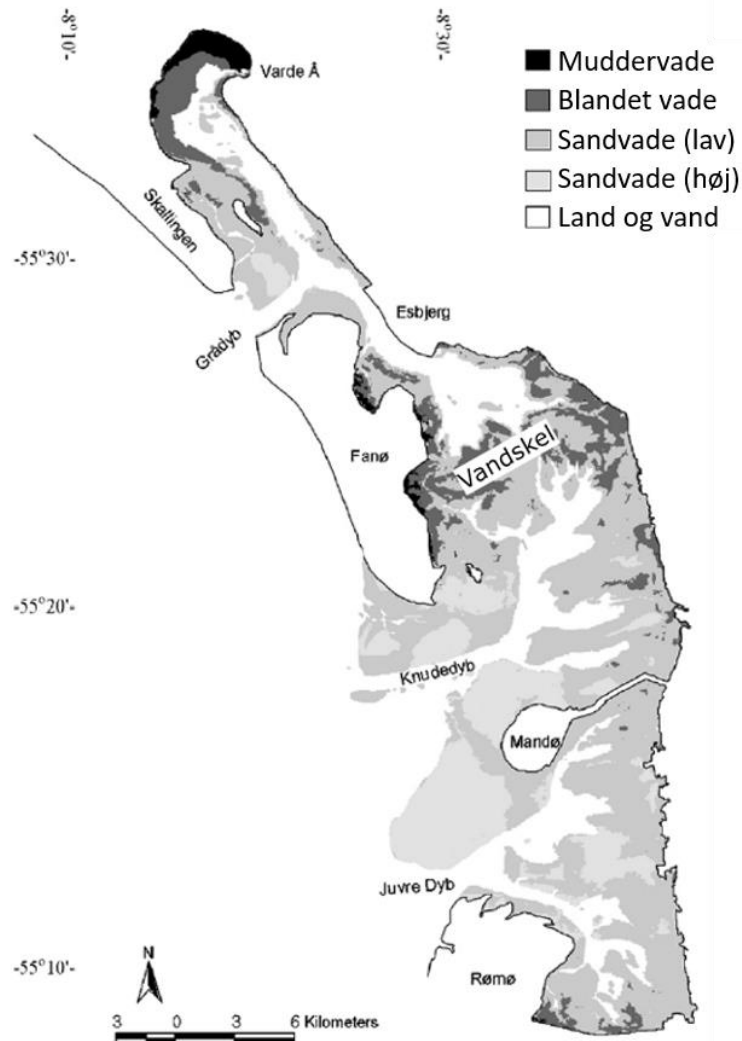


Figure 1.5: The Danish part of the Wadden Sea with sandy and muddy tidal flats in the tidal area. Legend from top to bottom: muddy tidal flats, mixed tidal flats, sandy tidal flats (low), sandy tidal flats (high), land and water.

The assessment of whether the port expansion, which requires the reclamation of a part of the tidal area, affects the hydraulic or morphological conditions in Grådyb and Knudedyb tidal areas is based on existing knowledge, field study data, numerical modelling and expert knowledge within the field.

The existing hydraulic conditions (base conditions) in the tidal area (water levels, mixing, waves and currents) and the impact the project has on these is analyzed via a two-dimensional hydraulic model, in addition to an analytical assessment of depth variation wherein layering can occur. The results thereof are used in a numerical model, analyzing the morphological changes to the seafloor and the adjacent sandy tidal flats caused by the estimated hydraulic changes. Furthermore, the results from the hydraulic model will be used in a third numerical model, calculating the spread of fine grained sediment resuspended into the water column by the construction of the port expansion.

The numerical models and base conditions for the hydraulic and morphological conditions are based on an extensive dataset. An extensive data collection program was conducted for the entirety of the Grådyb and Knudedyb tidal areas. Data was collected as time series going back at least 10 years for multitude of variables: wind conditions, water levels, waves, currents, salinity, and run-off plus sediment run-off from land. Furthermore, a series of measurements were taken in 2018 for currents, salinity, temperature and turbidity from five different measuring stations in the area supplemented by acoustic measurements of the current speeds. Lastly, data was collected for depth and sediment conditions, sediment composition and sediment turnover and the experiences and data from previous dredging and disposal activities in the area was gathered.

The numerical models were verified using the collected data and existing knowledge of the developments in the area. It was then calculated how the coastal morphology could change based on the existing hydrological conditions i.e. without the construction of the proposed Stage 5 expansion (base description). Afterwards, a similar set of calculations was done based on the hydrological model for the conditions after the construction of the proposed port expansion. Lastly, the change in the morphology of the seafloor and sediment dispersion was calculated by comparing the model with and without the port expansion. This development is calculated for a 3 month summer and winter period or an entire calendar year and thus takes seasonal variation into account.

The collective results from these three numerical models form the base for the assessment of the impact of the port expansion on the environment, both during its construction and operation.

1.4.1.1 *Hydrography*

The hydrography of the tidal area is primarily controlled by the tidal movements in and out of Grådyb and Knudedyb with fluctuating currents and water levels.

The port expansion will lead to minor local changes in the current conditions surrounding the expansion in the form of increased currents in the channel next to the proposed Stage 5 expansion and reduced currents on the side sheltered by the new Stage 5 pier (Figure 1.6).

The area with increased current speeds is shown in red on the southern end of the Stage 5 expansion and areas with lower current speeds are shown in blue just southeast of the Stage 5 expansion. The changes in current speeds have an extent of roughly 2 km up and downstream of the port expansion.

Furthermore, the port expansion will cause a minor increase in current resistance in the Grådyb tidal area, but will not affect the net water circulation from Knudedyb to the Grådyb tidal area significantly.

The proposed Stage 5 expansion will affect the average wave height locally around the expansion and will increase the existing high tide water levels by 1 cm. Thus, it will not increase the risk of flooding during storm surges. Overall, the impact of the port expansion on the wave-, water level-, salinity-, and storm surge conditions are negligible.

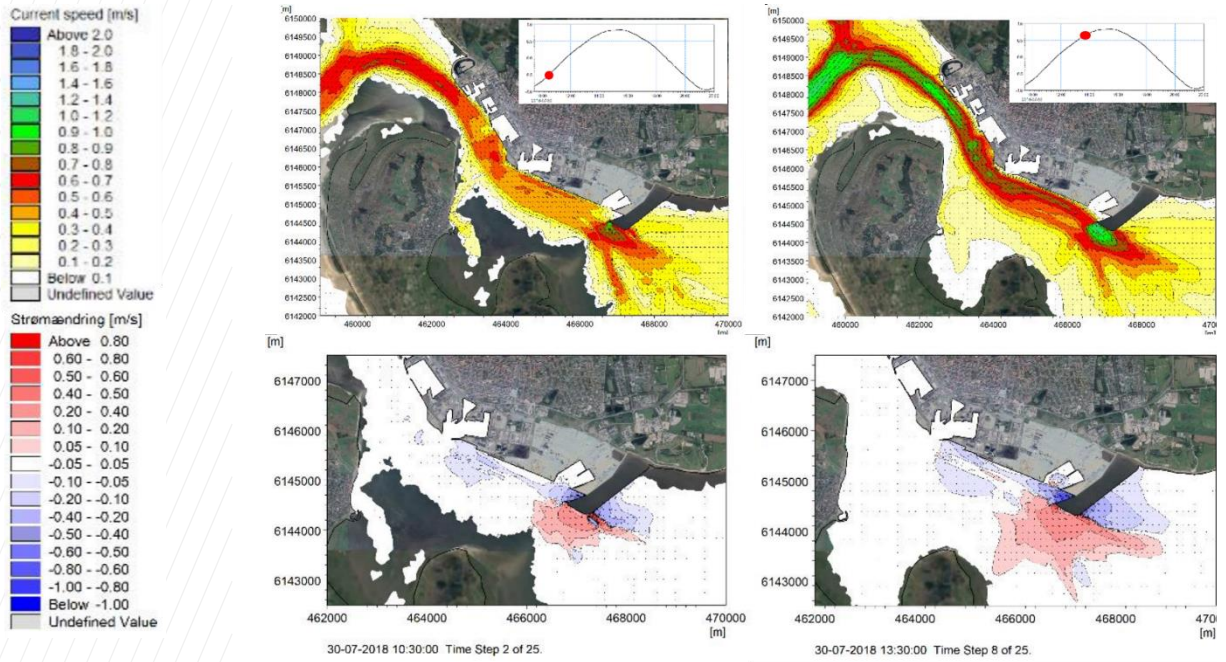


Figure 1.6: A snapshot of the current speeds and changes therein following the construction of the Stage 5 expansion during a typical tidal period with increasing water levels on the 30th of July 2018. The two smaller graphs depict when in the tidal cycle the snapshot was taken. The two upper figures show the current speeds at two different times after the construction of the proposed Stage 5 expansion and the two lower figures show the changes in current speeds caused by the port expansion.

1.4.1.2 Morphology

The majority of the Grådyb and Knudedyb tidal areas are either permanently submerged or made up of sandy tidal flats with a relatively uniform and even sediment of fine grained sand with a median grain size of 0.2 mm in diameter. A smaller part is made up of tidal flats with mixed sediment (silt and sand) or mud. The morphological models are based on the assumption that the entirety of the tidal area is covered in fine sand with a median grain size of 0.2 mm in diameter.

The local changes in current conditions around the port expansion will cause some morphological changes of the seafloor both in the channel and the adjacent tidal area south and east of the proposed Stage 5 expansion.

In the northern part of the channel at Købmandssand and right next to the Stage 5 expansion, the seafloor will be eroded by up to 1-2 m, while there will be an increase in deposition in a similar order of magnitude right next to the Eastern Port of Esbjerg and along Købmandssand (Figure 1.7).

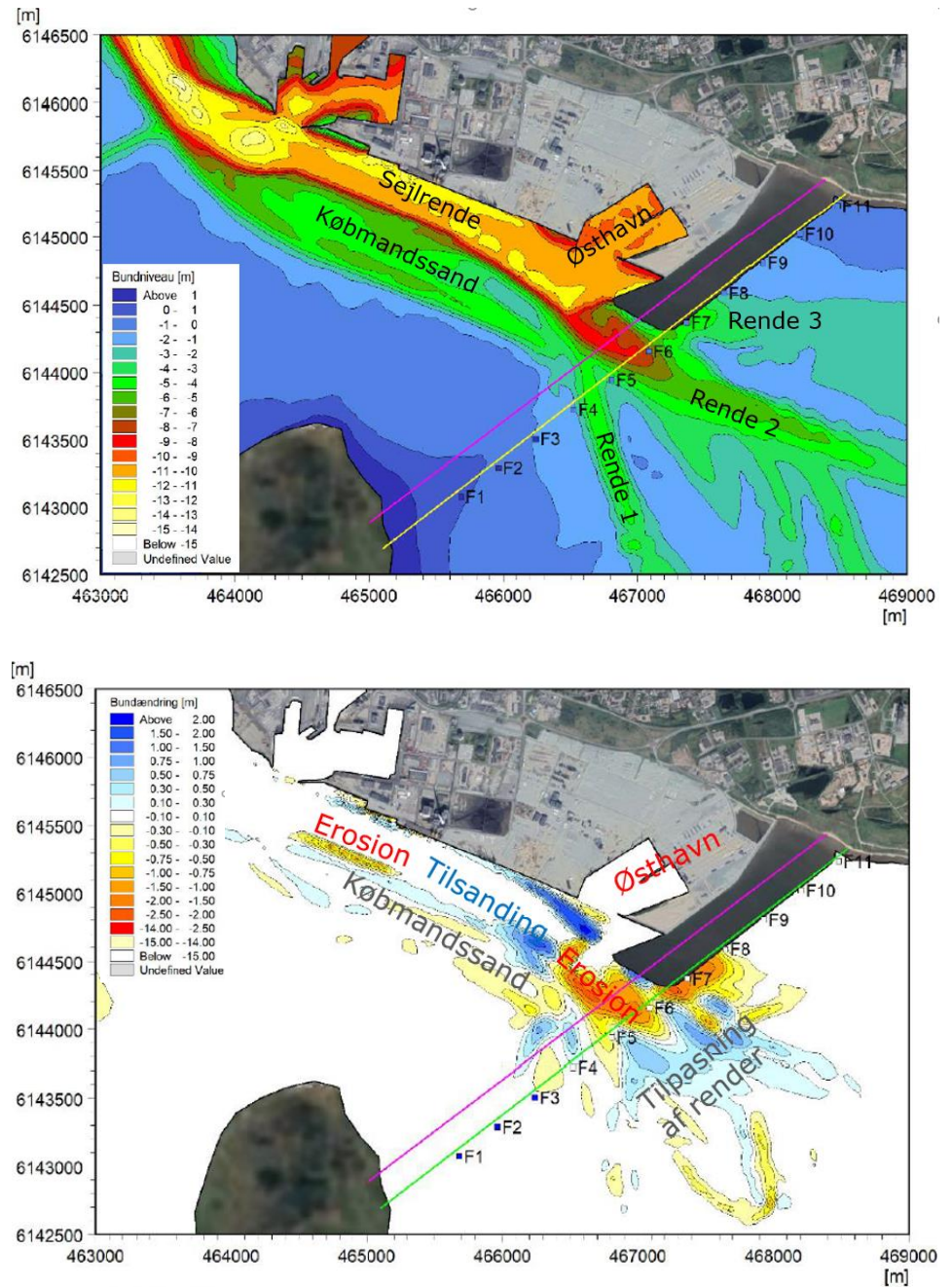


Figure 1.7: Top: Future seafloor conditions. Bottom: the changes on the seafloor caused by the Stage 5 expansion after 365 days. The blue color shows the deposition of sediment and the yellow and red colors show erosion. The pink line shows a pipe for district heating and waste water and the green line shows an underground power cable. Power pylons are marked and named F1-F11.

In the area south and east of the port expansion (roughly 2.5 x 2.5 km²) the three tidal channels in the area will change to accommodate the new current conditions. These changes will lead to erosion and deposition of roughly 0.5-2 m of sediment along the channels. These morphological changes will mainly occur during the first year after the construction of the port expansion.

Just south and southwest of the Stage 5 expansion, erosion can occur in the areas where power pylons, pipes and underground cables are situated. It is therefore recommended that these elements are inspected and their erosion protection is improved if necessary.

The potential effects on morphology are evaluated as being insignificant for the marine environment in the Wadden Sea.

1.4.1.3 Sediment dispersion during the construction of the Sage 5 expansion

During the construction of the port expansion, 900,000 m³ of sediment is dredged from channels and port basins near the new quay (388,000 m³ sand and 512,000 m³ clay) and disposed of on the disposal sites in the North Sea.

Sediment dispersion caused by dredging

Model calculations are made for a period of 90 days of summer and 90 days of winter in 2018 encompassing the entire dredging period. During this period it is assumed that 120,000 TDS (Tons of Dry Sediment) will be disposed of during the summer and 51,000 TDS will be disposed of during the winter on disposal sites in Grådyb (Figure 1.8). This means that during this period, the construction of the port expansion leads to an increase in sediment spillage and thus sediment dispersal of roughly 31,000 TDS clay and 29,000 TDS sand.

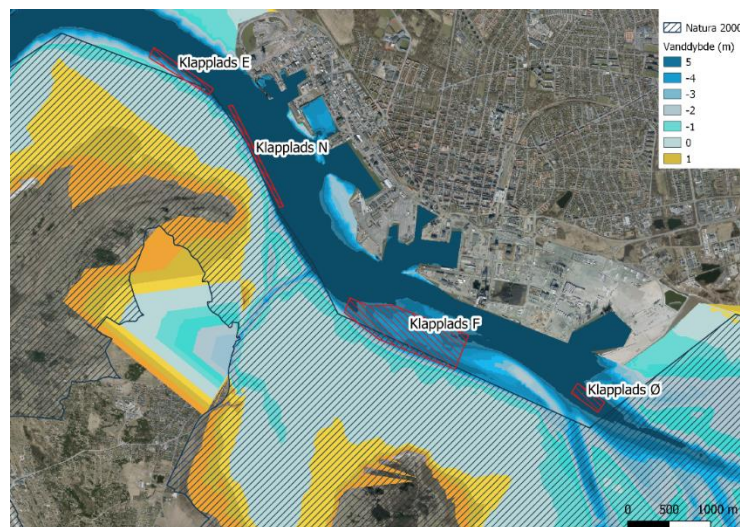


Figure 1.8: Overview of disposal sites (klapplads) in Grådyb.

During the construction phase, the dredging of the channel and the new basin will lead to small changes in average sediment concentrations of the water of up to 1-5 mg/l (Figure 1.9). The duration of any periods of sediment concentration above 50 mg/l will increase by 3-5 days in the channel and in a 2 km wide area southeast of the Stage 5 expansion during the dredging.

Lastly, there will be an increase in sediment deposition over the 90 days of the model by 1-8 mm in several different areas along the channel and on the side sheltered by the Stage 5 expansion as well as just north of the boundary between the Grådyb and Knudedyb tidal areas (Figure 1.9 and Figure 1.10). Outside of these areas the results of the modelling show no measurable changes in the sedimentation conditions.

When comparing the above changes in sediment dispersion during the construction phase to the natural short term and seasonal changes in sediment concentrations of 20-500 mg/l and the changes in deposition of 20-100 mm as well as the yearly average net sedimentation of 1-10 mm/year it is assessed that the impact of the construction of the Stage 5 expansion on the marine environment of the Wadden Sea will be negligible.

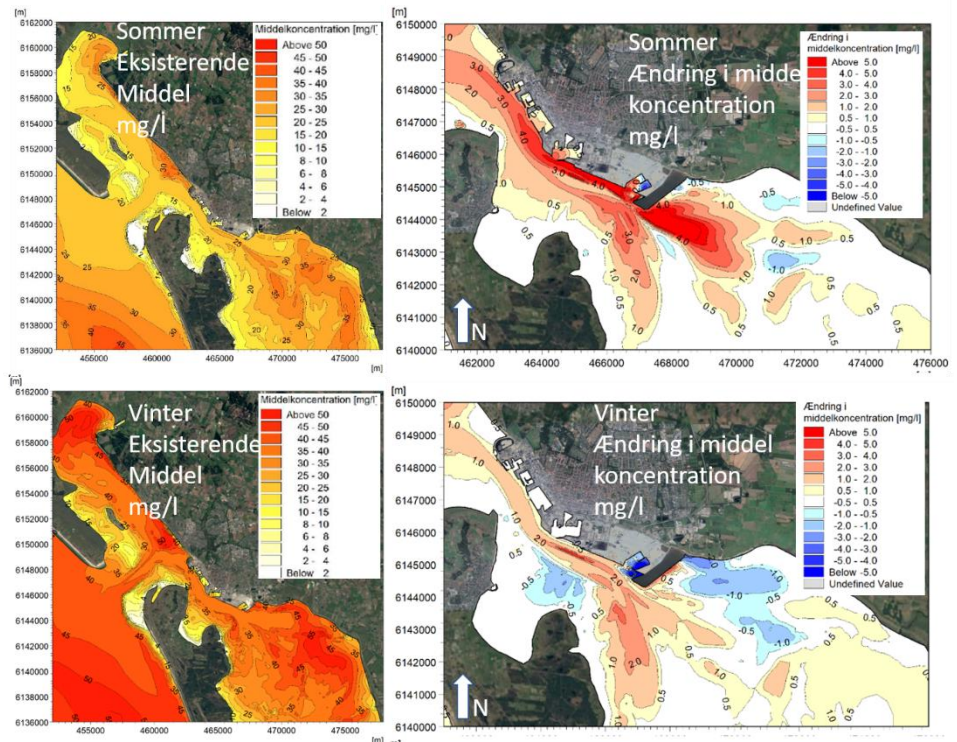


Figure 1.9: Existing average sediment concentration (mg/l) during summer (top) and winter (bottom) in 2018 and model calculations (right side) of the changes in sediment concentrations (mg/l) in winter and summer during the construction phase.

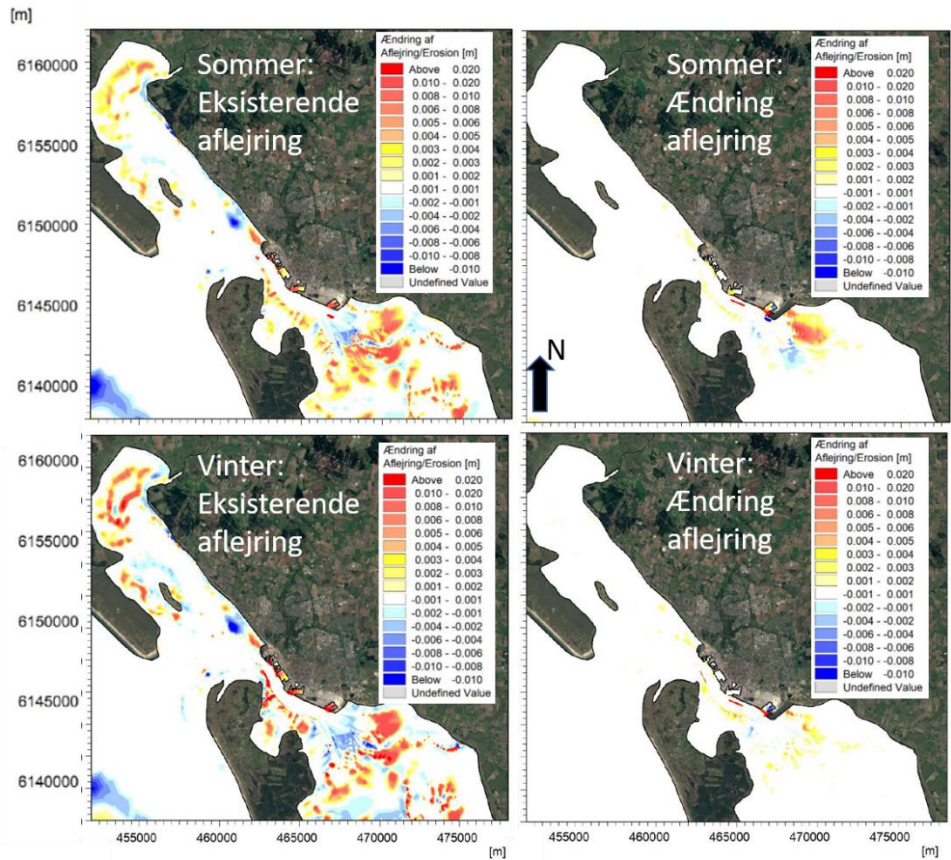


Figure 1.10: Deposition conditions during the construction phase with the contribution from dredging and disposal in 2018. Left: existing deposition conditions over 90 days of summer (5th of June 2018 to 15th of September 2018) and winter (18th of December 2017 to 20th of March 2018). Right: difference in sedimentation between existing conditions and during the dredging of 900,000 m³ sand and clay including the Stage 5 expansion.

Sediment dispersion from disposal

The material that is dredged from the channel and basin during the construction of the Stage 5 expansion is disposed of on the disposal sites Vesterhavet 2B and Vesterhavet 3B in the North Sea just next to Skallingen and the West coast of Fanø (Figure 1.11).

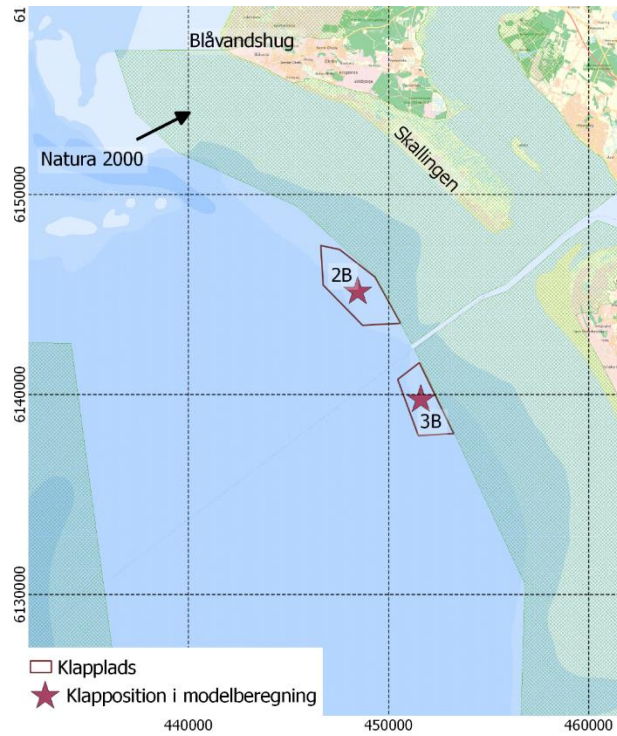


Figure 1.11: Map showing the location of the two disposal sites in the North Sea.

The disposal will cause variations in the sediment concentrations in and around the disposal sites during the period it takes place. Within the disposal sites there will be short periods of high sediment concentrations between 50-100 mg/l and the area around the disposal sites might experience concentrations above 50 mg/l. These variations in sediment concentrations are in the same order of magnitude as the background sediment concentrations in the area of roughly 2-200 mg/l.

An area around the disposal sites of roughly 10-30 km² will experience higher sediment concentrations (>10 mg/l) for 10-20 days depending on the disposal site and season. The extent is shown for disposal site 2B in Figure 1.12 and is similarly calculated for disposal site 3B. The extent of sediment concentrations over 10 mg/l will however not be significantly increased as the natural background level already surpasses 10 mg/l when the wind speeds exceed 5 m/s in the North Sea which is the case roughly 70 % of the time.

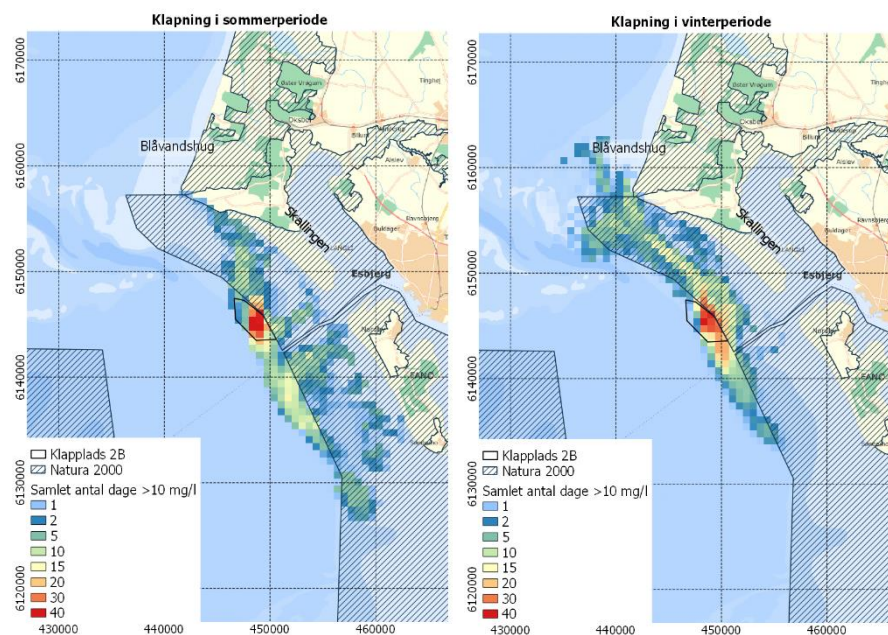


Figure 1.12: Total number of days with sediment concentrations greater than 10 mg/l during the disposal of dredged sediment from the construction phase at disposal site 2B during the summer and winter period.

Outside the disposal site, the increased sediment concentrations will cause minor sediment depositions of roughly 1-8 mm in thickness. This deposited sediment will be rapidly integrated into the natural sediment turnover in the North Sea.

Overall the effects from the disposal of the dredged sediment is evaluated to be insignificant for the marine environment.

1.4.1.4 Sediment dispersal during the operation of the Stage 5 expansion

The model calculations of dispersal of fine grained sediment are done for a summer and winter period of 90 days each in 2018. During this period it is assumed that sediment is continuously dredged from the basins and is dumped on the disposal sites in Grådyb just like in 2018 i.e. 120,000 TDS (Tons of Dry Sediment) during the summer and 51,000 TDS during the winter.

The slight increase in current speeds and changed pattern of the currents caused by the Stage 5 expansion will cause small changes in the average sediment concentrations of up to 1-5 mg/l (Figure 1.13). In some areas the average sediment concentrations will increase while it is expected to decrease accordingly in other areas. The duration of any periods of sediment concentrations exceeding 50 mg/l will be increased by a few days (1-5 days) in the channel and in a 2 km long area east and southeast of the Stage 5 expansion.

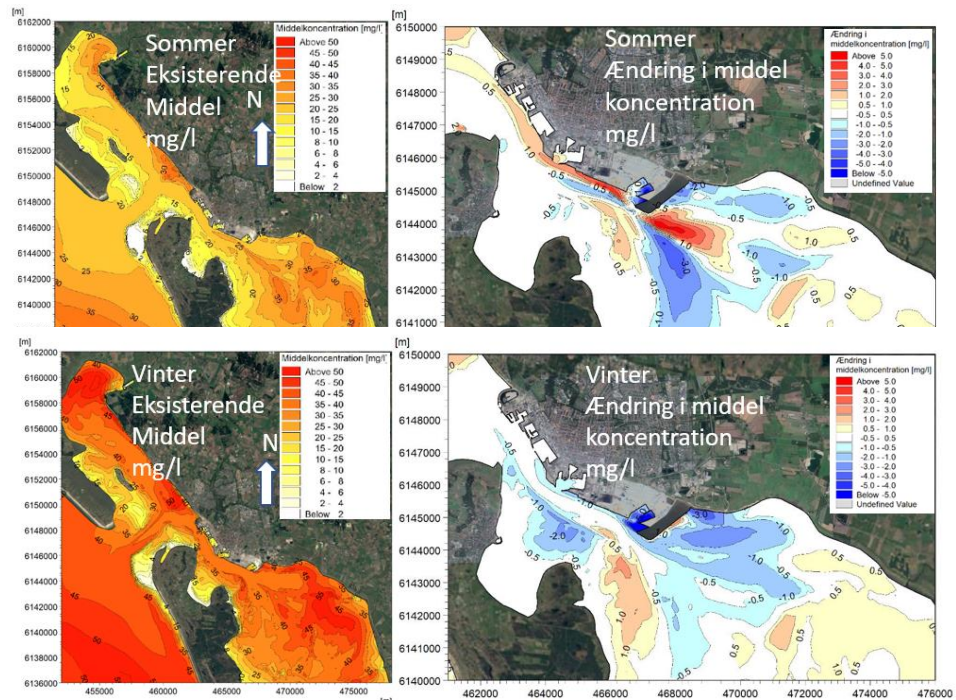


Figure 1.13: Existing average sediment concentrations (mg/l) in summer (top) and winter (bottom) in 2018 and the calculated (right side) changes in sediment concentrations (mg/l) in winter and summer during the operation of the Stage 5 expansion.

The changes in sediment concentrations are most evident when sediment from the port is being disposed of on disposal site Ø (East) in Grådyb just south of the Stage 5 expansion because of the increased current speeds that carry the fine grained sediment from the disposal site into the area east/southeast of the Stage 5 expansion towards the boundary to Knudedyb. The calculations for the summer period exemplify this as roughly 100,000 TDS is disposed of on disposal site Ø, while the calculations for the winter period (which has rougher weather) show that there is a higher outflow out of the Wadden Sea and no sediment is disposed of on disposal site Ø. The variation in future sediment conditions after the construction of the Stage 5 expansion are well illustrated by the model calculations for the summer and winter periods and lie within the range of the shown calculations. There will be no significant changes in the sediment concentration in the Grådyb and Knudedyb tidal areas.

The changed current conditions and sediment concentrations will not affect the deposition of sediment in the Wadden Sea significantly. There will be an increase in deposition over 90 days of the model of roughly 1-20 mm in several specific areas along the channel and in the area sheltered by the proposed Stage 5 expansion just north of the boundary between the Grådyb and Knudedyb tidal areas (Figure 1.14). Furthermore, there will be a slight decrease in deposition of roughly 1-5 mm in small areas south of the Stage 5 expansion. Outside of these areas the model calculations show no measurable changes in sedimentation conditions. The total accumulation of sediment in the Wadden Sea will not be reduced. On the contrary, the model calculations suggest that a slight increase can be expected.

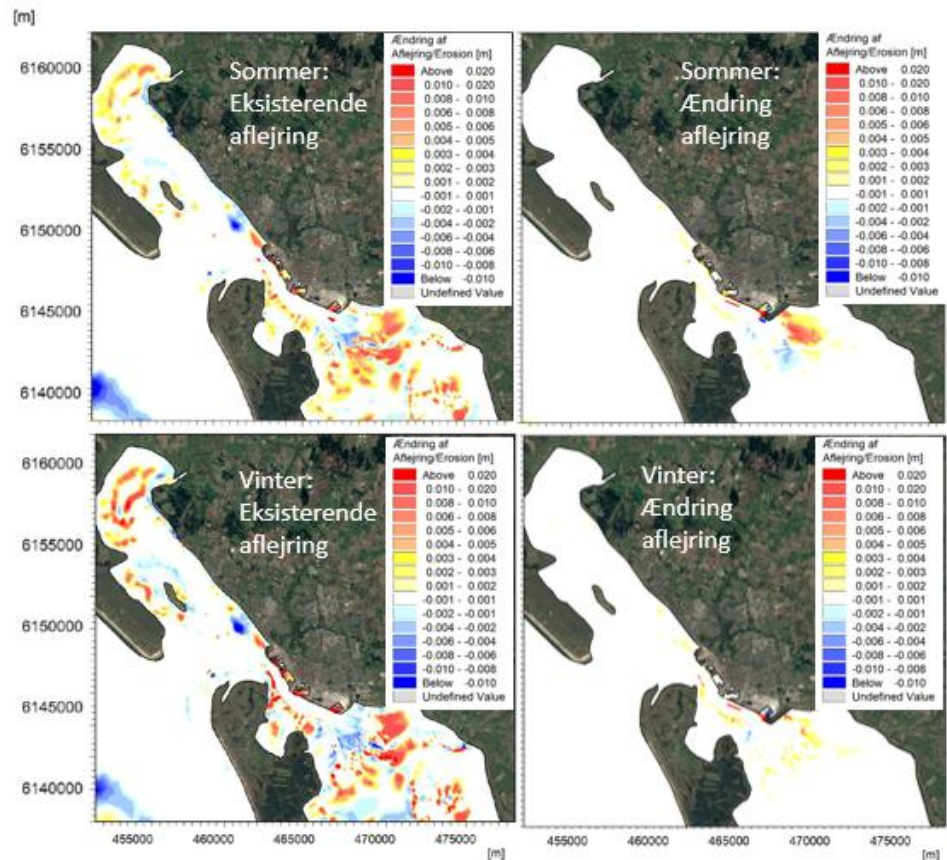


Figure 1.14: Deposition conditions during the operation phase with contributions from disposal of sediment in 2018: Top: The existing deposition conditions over 90 days during summer (left) 5th of June 2018 to 15th of September 2018 and winter (right) 18th of December 2017 to 20th of March 2018. Bottom: differences in deposition between existing conditions and the conditions after the construction of the Stage 5 expansion.

When comparing the above changes in sediment dispersion during the operation of the Stage 5 expansion to the natural short term and seasonal changes in sediment concentrations of 20-500 mg/l and the changes in deposition of 20-100 mm as well as the annual average net sedimentation of 1-10 mm/year it is assessed that the impact after the construction of the Stage 5 expansion on the marine environment of the Wadden Sea will be negligible.

1.4.1.5 Coastal morphology

The construction of the Stage 5 expansion will lead to a slight increase in current speeds on the southern edge of the tidal flat near the eastern coast of Fanø near Halen, but also a reduction of the general water flow pressure on the tidal flat due to the expansion of the channel. Previous eastward expansions of the Port of Esbjerg and simultaneous dredging of the channel has not affected the morphology of the east coast of Fanø significantly as the water levels and wave heights during extreme storms along the coast are not increased. Because of this, the impact of the port expansion on the coastal morphology of the east coast of Fanø will be negligible.

By establishing the proposed Stage 5 expansion the port area is expanded roughly 600 m eastward and thus shelters this part of the coast just east of the expansion from the influence of the waves. This coastline is currently constantly being eroded by roughly 1 m per year. The port expansion will prevent the erosion of roughly

240 m³ sand per year and thus prevent it from being incorporated into the natural sediment transport eastward. It is recommended that the same amount of sand is added as compensation for the sand removed from the sediment transport in the area.

1.4.1.6 *Need for dredging in the Port of Esbjerg*

Overall the total amount of deposited sediment in the basins of the port will be unchanged after the construction of the Stage 5 expansion with the exception of the Eastern Port of Esbjerg where the deposition will be lower in the inner basin while there will be a need for dredging in the new outer part that is part of the expansion.

1.4.1.7 *Climate effects*

All effects of the Stage 5 expansion on the hydrography and coastal morphology including the sediment balance in the Wadden Sea overwhelmingly stem from the narrowing of the channel just next to the port expansion and the following increase in current speeds and local changes in the current pattern.

The expected increase in water levels caused by climate change will increase the cross section of the channel near the Stage 5 expansion and thus lower the current speeds. Based on this, any climate related increases in water level will not change the described effects but rather compensate for the change caused by the construction of the Stage 5 expansion.

1.4.2 **Marine biology**

The following sections include a summary of sections from the EIA report on marine biology. These subjects include the seafloor, benthic flora and fauna, fish, marine mammals and birds.

In order to assess the impacts of the port expansion on the marine environment a series of field studies of the seafloor and tidal flats in and around the project area were conducted. Furthermore, birds on and around Halen (Fanø) and near Måde east of the Port of Esbjerg, were counted. To support these studies the assessment also draws upon existing knowledge about the Wadden Sea and the areas around the Port of Esbjerg.

1.4.2.1 *Seafloor and benthic flora and fauna*

The entire area around the Port of Esbjerg has a water depth of less than 10 meters and the seafloor is level, uniform and consists of relatively fine grained sediment of silt/sand mixed with gravel and seashells. The majority of the seafloor consists of fine silt/sand, whereas the exposed areas along the pier on the existing port area are more mixed and consists of sand, gravel and small pebbles. Strong currents and waves combined with poor substrate for anchoring makes this area unsuitable for macroalgae as well as vascular plants like eelgrass. Eelgrass does occur further away from the Port of Esbjerg, and on the tidal flats east of Fanø but not in the area near Måde.

The fauna in the sandy sediments primarily consists of buried soft-bottom species, however there are also more mobile species such as crustaceans living on the surface of the sediment. Empty shells on the surface of the soft sediment also provide hard substrate for many different animal species that make up a considerable percentage of the total fauna. All registered soft-bottom species in the area are common in coastal areas of the North Sea, and since this sediment type is evenly distributed throughout, the benthic fauna is assumed to be so as well.

The impacts of the construction phase on the seafloor and its flora and fauna is primarily caused by changes in sediment conditions.

In section 1.4.1 the following conclusions related to suspension and deposition of sediments during the construction phase are drawn:

- The changes to sediment concentrations in the water column are small (1-5 mg/l average sediment concentrations).
- In some particularly exposed areas the increase in sediment deposition will be 1-8 mm.
- Compared to the background values for the area these changes in water sediment concentrations and deposition are insignificant.

Furthermore, the daily operation of the Stage 5 expansion leads to habitat loss and redistribution of sandy sediments in the channel and the areas adjacent to the expansion. This means that:

- 0.4% of Grådyb tidal area is converted into the new port area.
- Southeast of the proposed stage 5 expansion three tidal trenches of roughly 2.5 x 2.5 km² will change to accommodate the new tidal conditions. This change will lead to erosion and deposition along the trenches of roughly 0.5-2 m of sediment.

The only plant species that grow near the project area is eelgrass. The areas of increased sedimentation do not overlap with the areas containing eelgrass. The increased deposition is very limited and thus will not affect the eelgrass. Therefore it is assessed that the potential impacts on the benthic flora as a consequence of increased sediment concentrations in the water and deposition of sediment is negligible.

Most benthic animals are able to move through layers of sediment deposited on top of them, or reestablish themselves in the area after sedimentation has occurred. Generally, the higher sediment concentrations in the water column are not dangerous for the benthic organisms buried in the sediment. It can however affect the filter feeding organisms. The sessile organisms that are found in the area have generally adapted to cope with periods of higher sediment concentrations and thus can close down and survive for long periods without food. This might however lead to a period of less growth than normal. Since only minor changes in the sediment concentrations of the water column are seen, and the increase in sediment deposition is only 1-8 mm it is assessed that the impact of the works on the benthic fauna will be negligible.

In addition to fluctuations in the current and sediment conditions the proposed Stage 5 expansion will convert 570,000 m² of the Grådyb tidal area into new port area. At present tidal flats cover most of the area where near the existing port they become exposed at low tides and further away have a water depth of approximately 4 meters. Grådyb tidal area encompasses an area of roughly 132,000,000 m² which means the expansion of the port only reduces this area by 0.4 %. The converted area makes up a very small proportion of the total area and will contain the same habitat types. Therefore it is assessed that the loss of habitat for benthic flora and fauna in the Danish part of the Wadden Sea is negligible. In addition the permanent habitat loss following the expansion of the Port of Esbjerg is assessed as having a negligible impact on the benthic ecosystems.

The redistribution of sandy sediment in the channels and around the proposed Stage 5 expansion will not lead to habitat loss but rather a redistribution of deep and shallow areas. Benthic flora and fauna in the area have adapted to the dynamic tidal flat environment, and thus should be capable of adapting to these new slight fluctuations. As a result the impact of the changes to the tidal trenches on the benthic flora and fauna is assessed as negligible.

As part of the expansion of the Port of Esbjerg, dredged material will be disposed of at the disposal sites near Skallingen and the west coast of Fanø. The conclusions regarding the consequences of the disposal of sediment are as follows:

- Apart from the small area directly adjacent to the disposal sites the sediment concentrations outside their boundaries and in the nearby Natura 2000 site will be of a similar magnitude to a mild storm in the North Sea during the 50 day period as the disposal is taking place.
- The range of variation in the sediment concentrations for the area are within the normal background range of 2-200 mg/l.
- The amount of deposited sediment is small (a maximum of 8 mm outside the disposal sites).
- The deposited sediment will be rapidly assimilated into the natural sediment cycling in the North Sea at least by the following winter.

It is assessed that the increased sediment levels on the benthic fauna near the disposal sites will only have a minor local impact and will be a temporary disturbance limited to the immediate vicinity of the disposal sites. As the amount of deposited sediment is small with a maximum of 8 mm outside the disposal sites, it is assessed that the impact of the disposal of sediment on the benthic flora and fauna is negligible.

Overall it is assessed that the impact of the construction and daily operation of the proposed Stage 5 expansion on the seafloor and benthic flora and fauna is negligible.

1.4.2.2 *Fish*

The Wadden Sea is an important nursery for many species of fishes. This is especially true for flatfish fry. Furthermore, many mobile pelagic species often occur here including Atlantic herring, European sprat, Atlantic cod and whiting. There is no information describing any particular spawning grounds in the areas close to the Port of Esbjerg. The relatively uniform soft substrate in the area does not suggest that any particular parts of the area would be more suitable as fish habitat than other parts of the Wadden Sea.

The increased sediment concentrations in the water as well as increased deposition on the seafloor could potentially affect fish and their prey, including potential habitats near the project area. The effect on fish as a consequence of increased sedimentation is dependent on the species and is generally related to the lifestyle of the species. It is assessed that the impact on fish is negligible due to fish species in the Wadden Sea having adapted to a dynamic environment with large variation in suspended sediment. Also the project only leads to small changes in sediment concentrations in the water and the deposition of sediment on the seafloor which has a negligible impact.

Underwater noise from the construction phase and ship traffic can also have a potential effect on the hearing of the fish and disturb the fish to a degree where it

could cause them to temporarily leave the area. The construction phase is however temporary and so the effect of the noise is minimal. Based on this it is assessed that the impact of noise and disturbances from the construction phase on fish is negligible.

The fish that inhabit the area near the disposal sites that are used for the project are able to leave the area temporarily if the visibility in the water (and thus their hunting opportunities) are affected too much. Furthermore, the disposal of material can cover the benthic organisms on the disposal sites for short periods of time. It must be noted that these disposal sites take up a very small percentage of the potential feeding grounds for fish, and they will have ample opportunity to feed in adjacent grounds until the benthic fauna on the disposal sites has reestablished. Thus it is assessed that the impact of the disposal of sediment on fish is negligible.

Overall it is assessed that the impact of the construction and daily operation of the proposed Stage 5 expansion on fish is negligible.

1.4.2.3 *Marine mammals*

Several species of marine mammals inhabit the North Sea and Wadden Sea including harbour porpoise, harbour seal and grey seal. Porpoises spend their whole life in the water while seals breed and rest on land.

There is no information on whether porpoises inhabit the waters close to the Port of Esbjerg, or the related project area but it cannot be ruled out that some individuals might. It is however assessed that the habitat around the Port of Esbjerg is not suited to porpoises and thus it is unlikely that this species occurs near the project area in larger numbers.

The Port of Esbjerg and the project area is about 3-4.5 km from the nearest resting sites for seals. However these sites are not the primary resting sites for the seals. The most active resting sites are located about 8.5-10 km away from the project area. The locations of the resting sites are shown in Figure 1.15. The northernmost and southeasternmost sites shown on this map are also used as breeding grounds. Therefore it is assessed that the area in the immediate vicinity to the Port of Esbjerg is of limited importance to the populations of harbor and grey seals. Especially when compared to the areas further north and south that are closer to the more frequently used resting and breeding sites. Individual harbor seals do sporadically occur in the areas close to the Port of Esbjerg and the project area.

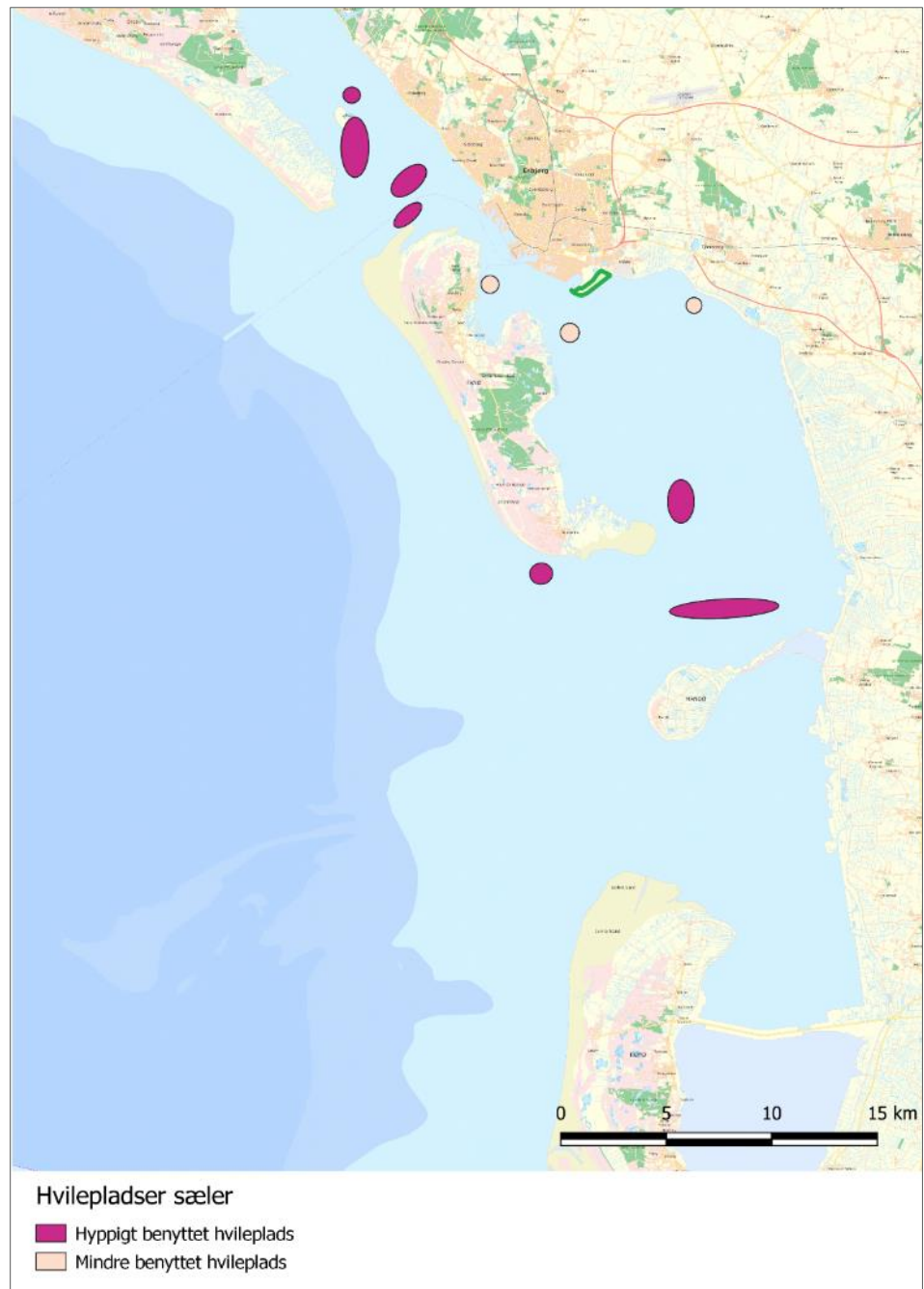


Figure 1.15: Resting sites for seals (primarily harbor seals) in the Danish part of the Wadden Sea near the Port of Esbjerg and the project area. Bright pink spots indicates the frequently used resting sites and light pink spots indicate less used sites.

The marine mammals prey will not be significantly affected by the expansion of the Port of Esbjerg. Increased sediment concentrations rarely pose an issue for the porpoises and seals' ability to catch prey, as the porpoises echo-location and seals whiskers enable them to locate prey even in very low visibility environments. Therefore it is assessed that the impact of the increase in sediment concentrations during the construction phase on marine mammals is negligible, both near the Port of Esbjerg and near the disposal sites.

The construction of the proposed Stage 5 expansion will lead to increased underwater noise caused by construction activities such as pile driving as well as noise and disturbances from the ships used during construction. The underwater noise can cause permanent hearing damage to marine mammals that are close to the source of noise. Furthermore, the noise can cause temporary hearing damage and behavioral changes for marine mammals. Permanent hearing damage is seen as a high degree of disturbance as it can have serious consequences for the animal. As there is a risk for permanent hearing damage, the marine mammals must be scared away from the area via acoustic scare methods before the driving begins helping to limit this risk. Also the driving must begin with a soft-start procedure, where the force of driving gradually increases, which will allow the marine mammals to move away from the area of construction, before the high-energy driving starts.

The range from which risks of behavioral changes caused by noise such as fleeing, temporary loss of hearing or permanent hearing damage may occur is dependent on several factors affecting the way sound moves through water, like absorption and reflection. The area of the Wadden Sea near the Port of Esbjerg is relatively shallow with a soft substrate and thus the sound is absorbed and muffled relatively quickly. The extent of the noise that may affect marine mammals from this projects construction activities is very limited when compared to similar construction activities in areas with deeper water and harder substrates.

In conclusion, the area around the Port of Esbjerg is not a particularly important habitat for marine mammals. Even though some individual harbour porpoises and seals sporadically appear in the area, these individuals are likely to move to other grounds if they are disturbed by the noise. Since acoustic scare methods will be used to scare away marine mammals before the pile driving starts and since driving will start with a soft-start procedure to avoid permanent loss of hearing in any potential marine mammals close to the construction activities, it is assessed that the potential impact of noise and disturbances on marine mammals is negligible.

It is assessed that the impact of the construction and daily operation of the proposed Stage 5 expansion on marine mammals will be negligible.

Birds

The Wadden Sea provides valuable habitat for millions of water birds that stay there during migration, or use it for breeding, molting or overwintering. Furthermore, the different nature types in the area fill different important roles for a variety of breeding and migrating birds.

The most important areas of the Danish part of the Wadden Sea for birds are the southern and central areas. The area around Langli in the Ho Bay is important as well. Close to the project area large populations of water birds and shore birds are found near the southern tip of Fanø, and on the tidal flats near the southern parts of Fanø. The birds in this area are very mobile and so their use of the tidal flats is dependent on the tide. At low tide the birds are scattered over a large area, and at high tides the birds often gather on dry beaches and marshes. The largest bird populations are near Trinden and Keldsand 6-12 km south of the project area, which is the habitat for up to 70,000 dunlin, 35,000 red knot, 10,000 common shelduck, 6,000 Eurasian oystercatcher, 5,000 common redshank, 5,000 Eurasian curlew, 3,000 grey plover and 1,800 Northern pintail.

Few birds inhabit the tidal flats close to the project area and almost no birds are registered around the deeper waters of the project area and channel outside of the Port of Esbjerg. Near the port of Esbjerg birds mainly inhabit the tidal flats near Halen (Fanø).

There are very few breeding birds near the project area, the most important breeding grounds are found on Halen and Måde Meadows more than 2 km from the proposed Stage 5 expansion. Here, common marsh species such as common redshank, Northern lapwing and Eurasian oystercatcher breed, along with rarer species such as pied avocet.

Due to the low numbers of registered birds in the immediate vicinity of the project area the expansion of the Port of Esbjerg will likely have a limited effect on the bird populations in the area. Some activities during the construction phase can however lead to habitat loss in the form of displacement caused by noise and disturbance. The resuspension of sediment caused by dredging could indirectly affect water birds, since it can affect their ability to find food and the availability of prey (benthic animals or fish). Yet as the increased sediment concentrations in the water will not affect the benthic flora and fauna or fish in any significant way, the effect on birds is negligible.

Noise and disturbance from the construction and daily operation of the Stage 5 expansion is estimated to prevent birds from foraging in the area (about 600,000 m²). The bird species that are to be disturbed by the construction and daily operation of the Stage 5 expansion are however relatively resistant to disturbances, and usually stay relatively close to sources of disturbance without any lasting effects. This means that the bird species will likely only stay a couple of hundred meters away from the Stage 5 expansion. Furthermore, few birds are found within the area that is directly affected by the port expansion and thus it is assessed that the project area is not an important feeding or resting area for birds. The birds that are found in or near the project area have plenty of alternative habitats nearby to move to. The permanent habitat loss caused by the port expansion will lead to minor impacts on the local birds close to the Stage 5 expansion, all of which are common species in the Wadden Sea.

There is generally limited information on the direct effects of noise on birds. Birds do however often appear to continue their regular activities even at very loud noise levels without being affected. The available knowledge estimates 50 dB(A) as the lower limit for when negative effects can be observed in the behavior of birds. Because of this it can be assumed that noise levels below 50 dB(A) will not negatively affect the birds. Noise calculations show that the noise levels from the construction activities and daily operation of the Stage 5 expansion only exceed this 50 dB(A) limit in the immediate vicinity of the expansion. Therefore, potential breeding grounds will not be affected by noise that could limit communication between the birds, or otherwise affect them. It is assessed that the impact from noise on birds during the construction and daily operation of the Stage 5 expansion will be negligible.

The impact of the disposal sites near Skallingen and the western coast of Fanø on the local birds food sources are negligible, and furthermore it is assessed that the foraging potential for the birds will not be affected by the disposal. It is further assessed that the direct effect of the disturbances from the disposal itself on the birds is very limited. In addition the increased ship traffic is negligible compared to

the existing ship traffic. Therefore it is assessed that the overall impact of the disposal of sediment on birds is negligible.

In conclusion the impact of the construction and daily operation of the Stage 5 expansion on birds will be negligible to minor.

1.4.3 Natura 2000 sites and annex IV species

Natura 2000 is the term for the international network of nature protection areas and protected bird habitats within the EU. For each Natura 2000 site there is a list – a so called basis for designation – of nature types, and species of birds and other organisms that the individual site is designated to protect. The goal of the Natura 2000 network is to ensure the conservation status for the species and habitat types that are on these lists for each Natura 2000 site. Plans and projects that could interfere with or damage species or habitat types that a Natura 2000 site is designated to protect cannot be carried out.

The Habitat Directives annex IV contains a list of selected animal and plant species that the member countries of the EU are committed to protecting both within and outside the Natura 2000 sites. These species are also called annex IV species. Any project that could damage or destroy breeding or resting sites for annex IV species cannot be carried out.

The EIA report includes a Natura 2000 impact assessment where the impact of the port expansion on the different nature types and species as detailed in the designation basis for the relevant Natura 2000 sites is described and assessed. Furthermore, the EIA report contains a description and assessment of the impact of the port expansion on annex IV species. The following section contains a summary of the key conclusions from the Natura 2000 impact assessment, and the impact assessment on annex IV species.

1.4.3.1 Natura 2000 sites

The project area for the Stage 5 port expansion is very close to Natura 2000 site no. 89: the Wadden Sea. Additional Natura 2000 sites are so far away from the project area that they are not at risk of being affected by the project.

Natura 2000 site no. 89 encompasses the entirety of the Danish part of the Wadden Sea and numerous adjacent areas, and thus has a very large total area of 149,869 ha. Figure 1.16 shows the boundaries of the Natura 2000 site close to the Stage 5 expansion as well as the project area.

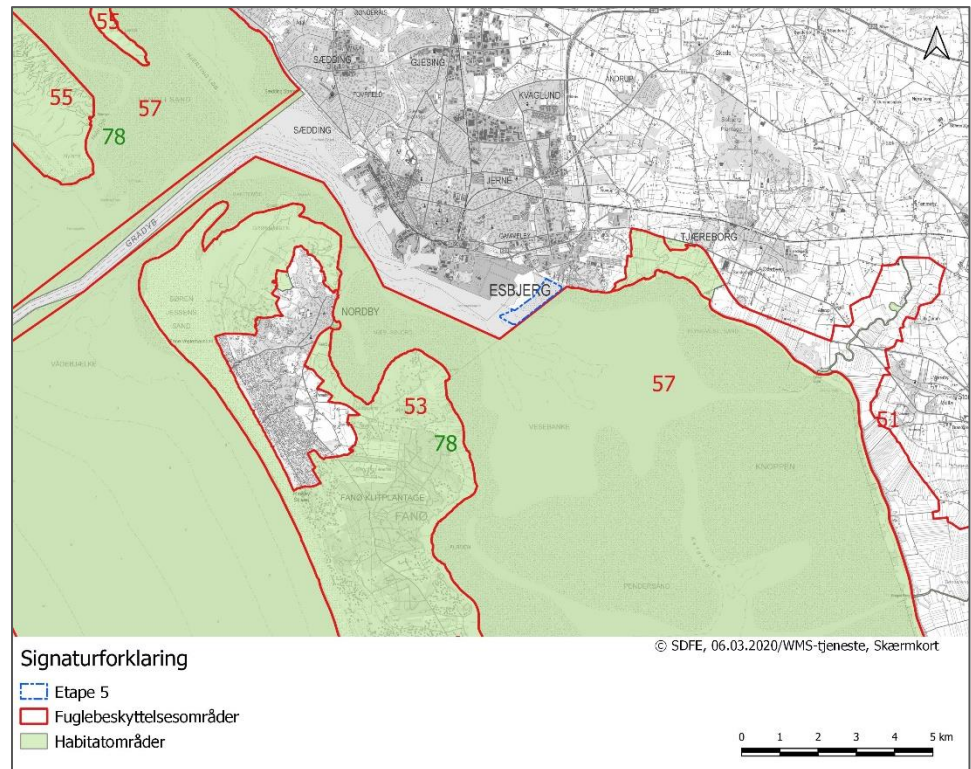


Figure 1.16: International nature protection areas near the Port of Esbjerg and the project area for the proposed Stage 5 expansion. Green numbers designate the ID for the special areas of conservation and red numbers designate the ID for special protected areas.

Because of the size of Natura 2000 site no. 89, the site is divided into four Special areas of conservation set by the Habitats Directive (SACs) and nine special protected areas set by the Birds Directive (SPAs). In Figure 1.16 it is shown that the only areas close to the project area are SAC no. 78 (the Wadden Sea and Ribe Å, Tved Å and Varde Å to the west of Varde), SPA no. 51 (Ribe Holme and the meadows at the outlet of the Kongeå), SPA no. 53 (Fanø) and SPA no. 57 (the Wadden Sea). Therefore these are the only areas included in the impact assessment.

1.4.3.2 Impact on natural habitat types

34 different natural habitat types form the basis for designation of SAC no. 78, the most important of which are the marine habitat types like; shallow bays and coves, reefs, sand banks and tidal flats, along with terrestrial habitat types like; salt marsh, coastal dune, dune heath, dune slack and wet meadows.

The marine natural habitat types closest to the project area (and thus at the greatest risk of being affected by the port expansion) are 1140: Mudflats and sandflats not covered by seawater at low tide (Tidal flats), and 1160: Large shallow inlets and bays (Bay). The distribution of the various marine natural habitat types near the project area are shown in Figure 1.18. The natural habitat type Tidal flat is a common habitat type in the Wadden Sea with large quantities of microscopic cyanobacteria and diatoms, yet mostly no larger plants with the exception of sporadic patches of eelgrass. The tidal flats are rich in benthic fauna like mussels, snails, crustaceans and worms. Because of this the habitat is an important feeding ground for waterfowl and shorebirds. The natural habitat type Bay is found behind the islands, where there are no other natural habitat types in the Natura 2000 site no. 89. The natural habitat type Bay is characterized as being relatively shallow with limited influence of freshwater. Bays are generally sheltered

from wave action and the seabed contains a great diversity of sediments and substrates with a well-developed zonation of benthic communities. These communities have generally a high biodiversity (large variation and many species). Eelgrass is often found in the natural habitat type together with benthic animals like mussels, worms, snails and crustaceans.

As the proposed Stage 5 expansion is constructed outside of the Natura 2000 site there is no risk of directly affecting the tidal flats, however changes to the sediment conditions at the Grådyb tidal area could indirectly affect the habitat type. The volume of natural sediment transport is very large in the Wadden Sea. Models of the suspension and deposition of sediment during the construction phase of the Stage 5 expansion only show small changes in the sediment concentration of the water (1-5 mg/l on average). However, a few specific areas will experience an increase in deposition of sediment of roughly 1-8 mm. Compared to the background values of the area these changes in sediment concentrations and deposition of sediment are negligible. Based on the results from these models it is assessed that the impact from the construction of the Stage 5 expansion on the tidal flat habitat type is negligible, especially when compared to the natural conditions. The organisms that inhabit this habitat type have adapted to the natural variation of sediment concentrations and depositions. The existing benthic flora and fauna mainly consist of relatively common and hardy species with a high potential for reestablishing themselves. This also means that any benthic flora and fauna that are lost because of the increased deposition of sediment during the construction of the Stage 5 expansion will likely quickly recolonize the area. On this basis, and because the construction of the Stage 5 expansion will cause an insignificant redistribution of sediment in the Grådyb tidal area, it is assessed that the project will not cause damage to the tidal flats.

In the natural habitat type Bay the establishment of Stage 5 will cause a reorganization of the sediment in an area south and east of Stage 5, since the tidal channels will adapt to the modified current system. The adjustment of the tidal channels in the Natura 2000 site can be seen in Figure 1.17 together with the natural habitat types. The modifications of the ocean floor will happen in an area with a certain depth, and there will be a minor change in water depths in areas with the natural habitat type Bay. The geographical extend of the natural habitat types will not change and the minor changes that will occur during the adjustment of the tidal channels will not cause long term effects on the benthic flora and fauna. The species inhabiting the deeper areas with high currents in the Wadden Sea are adjusted to dynamic conditions and they will quickly be able to recolonize areas, where reorganization of the sediment has occurred.

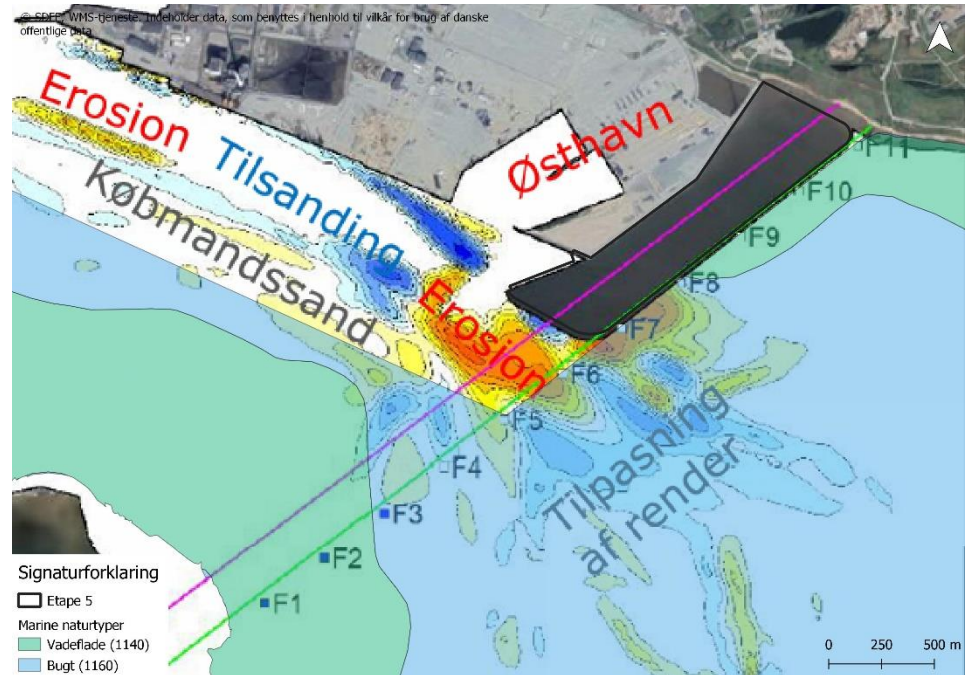


Figure 1.17: International nature protection areas near the Port of Esbjerg and the project area for the proposed Stage 5 expansion. Green numbers designate the ID for the special areas of conservation and red numbers designate the ID for special protected areas.

The brackish area between the harbor and the coast will be extended as a part of the project, and the outlet of this brackish area will after the establishment of Stage 5 be situated closer to the Natura 2000 site no. 89 than in the current situation. The extension of the brackish area will not change the fact, that there will be discharge of water from the Wastewater treatment plant East (Renseanlæg Øst) to the Præstegårds-stream. The discharged water includes treated and partly treated wastewater and diluted, untreated wastewater. The establishment of Stage 5 will not cause changes in the total amount of nutrients etc. that are discharged from the wastewater treatment plant, but the discharge point will be moved. The establishment of Stage 5 will cause an extension of the brackish area, and the amount of water in the brackish area will increase from 1,000 m³ to approx. 30,000 m³ by average high tide. This means, that in the event of discharge of water from the waste water treatment plant, there will be a larger volume of water for dilution in the brackish area after the establishment of Stage 5, regardless of tides, rain events etc. The content of nutrients, organic material etc. will therefore be more diluted before flowing into the Wadden Sea after the establishment of Stage 5. At the outlet of the brackish area to the Wadden Sea the water will, like in the current situation, be spread on the coastal tidal flat and from there to the Grådyb tidal area through the tidal channels. This means, that the water, that originates from the brackish area, will be caught by the outward current during low tide twice a day, which will cause a complete mixing of the water into the Wadden Sea. Based on this and the fact, that discharge of untreated and partly treated wastewater from the wastewater treatment plant only occurs a few times a year, it is assessed, that the diluted wastewater will not cause any locale effects on the natural habitat types.

West of Fanø, a large area of the habitat type 'sandbank' is found. This habitat type, shown in Figure 1.18, is described as sandbanks which are constantly submerged by up to 20 m of water. The sandbanks are either without plant cover, or

covered with eelgrass. Sandbanks can be found close to the coast due to the creation of temporary shoals, but can also be found as permanent structures further away from the coast. During the construction of the Stage 5 expansion sediment is disposed of on disposal sites just outside of Natura 2000 site no. 89 and areas classified as sandbanks. The impact will therefore primarily be at the disposal sites themselves and in a small area around the immediate vicinity. It is assessed that the increased sediment concentrations at the Natura 2000 site caused by the disposal are of the same magnitude as a mild storm in the North Sea. Thus it is assessed that the disposal of sediment will not affect the sandbanks or other habitat types within SAC no. 78.

The terrestrial habitat type listed that is closest to the project area is about 2 km away. This habitat consists of a larger area of dune heath and salt marsh on Halen (Fanø). The area is shown in Figure 1.19. Dune heath consists of stable (old) dunes behind the outer dunes that are more or less covered with vegetation consisting of subshrubs like crowberry, common heather, cross leaved heath and broom. Salt marsh is a habitat that gets regularly flooded by the sea and as a result it is dominated by salt-tolerant grasses and herbs. About 3 km east of the project area there are habitats classified as salt marsh on Måde Enge and along the coast. The proposed Stage 5 expansion is constructed more than 2 km away from the nearest designated terrestrial habitat type ensuring there is no direct impact. The distance from the expansion to the nearest terrestrial habitat types is so great that any dust from the construction activities will not affect the habitats. Therefore it is assessed that the terrestrial habitat types will not be affected by the project.

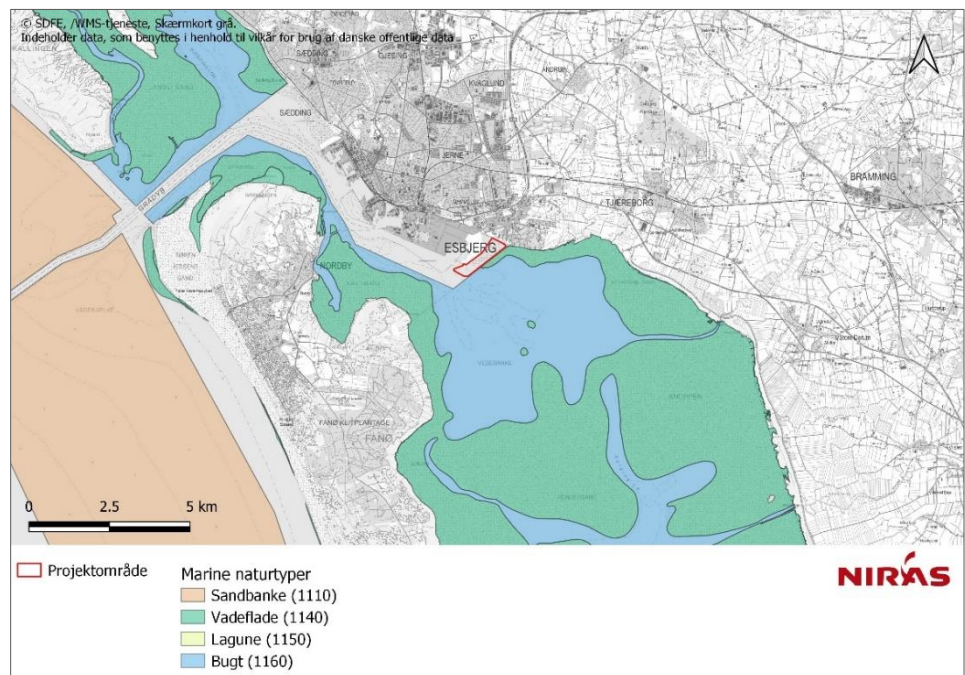


Figure 1.18: Marine habitat types near the project area (Naturstyrelsen, 2016c). Legend top to bottom: Red ring = project area, orange = sandbanks, green = tidal flats, yellow = lagune and blue = bay.

Overall, it is assessed that the construction of the proposed Stage 5 expansion will not damage any habitat types or conservation objectives that form the basis for designation for Natura 2000 site no. 89: The Wadden Sea.

1.4.3.3 *Impact on species*

The basis for designation for SAC no. 78 includes a list of animal species which contains the following fish and mammal species that may interact with the project. Fish species: sea lamprey, European brook lamprey, European river lamprey, twait shad, Atlantic salmon and houting. Mammal species: Eurasian otter, harbour seal, grey seal and harbour porpoise.

Noise and visual disturbances from the project are the factors most likely to affect the species detailed in the basis for designation along with changes to the habitats of the species caused by increased deposition of sediment.

None of the key habitats for the species listed above are found near the project area. It is likely that some individuals might roam close to the project area, but the important habitats such as spawning grounds for fish, or breeding and resting sites for seals are found far from the project area and so will not be affected by noise or visual disturbances.

Some of the habitats for fish and marine mammals could potentially be affected by the changes in water sediment concentrations or deposition of sediment caused by the construction of the Stage 5 expansion. As these changes do not change the habitat types themselves (1.4.3.2) or cause a significant change in the water sediment concentrations (1.4.1) it is assessed that they will not cause damage for fish or marine mammals. This is also true for the Eurasian otter as it is possible that this species forages in the coastal waters. All other foraging areas and habitats for this species are located far from the project area that the construction of the Stage 5 expansion presents no risk of damaging otter populations.

Overall, it is assessed that the expansion of the Port of Esbjerg will not damage the populations of any of the protected species (marine mammals, fish and otters) or the conservation objectives for the species in the basis for designation for Natura 2000 site no. 89: The Wadden Sea.

1.4.3.4 *Impact on birds*

The Wadden Sea area is an important habitats for millions of water birds that rest here during migration, or use it as a breeding, moulting or overwintering site. The SPAs near the project area are designated to protect the species richness in the Wadden Sea. There are 47 species detailed in the basis for designation for the bird protection areas closest to the proposed Stage 5 expansion (SPA51, SPA53 and SPA57). The 47 species have been divided into 18 bird species that breed in the area and 33 bird species that use the site during migration (of which four species are found on both lists).

Not all the species in the basis for designation for nearby SPAs are found near the project area. The species relevant to the assessment of the projects impacts are the following breeding birds: bluethroat, Arctic tern, pied avocet, Eurasian bittern, Western marsh harrier and Mediterranean gull. Along with the following migratory birds: dunlin, barnacle goose, common eider, common shelduck, mallard, graylag goose, white-tailed eagle, European golden plover, common greenshank, red knot, pied avocet, Eurasian teal, bar-tailed godwit, dark-bellied and pale-bellied brant, Eurasian wigeon, common redshank, northern shoveler, northern pintail, Eurasian curlew, grey plover, Eurasian oystercatcher and peregrine falcon. The most important habitats for birds are shown in Figure 1.19.

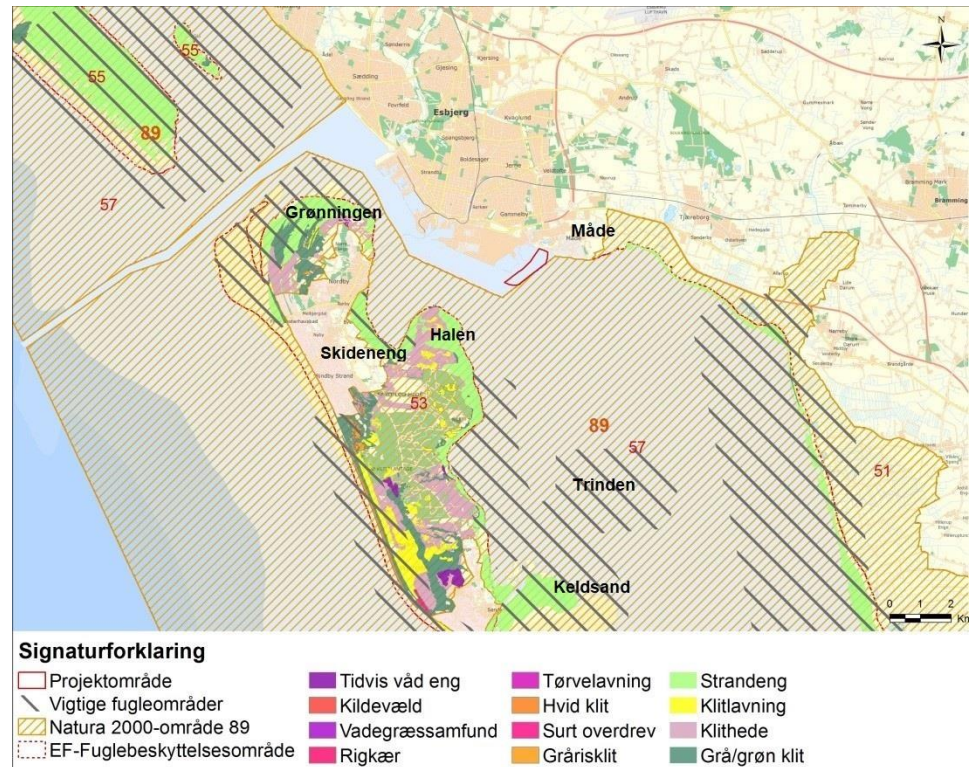


Figure 1.19: The most important habitats for birds on Fanø and southeast of Esbjerg (adapted from dofbasen.dk).

The birds in the basis for designation can be affected by noise, disturbances and direct and indirect removal, or degradation of food sources and habitats.

There are few studies on the effects of noise on birds but these studies show that a limit of 50 dB(A) can be used as the boundary for when negative effects can be observed in the birds. The SPAs will generally be too far away to experience noise levels over 50 dB(A), however some of the areas closest to the Stage 5 expansion might experience noise levels slightly higher (between 50 and 60 dB(A)). It cannot be ruled out that a few species in the basis for designation will inhabit the areas close to the Port of Esbjerg and thus be disturbed by periods of particularly loud noises from the construction and daily operation. The species that inhabit the areas closest to the Stage 5 expansion are not dependent on using sound during feeding or resting. It is assessed that these birds will be less sensitive to noise disturbances than other species that might rely on sound for protecting breeding territories or communication. Due to this it is also likely that these species are tolerant of noise levels from 60 dB(A) or even higher. In conclusion it is understood that the noise from construction and daily operation of the Stage 5 expansion will not harm bird populations detailed in the basis for designation for the bird protection areas.

Many bird species often find visual disturbances more severe than noise disturbances. This is especially true if the disturbance appears threatening or dangerous to the birds. Most often these disturbances occur at relatively close distances, yet it appears most species are very adaptable to these disturbances. The visual disturbance from the construction and daily operation of the Stage 5 expansion will be similar in nature to the existing port. It can therefore be expected that birds

that live close to the port are accustomed to this disturbance. As a result it is assessed that the effect of the visual disturbance from the Stage 5 expansion will be negligible, and not cause any damage to the bird populations detailed in the basis for designation for Natura 2000 site no. 89.

Several species detailed in the basis for designation for the nearby SPAs forage on the benthic organisms found on the tidal flats, or on the pelagic organisms found in deeper waters. For these birds the increased sediment concentrations in the water column from the construction of the Stage 5 expansion could potentially affect the food availability. The loss of foraging area that will be a direct result of the area converted into the new port could also affect the birds in the Wadden Sea and in turn the bird protection areas. However, as the project is assessed to not have any impact on the organisms that these birds forage for, it is also assessed that the construction of the Stage 5 expansion will not affect the birds feeding in these areas.

Near the disposal sites of Skallingen and along Horns Rev there are large populations of common scoters and common eiders that could potentially be disturbed by the sediment deposits. The sediment concentrations in the water in the Natura 2000 site during the period of the deposits is estimated to be in an order of magnitude similar to a mild storm, and thus the organisms that the birds forage on (benthic fauna and fish) are not significantly affected. Furthermore, it is assessed that the birds have ample opportunity to forage in nearby areas with similar benthic and fish communities over the short period whilst the sediment disposal is taking place. It is therefore assessed that the sediment disposal only affects birds insignificantly and so cannot damage the birds detailed in the basis for designation for Natura 2000 site no. 89.

Overall, it is concluded that the construction of the Stage 5 expansion will not damage the birds detailed in the basis for designation, or the conservation objectives for the birds for the Natura 2000 site no. 89: the Wadden Sea.

1.4.3.5 *Impact on annex IV species*

There are potentially a number of species protected by annex IV of the Habitats Directive in or near the project area. As already described a project is not allowed to be carried out if it could damage or destroy breeding or resting sites for annex IV species. This means that the ecological functionality of a breeding or resting site for an annex IV species must be maintained and remain at the same level as before the project started. Of the protected species near the project area, the Eurasian otter, harbor porpoise and houting are annex IV species. The assessment of the consequences of the project on these species is described in the Natura 2000 section of the EIA report. This assessment also covers the ecological functionality of the breeding and resting areas for the species. In addition to these species, the following annex IV species also inhabit the areas within or close to the project area: natterjack toad, Daubenton's bat and the serotine bat. None of these species are included in the basis for designation for the nearby habitat area and thus a short description and assessment of the effects on these species is given in the remainder of this section.

The natterjack toad lives near the coasts and breeds in shallow ponds that dry out during the summer. In areas near the Wadden Sea the natterjack toad is often found in beach ponds or gravel pits. The construction of the Stage 5 expansion will not interfere with or remove any temporary lakes that could be used by the natterjack toad for breeding or resting.

The Daubenton's bat and serotine bat are some of the most common bat species in Denmark. The serotine bat is often found foraging over meadows or open areas with scattered trees or shrubs, while the Daubenton's bat forages over bodies of water. The serotine bat breeds and rests exclusively in or around buildings, while the Daubenton's bat breeds and rests both in buildings and hollow trees. The construction of the Stage 5 expansion will not damage or remove any trees, buildings or the like that could be breeding or resting sites for these bats. There will be no damage to any linear structures in the landscape that could serve as guidelines for the bats.

The noise disturbance caused by the port expansion will be primarily throughout the construction phase and when operation of the businesses on the expansion begins. The noise will primarily affect the areas along the coast and the areas north of the proposed Stage 5 expansion. These areas are already affected by the noise from the existing port, traffic etc. and thus it can be expected that any annex IV species that inhabit the areas along the coast north of the proposed Stage 5 expansion are already accustomed to the noise. Likewise it can be expected that the species will adapt to the increase noise level relatively quickly. The increase in noise is only a few dB and is consistent in both timing (primarily during the day) and type as that already experienced from the existing port.

Overall it is assessed that the construction and operation of the Stage 5 expansion will not affect the ecological functionality of the breeding and resting areas for the natterjack toad, Daubenton's bat, the serotine bat, or any other annex IV species that might inhabit the area.

1.4.3.6 Overall assessment of the impact on Natura 2000 sites and annex IV species

The project will not damage the habitat types or the species that are detailed in the basis for designation or conservation objectives of Natura 2000 site no. 89. There will also be no impact on the ecological functionality of the breeding and resting areas of annex IV species.

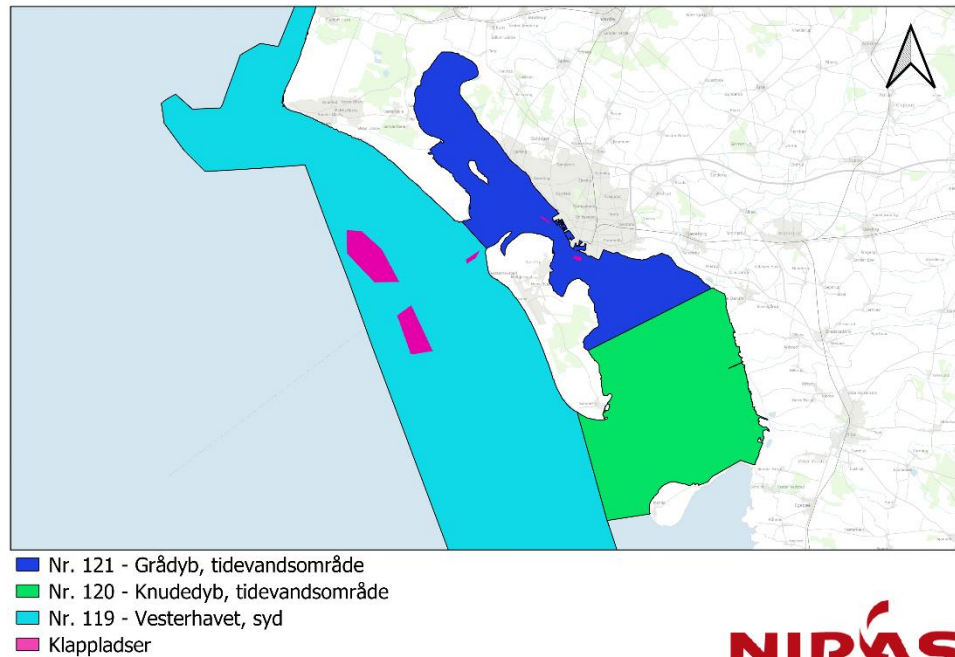
1.4.4 River basin management plans and marine strategy

The EIA report contains a detailed assessment according to the guidelines of the river basin management plans and Marine Strategy Framework Directives.

1.4.4.1 River basin management plans

The river basin management plans are designed to improve the Danish aquatic environment and secure cleaner water in the coastal waters, lakes, rivers and groundwater reserves of Denmark, according to the EU Water Framework Directive. Due to this policy it is important to assess whether the construction and daily operation of the Stage 5 expansion will interfere with the goals to maintain good ecological and chemical conditions. These goals are defined in the river basin management plans.

According to the river basin management plans, the assessment of the ecological conditions in an aquatic habitat is based on the contents of microscopic algae in the water (chlorophyll-a), benthic fauna, the presence of eelgrass and certain nationally defined environmentally hazardous substances. Furthermore, the river basin management plans focus on reducing the amount of nitrogen that gets discharged into coastal waters in order to achieve and maintain good ecological conditions. The assessment of the chemical conditions in an aquatic environment is based on the presence of certain substances prioritized by the EU, which are particularly hazardous to marine environments.



NIRAS

Figure 1.20: Map of the different coastal water areas in the area and the disposal sites (klappladser) in the North Sea.

The project area is described in the river basin management plans for 2015-2021 under river basin district Jutland and Funen. The project area is situated in the coastal water area no. 121 (Grådyb tidal area) whereas the disposal sites for non-reusable dredged material can be found in coastal water area no. 119, (North Sea, South) (Figure 1.20).

Coastal water area no. 121, Grådyb tidal area

It is estimated that dredging activities during the construction phase will not significantly influence the ecological conditions in the area including the extent of eelgrass cover, benthic fauna, microscopic algae in the water column, and levels of environmentally hazardous substances of interest in the surrounding water. The release of nitrogen and environmentally hazardous substances contained in any sediment spill caused by the construction process will be very limited. Sedimentation as a result of the project will be limited and will not exceed the natural range of variation. The chemical conditions of the area will not be affected by the construction activities as any resuspended sediments will be uncontaminated.

It is estimated that the planned beach nourishment to the south of the Stage 5 extension area and the release of the cleaned surface water from the sealed areas within the construction zone and the extension of the brackish area between Stage 5 and the coast will not have an adverse effect on the aquatic environment. Such works also comply with, and thus do not contradict the goals of the river basin management plans in the area.

In conclusion, the construction and daily operation of the proposed Stage 5 expansion will not impact or deteriorate the ecological or chemical conditions in the coastal water area no. 121, Grådyb tidal area.

Coastal water area no. 119, the North Sea, South

The disposal of uncontaminated dredged material at the disposal sites in the area

(Figure 1.20) will not significantly affect the ecological conditions in the area including benthic fauna, microscopic algae in the water column or the concentrations of environmentally hazardous substances (eelgrass is not present in the area and thus is not assessed). This assessment is based on the fact that the vast majority of the disposed material will remain confined to the disposal sites, not spreading or impacting the surrounding seabed. For a short period during the disposal of material and immediately after, the amount of suspended sediment in the water column will be increased. This increase will be comparable to the natural conditions during a light storm in the area. The chemical conditions will not be affected either as the disposed material is uncontaminated.

No activities during the daily operation of the Stage 5 expansion will affect coastal water area no. 119, the North Sea, South.

In conclusion, the construction and daily operation of the proposed Stage 5 expansion will not impact or deteriorate the ecological or chemical conditions in the coastal water area no. 119, the North Sea, South.

1.4.4.2 *Marine strategy*

The goal of the EU Water Framework Directive is to secure good environmental conditions in all European marine areas before 2020, the environmental goals for these conditions within Danish marine areas have been set out in the Danish marine strategy. These goals are used to ensure the correct balance of human use of the marine environment while still maintaining good environmental conditions. The environmental goals encompass both the marine ecosystems and human activities affecting them. In the assessment of the marine environmental condition a wide array of descriptors are used including the following subjects: 1) biodiversity, 2) non-native species, 3) commercially exploited fish and crustacean populations, 4) the marine food chain, 5) eutrophication, 6) sea floor integrity, 7) permanent hydrographic changes, 8) environmentally hazardous substances in the environment, 9) pollutants in harvested fish and crustaceans for consumption, 10) marine waste and 11) underwater noise. In the EIA report a detailed assessment of the effects from the Stage 5 expansion on each of these 11 descriptors for the North Sea is included.

During the construction phase, an area in the Grådyb tidal area will be dredged and the sediment non-reusable sediment will be disposed of on disposal sites 2B and 3B. Estimates show that the construction of the Stage 5 expansion will not affect the conditions or goals for the descriptors significantly or that the expansion of the Port of Esbjerg will worsen the current natural conditions or interfere with achieving good environmental conditions in North Sea ecosystems. The project will not interfere with the sustainable use of the marine resources of the area either.

The only potential effect of the daily operation of the Stage 5 expansion that needs to be assessed is the permanent loss of sea floor area directly caused by the reclamation of land for the expansion. It is assessed that the daily operation of the port expansion will not significantly affect the conditions or environmental goals for the Danish marine strategy II. The daily operation will not worsen the environmental conditions or stand in the way of achieving good environmental conditions for the North Sea's ecosystems. Furthermore, the daily operation will not hinder or negatively affect the sustainable use of the marine resources in the area.

1.4.5 World Heritage Impact Assessment

The Wadden Sea World Heritage site covers 11.434 km² of tidal area and marsh landscape, stretching from Blåvandshuk in Denmark through Germany to Den Helder in The Netherlands. The Wadden Sea is inscribed on UNESCO's World Heritage site list (a convention for the protection of the world's cultural and natural heritage) as being of Outstanding Universal Value (OUV) as it is the largest unbroken tidal flat system in the world, where natural processes proceed largely undisturbed. It encompasses a multitude of transitional zones between land, sea and freshwater environments and is rich in species specially adapted to the demanding environmental conditions.

The port expansion will be located in the tidal regime, within the existing administrative and operational borders of Esbjerg Port and in close proximity to the boundary of the Danish part of the Wadden Sea World Heritage Site (that overlap with the Natura 2000 Area nr. 89) (Figure 1.21). Therefore, an impact assessment conducted according to IUCN's World Heritage Advise Note on Environmental Assessment is included in the EIA. The assessment is intended to ensure that the proposed project's likely impacts on the Outstanding Universal Value of the site are fully considered in the decisions with the objective of preserving this exceptional place for future generations.

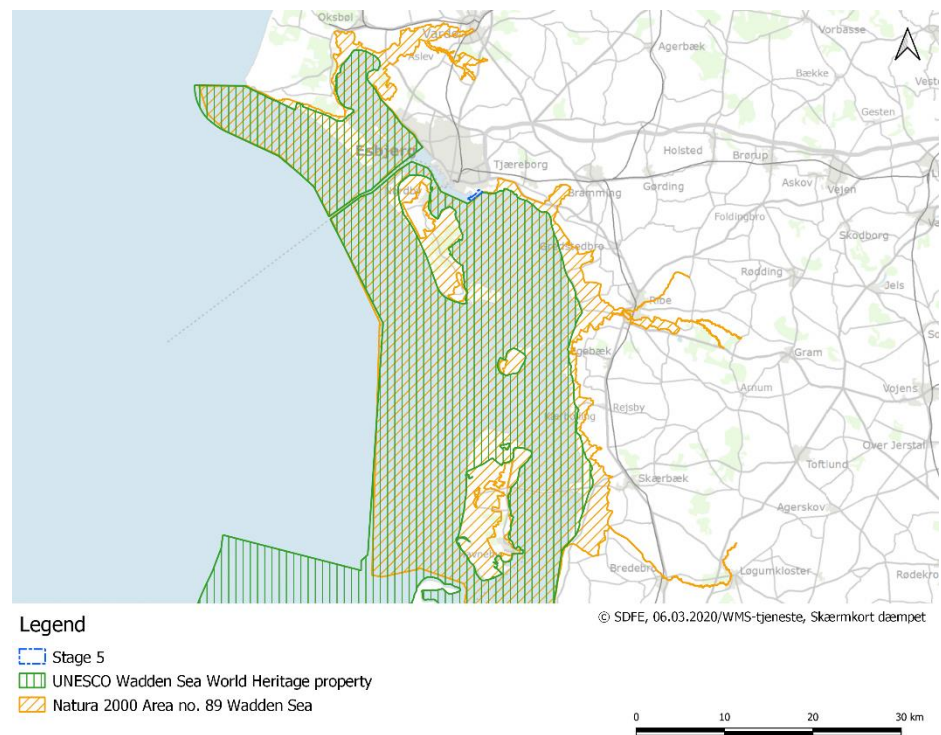


Figure 1.21: The port extension (outlined in blue) and the outline of the Wadden Sea World Heritage property and the overlapping Natura 2000 area nr 89.

1.4.5.1 Outstanding Universal Value (OUV)

Outstanding Universal Value is the basis for a site's inscription on the World Heritage List and is defined as possessing "... *natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity*". To be included on the World Heritage List, a nature site must qualify in three ways:

(1) The site must meet one of the UNESCO's four natural selection criteria: The Wadden Sea's inscription on the World Heritage List as OUV is based on the following three selection criteria:

Criterion (viii) - to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features (Earth processes). The Wadden Sea meet this criteria as it is a depositional coastline of unparalleled scale and diversity. It is distinctive in being almost entirely a tidal flat and barrier system with only minor river influences.

Criterion (ix) - to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals (Ecosystems). The Wadden Sea meet this criteria as it includes some of the last remaining natural large-scale intertidal ecosystems where natural processes continue to function largely undisturbed.

Criterion (x) - to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation (Threatened species and their habitats). The Wadden Sea meet this criteria as it's salt marshes host around 2,300 species of flora and fauna, and the marine and brackish areas a further 2,700 species, and 30 species of breeding birds. The clearest indicator of the importance of the property is the support it provides to migratory birds as a staging, moulting and wintering area. Up to 6.1 million birds can be present at the same time, and an average of 10-12 million each year pass through the property.

(2) The site must show integrity: Integrity is a measure of wholeness. The Wadden Sea show integrity as the boundaries of the extended property include all of the habitat types, features and processes that exemplify a natural and dynamic Wadden Sea, extending from the Netherlands to Germany to Denmark. This area includes all of the Wadden Sea ecosystems, and is of sufficient size to maintain critical ecological processes and to protect key features and values.

(3) The site must be adequately protected and management: The site must be adequately managed and protected to ensure that the site's values and the conditions of integrity at the time of inscription are maintained and enhanced in the future. The Trilateral Wadden Sea Cooperation provides the overall framework and structure for integrated conservation and management of the property as a whole and coordination between all three States Parties. Comprehensive protection measures are in place within each State.

1.4.5.2 *Assessment of impacts on OUV*

The assessment of the planned expansion of Port of Esbjerg is conducted according to the IUCN's World Heritage Advice Note and addresses the potential impacts on the Wadden Sea World Heritage site including potential direct, indirect and cumulative effects on values, integrity and protection and management. The assessment of potential impacts related to the different selection criteria are based on hydrodynamic modelling and assessed by relevant experts in marine biology, ornithology and ecotoxicology (for more details see section 1.4.1 to 1.4.4).

1.4.5.3 *Impacts on criterion (viii) Earth Process*

The main impact of the project is a change in the current pattern in the navigational lane and along the adjacent sand flat. The change in flow pattern will alter erosion and sedimentation patterns locally, and cause a small redistribution of areas of deeper tidal gullies and tidal flats permanently covered with water in the Grådyb tidal area south of the project. Construction work will cause temporarily change in suspended sediment concentration and sediment deposition, however the magnitude of the changes is insignificant compared to the highly variable natural conditions in the Wadden Sea. Spillage and resuspension from deposition of dredged sediment in the North Sea during the construction phase will cause temporary increases in suspended sediment concentration and sediment deposition in areas surrounding the deposition site. However, all changes are within the high natural variability in the North Sea and will not result in any long term effects on the Wadden Sea. During operation, the project impact on the Esbjerg Harbour area current pattern, will induce a small redistribution of areas of deeper tidal gullies and tidal flats permanently covered with water in the Grådyb tidal area south of the project and cause temporarily change in suspended sediment concentration and sediment deposition, however the magnitude of the changes is insignificant compared to the highly variable natural conditions in the Wadden.

The overall assessment is, that the proposed expansion of the Port of Esbjerg (Stage 5) will not have any significant impact on the Criteria viii, Earth Processes in relation to the Wadden Sea World Heritage site. Project impact is local and within the natural variability of the highly dynamic system, and will not affect the diversity, scale and continuum of the Wadden Sea World heritage tidal flat and barrier system.

1.4.5.4 *Impacts on criterion (ix) Ecosystems*

During the construction, impacts related to stage 5 is limited to small local changes in concentrations of suspended sediment in the water column, sediment deposition and sea bed topography, that are all within the natural variability of the highly dynamic Wadden Sea ecosystem. During the operational phase, slightly altered current patterns will lead to small, local changes in the naturally occurring highly variable suspended sediment concentrations and sediment deposition patterns with redistribution of areas of deeper tidal gaps and tidal flats permanently covered with water in Grådyb. The species living in the Wadden Sea are adapted to a highly dynamic and changing environment, with significantly variations in the suspended sediment concentrations in the water column and sediment deposition and erosion. Furthermore, the project area and the limited nearfield of the project area is characterized by a relatively low species diversity compared to the Wadden Sea in general. The small local project-induced changes in suspended sediment and sedimentation during both the construction and operation phase will have negligible direct or indirect impacts on the species richness and biomass productivity as well as the habitats that make up the intertidal ecosystem.

Noise from the construction work and operation of the new port area can have a negative impact on migrating birds and marine mammals. According to the baseline study, there are only few birds within the project area and within the nearfield area of the project site and there are no concentrated bird migration across the project area. Therefore, noise from the construction and operation phase that can potentially prevent migrating birds from using the area as a foraging and or staging area is considered to be negligible. The area around Esbjerg harbour is not a suitable area for seals or harbour porpoises and they will only occur in the area to a limited extent. Despite the limited probability of encountering marine mammals

in the area, noise from installation of sheet piling by hammering can generate noise levels, that can cause behavioral disturbances, temporary hearing and permanent hearing damage (for marine mammals in immediately vicinity to the noise source). As the Wadden sea is a shallow water habitat with a soft bottom, the underwater noise from the installation will be absorbed and attenuate relatively quickly and reach a level at a short distance from the construction work, where no harm will be done to marine mammals. However, to ensure that marine mammals in the vicinity of the construction site are not harmed acoustic alarms (pingers) are used before the pile-driving is initiated which will make sure that any nearby marine mammal will move out of the area. By applying mitigation measure it is considered, that the impact on marine mammals is negligible.

The overall assessment is, that the proposed expansion of the Port of Esbjerg (Stage 5) will not have any significant impact on the Criteria ix - Ecosystems, in relation to the Wadden Sea World Heritage site. Project impact is local and the suspended sediment and sedimentation are within the natural variability of the highly dynamic Wadden Sea system, and will not affect the natural processes in the large scale intertidal ecosystem with its habitat, species richness and high productivity.

1.4.5.5 *Impacts on criterion (x) Threatened species and their habitats*

The overall effects of the stage 5 of Esbjerg harbour extension is related to small changes in the suspended sediment in the water column and small increase in sedimentation at specific areas in the nearfield of the project area during the construction phase. Furthermore elevated noise levels and visual disturbance can occur due to construction work. During the operation phase redistribution of sand material in the shipping lane and in the area in vicinity of the port expansion will result in redistribution of areas of deeper tidal gaps and tidal flats permanently covered with water in a part of the The Wadden Sea just next to the project area. The erosion patterns along the coast of Fanø will remain unaltered and the tidal flat and barrier system will remain uninterrupted across the Wadden Sea World Heritage property.

The existing natural variations of suspended sediment in the water column as well as sedimentation in the near-field of the project area are significantly higher compared to the project caused changes in suspended sediment and sedimentation. The species living in the Wadden Sea are adapted to a highly dynamic and changing environment, with significantly variations in the suspended sediment in the water column and sedimentation.

The marine habitat type closest to the project area is tidal flats. Tidal flats constitute important feeding grounds for several species of sea ducks and shore birds, as it contain numerous important bottom living prey species, such as mussels, snails, crustaceans and worms. The potential impact on the tidal flats are related to suspended sediment in the water column and sedimentation. As the changes in suspended sediment and sedimentation caused by the harbour extension (stage 5) is significantly less than the existing natural variation in suspended sediment concentrations and sediment deposition, the project will have no impact on the tidal flats geomorphology nor on the species that form the basis of the habitat type. As the harbour expansion have no impact on the species that inhabit the tidal flats the project will not cause an indirect impact on the feeding grounds for several species of sea ducks and shore birds.

The salt marshes are an important habitat nature type of the Wadden Sea World Heritage site. The nearest areas of salt marshes are located more than 2 km west of the project area at Halen (Fanø) and 3 km southeast of the project area at Måde Eng and along the coast. The construction work is located more than 2 km from the nearest salt marsh area at Fanø and the erosion patterns along the coast of Fanø will remain unaltered, therefore the impact on the salt marshes will be insignificant.

Although the Wadden Seas supports millions of birds, there are only few birds within the project area and within the nearfield area of the project site. Thus the project area and the area in close proximity to the project area do not provide important feeding-, staging-, moulting- nor breeding grounds for the many birds species. Therefore, impact from the construction and operation phase of the harbour expansion is considered to be not important. The indirect impact on birds are also considered to be not important as the harbour expansion do not cause an impact on the feeding grounds (nearby tidal flats and salt marshes) for the many bird species.

The overall assessment is, that the proposed expansion of the Port of Esbjerg (Stage 5) will not have any significant impact on the Criteria x – Threatened species and their habitats, in relation to the Wadden Sea World Heritage site. Project impact is local and the suspended sediment and sedimentation are within the natural variability of the highly dynamic Wadden Sea system, and will not affect the many species of flora and fauna living in the salt marshes, the marine and brackish areas nor the millions of seabirds that use the Wadden sea as staging, moulting and wintering area.

1.4.5.6 Impact on Integrity

The Esbjerg harbour expansion will not have an impact on the integrity of the Wadden Sea World Heritage site as there will be no significant impact on any of the three Wadden Sea Outstanding Universal Value criteria (viii, ix and x). Thus all elements necessary to express its values will stay intact during both the construction and operation of the harbour expansion.

1.4.5.7 Impact on protection and management

The project will have no significant impact on the three Wadden Sea Outstanding Universal Value criteria (viii, ix and x) nor on the integrity of the property. The harbour extension will therefore not impact the various protection and management systems, that have been implemented to ensure the future maintenance and enhancement of the Wadden Sea World Heritage site.

1.4.5.8 Social impacts of the proposed project on the OUV

A social impact assessment concerning effects of the port expansion including: noise, air pollution and visual disturbances has been conducted. Furthermore potential impacts on recreational activities and socioeconomic subjects have been included.

Noise from the construction and operation phase of the port expansion is estimated to have a negligible impact on the recreational uses of the tidal flats and there are no socioeconomic effects of the noise contribution on these areas either. Thus the social impacts from noise during the construction and operation phase are considered to have no social impact. The emission of pollutants to the air during the construction and operation phase of the harbour expansion are considered to be insignificant compared to the general good air quality in the area,

that is well below the Danish limits for good air quality and is therefore assessed to have no social impact. The overall assessments of potential social impacts of the proposed project on the Outstanding Universal Value is that the project will have no significant social impacts.

1.4.5.9 Conclusions of impact on the OUV

Based on the rigorous Environmental Impact Assessment, the project Expansion of Esbjerg port (stage 5) is considered to not cause any significant impact of the Wadden Sea World Heritage Site, or on the surrounding landscape and adjacent wider ecosystem. The project is therefore not in conflict with the long-term objective of preserving the Outstanding Universal Value of the site for future generations.

The impact assessment related to the World Heritage and the English edition of the non-technical summary have been reviewed by the UNESCO from April to October 2020. The review was received from UNESCO on the 8th of October 2020, where they state, that the expansion of Esbjerg harbour is considered to not cause any significant impacts on the Wadden Sea World Heritage Site, or on the surrounding landscape and adjacent wider ecosystem. Nonetheless UNESCO recommends the preparation of an environmental management plan to monitor potential impacts during construction and operation of the new harbor facility, see section 1.4.5.11.

1.4.5.10 Alternatives and preferred proposal option

It is required as part of the EIA process that other relevant alternatives are investigated and considered.

None of the proposed alternatives to the port expansion (stage 5) meet the needs for the new port areas independently or in combination. Several of the alternatives include decommissioning of existing berthage causing reduced capacity for ship arrivals to the port.

As no reasonable alternatives to Stage 5 have been identified, environmental assessments of the alternatives are not included in the environmental impact assessment.

The environmental impacts related to stage 5 are all described in details and assessed in the EIA and the assessment of impact on the Wadden Sea OUV and summarized in the non-technical summary. No significant environmental impacts of the proposed project have been identified.

Thus stage 5 is considered to be the best environmental and operational solution to develop Port of Esbjerg.

1.4.5.11 Mitigation measures and monitoring activities

The expansion of Esbjerg harbour will only cause insignificant impacts on the Wadden Sea World Heritage site as outlined. As there are no minor residual negative impacts on the Wadden Sea Outstanding Universal Values there is no need for mitigation measures within the Wadden Sea World Heritage site.

To ensure that marine mammals in the vicinity of the construction site are not harmed, acoustic alarms (pingers) are used before the construction work is initiated. By applying mitigation measure it is considered, that the impact on marine mammals is negligible.

Local changes in current and erosion patterns surrounding power pylons and underground cables and along the shoreline bordering the project will require monitoring. The affected areas are outside the Wadden Sea World Heritage site, and the scale of any local impact is insignificant to the Wadden Sea ecosystem.

It is anticipated that the use of acoustic alarms and monitoring erosion patterns around the power pylons and subsea cables will be stated by the authorities in the permit if permission will be granted.

UNESCO recommends in their review, that an environmental management plan should be prepared to monitor potential impacts during construction and operation of the new harbor facility. This will ensure swift implementation of mitigation measures if unexpected environmental effects should occur during the construction and operation phases. Also, UNESCO recommends to undertake a brief comparison between baseline data generated for the EIA, and new monitoring data obtained during and after completion of the harbour extension to confirm the predicted neglectable impacts.

It should be emphasized that The Danish Transport, Construction and Housing Authority, that are responsible for granting the EIA-permit, will state legal requirements regarding the required mitigation measures in the EIA-permit.

1.4.6 Other protection regimes

The Wadden Sea is a natural area of international importance and therefore it is covered by several national and international conservation regimes. Amongst other things, the area is designated as a UNESCO World Heritage Site, international nature protection area (Natura 2000 site) and is under protection from several sections of the river basin management plans. Each of these protection regimes are described in separate sections of the EIA report and the non-technical summary (1.4.3, 1.4.4 and 1.4.5). Furthermore, the Wadden Sea is covered by several other protective regimes which are described in the following section.

Conservation and Wildlife Reserve (guiding principle of the trilateral Wadden Sea Cooperation):

The Wadden Sea is designated as a conservation and wildlife reserve in order to ensure sustainable management of the area and to ensure that Denmark lives up to its responsibilities according to the European Habitats and Birds directives, the Ramsar convention and the Trilateral Wadden Sea Cooperation between Denmark, Germany and the Netherlands. The designation imposes several restrictions and regulations concerning hunting and traffic with fast vessels as well as prohibition of removal of mussels, sandworms and other organisms from the seabed.

As shown on Figure 1.22, the Stage 5 expansion will be constructed within the boundaries of the conservation and wildlife reserve and thus the construction of the expansion will require a permit issued under the regulations of the guiding principle of the trilateral Wadden Sea Cooperation.

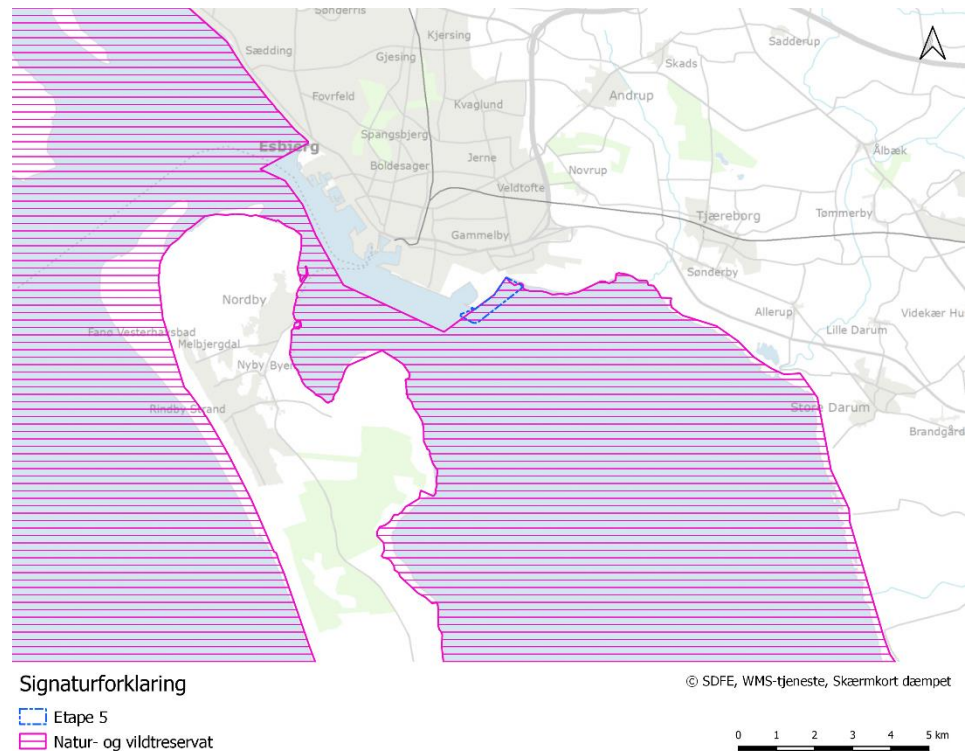


Figure 1.22: The area under the guiding principle of the trilateral Wadden Sea Cooperation (BEK nr 867 of 21/06/2007) shown in pink, and the boundaries of the project area for the construction of the Stage 5 expansion (blue).

The Wadden Sea National Park (National Park Law):

The Wadden Sea National Park was inaugurated because the area contains some of the most unique and exceptional nature areas and landscapes in Denmark. The national park is the largest in Denmark and extends all the way to the border between Denmark and Germany at Blåvandshuk. It encompasses an area of 1,459 km², of which roughly 300 km² is land. The Stage 5 expansion is constructed outside the boundaries of the national park and any ships entering the port expansion will approach through Grådyb and thus not through the national park.

The designation as a national park does not entail any environmental regulations in addition to the international law and regulations for the area. Therefore, the assessments in the EIA report are also adequate for the Wadden Sea as a national park.

The Wadden Sea Plan (The Trilateral Wadden Sea Cooperation):

Denmark, Germany and the Netherlands have been part of the trilateral Wadden Sea cooperation since 1978, with the overarching objective of protecting the entirety of the Wadden Sea (across boundaries) and its natural processes from pollution and degradation while ensuring its sustainable use through farming, fishing, tourism and other industries. The main focus points of the trilateral Wadden Sea cooperation are nature and environmental monitoring, administration and planning. The three countries have agreed on a joint management plan, the Wadden Sea Plan, that covers all coastal international nature protection areas and the marine environment extending three nautical miles from the coast. The Stage 5 expansion is not within any of these protected areas.

The Wadden Sea Plan is incorporated into the Danish management of the Wadden Sea and the objectives are similar to the ones in the EU environmental directives as well as the ones in Danish law. Thus, the assessments in the EIA report are adequate in accordance to the Wadden Sea Plan.

Particularly Sensitive Sea Area (PSSA):

In 2002, the Wadden Sea was designated as a "particularly sensitive sea area" by the International Maritime Organization (IMO) as the area is a unique dynamic ecosystem of international importance. A PSSA area requires special protection from international maritime traffic because of its ecological, socioeconomic and scientific importance. The PSSA of the Wadden Sea covers an area of roughly 13.000 km² and encompasses the German national parks along with the nature protection areas of Denmark and the Netherlands in the Wadden Sea. The Port of Esbjerg and the proposed Stage 5 expansion both lie outside the PSSA of the Wadden Sea.

The EIA report for the Stage 5 expansion covers several topics relevant to the designation of the Wadden Sea as a PSSA, including maritime traffic, impact on the marine environment and other topics of ecological and socioeconomic importance. The assessments in the EIA report are thus adequate for the Wadden Sea as a PSSA.

1.4.7 Maritime traffic

The maritime traffic in the Port of Esbjerg is assessed based on its capacity and navigation safety. The assessments are also based on data and experiences from the existing port and maritime traffic forecasts for the next 10 years as well as virtual navigational simulations of ship calls and maneuvering in the expanded Eastern Port. These parameters are then incorporated with the hydrographic modelling of water currents around the proposed Stage 5 expansion.

The waters around the Port of Esbjerg are dominated by the tidal fluctuations of the Wadden Sea which create a tidal current in the channel and along the port with speeds of up to three knots. Furthermore, the outer parts of the channel through Grådyb are influenced by strong western winds and high waves. Ships approach the port via dredged channels. The seabed surrounding the port predominantly consists of sandbanks and sandy flats.

The maritime traffic forecast that forms the base for the risk assessment for the Port of Esbjerg is shown in Table 1.1.

Table 1.1: A forecast for ship calls in 2026 and the actual number of calls and ship sizes in 2018.

SHIP TYPES	2018	2026
Offshore oil and gas	1,153	1,328
Offshore wind	1,717	2,387
Cargo	1,776	2,154
Passenger- and special vessels	60	76
Fishing vessels	1,376	1,145
Other	183	157
Total	6,265	7,247

In addition to the above, ferries from Fanø also operate frequently in the Port of Esbjerg. The Fanø ferrys sail between Esbjerg and Nordby and at its peak frequency at midday, it arrives every 20 minutes. The yearly contribution therefrom is roughly 15,000 calls.

The maritime safety in the Port of Esbjerg is managed by the harbour maritime safety officer who directs all ship traffic entering the Grådyb channel in the North Sea to the respective basins, around the clock all year long. Two tugboats are available at all times in the port and vessels carrying more than 5000 tons of fuel oil or dangerous goods are subject to mandatory maritime pilot assistance in the waters.

1.4.7.1 Risk assessment of the construction phase

Two to six project vessels will carry out construction activities during the construction phase. These construction activities will mostly take place outside the normal sailing routes and thus will not affect the everyday shipping activity at the port. Material from dredging of the new port basins will be transported to the disposal sites in the North Sea. It is estimated that at peak activity levels the dredging vessels will need to sail through Grådyb to the disposal sites 12-20 times daily.

The main risk related to the transportation of dredged material into the North Sea revolves around other vessels crossing the sailing routes of the slow moving dredging vessels, typically the Fanø ferries. The risk of collision is assessed as small because all maritime activities related to the construction of the port expansion are broadcasted to sailors in the area via "Notices for Mariners". Furthermore, all vessels are obligated to tune into VHF channel 12 for further information. Lastly, the captains aboard the Fanø ferries are experienced and know the waters.

For comparison, there were no reports of dangerous situations during the construction of the most recent expansions of the Port of Esbjerg (Stages 3 and 4) even though it required twice as many trips to the disposal sites in the North Sea as is deemed necessary for the construction of the Stage 5 expansion.

1.4.7.2 Risk assessment of the operation phase

Risk assessment has been done for four different sections of the approach to the Eastern Port of Esbjerg and the proposed Stage 5 expansion:

- 1) The section from where ships enter the North Sea to the channel in Grådyb and to Esbjerg Strand (the recreational harbour)
- 2) From Esbjerg Strand to the traffic harbour
- 3) The turning basin outside the entrance to Dokhavn and Sydhavn
- 4) From Atlantkaj and into the newly expanded area of the Eastern Port

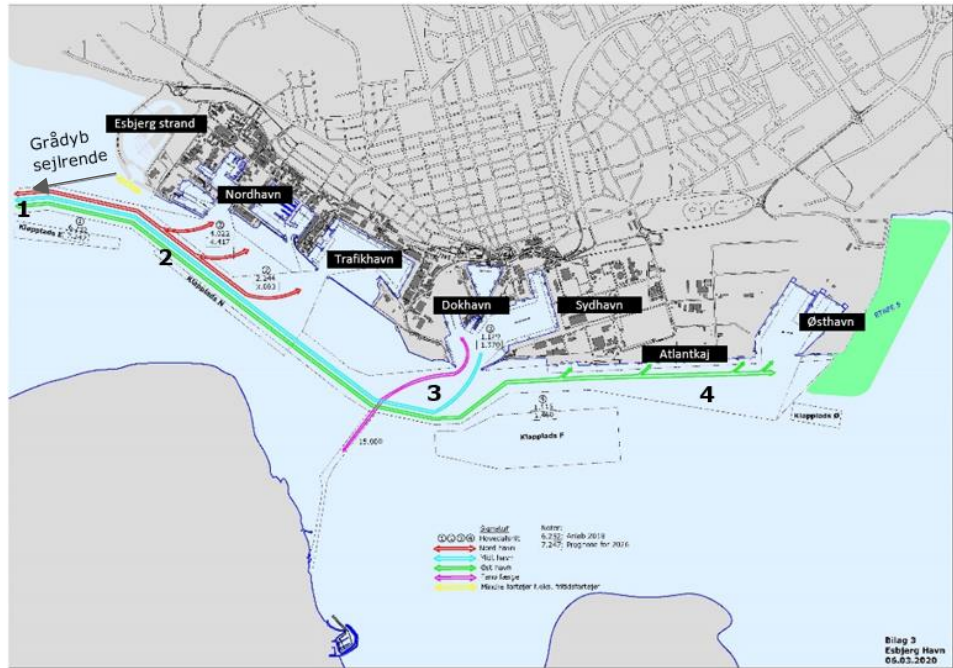


Figure 1.23: Ship calls distributed amongst the different numbered port sections (map courtesy of the Port of Esbjerg). Pink line indicates the route of the Fanø ferries.

- 1) The maritime traffic in the channel is calculated to increase by roughly 16 % by 2026 (up to roughly 7,247 port calls) compared to 2018. Risk analysis has shown that the channel is wide enough to accommodate the vast majority of the maritime traffic without any increased risks. When approaching with particularly wide or long vessels, situations could arise where extra care has to be taken. Some stretches of the channel are not wide enough to allow passage of two large bulk carriers, that require deeper waters to navigate, during spring tide. These conditions already exist today and all port calls are monitored by the harbour maritime safety officer.
- 2) Larger vessels servicing the oil and windfarm industries operate in Section 2 as well as crew boats and fishing vessels. Furthermore, pleasure vessels also use this section to approach the marina. To avoid dangerous situations, the marina was moved to Esbjerg Strand west of the port in 2019. This has improved the conditions for calling ships and because of the large navigable areas in this section it is assessed that the increased maritime traffic to the Eastern Port will not increase the risk of dangerous situations on the section.
- 3) Section 3 includes the turning basin and the approach to the ferry port and the basins used by RO/RO ships². The primary risk factors in this section are the Fanø ferries crossing the sail route of ships moving east/west (Figure 1.23). As maritime traffic to the Eastern Port is expected to increase due to the construction of the Stage 5 expansion, the number of sailing routes that will be intersected are also increased. Today, the Fanø ferries already cross these routes up to 30.000 times each year and the crew aboard the ferries are already accustomed to navigating with intersecting traffic. Therefore, the increased risk for collisions is assessed as

² RO/RO is short for roll on/roll off which is a term used for ships that transport trucks that can drive onto deck by themselves.

not significant. No collisions with the Fanø ferry have been registered since 1973.

- 4) The shape of the Stage 5 expansion and the increased depth and width of the channel next to Atlantkaj results in ships having more space to navigate these waters. The crew of ships navigating this section should be vigilant as there can be very wide vessels with projecting cargo at these quay facilities.

Finally, it is concluded that any increased risks caused by the increased traffic to the Eastern Port can be managed in the existing channel and the new port expansion. This assessment is supported by numerous sailing simulations with three large ship types done by FORCE. The safety levels in the channel and turning basins are deemed acceptable in their current configuration.

Based on historical data, the risk of accidents involving only a single vessel, is not dependent on the total yearly number of ship calls. The total number of grounded ships approaching the Port of Esbjerg for the period between 2002 and 2018 were 20. All groundings have been on soft sandy seabed and there have been no resulting leaks of oil or other environmentally hazardous substances.

For accidents involving two or more vessels it is implicit that the risk will increase with more ship calls annually, but as there have only been six collisions over the past 16 years, it is assessed that this risk will remain low. None of these collisions lead to injuries or leaks of oil or other environmentally hazardous substances.

1.4.8 Marine archeology

With the construction of the Stage 5 expansion to the Port of Esbjerg, it is important to secure any potential historical relics of that could be destroyed during the construction activities in the seabed.

To elucidate whether any such relics are present and where they might be near the port expansion, an archival control of the project area was done, where one relic was identified in the project area. The museum responsible to marine archaeological cultural heritage in the North Sea, Strandingsmuseum St. George, has carried out a preliminary investigation of the area in spring 2020, in agreement with the Port of Esbjerg. During the preliminary investigation it was not possible to localize the relic, which is assumed to be a fish farm. The Agency of Culture and Palaces has based on the results of the preliminary investigation decided to admit establishment of projects in the area.

1.4.9 Raw materials

The construction of the Stage 5 expansion requires 3.3 million m³ of material for reclamation. The entirety of this material stems the dredging of the channels as well as the port basins and navigable areas that are part of the port expansion. It is assessed that the described raw materials can be used in the required quantities without impacting the environment. Dredging already takes place in the area and thus the dredging during the construction will not pose any increased risk to the maritime traffic or the environment. As the entirety of the needed raw materials stem from the existing dredging or the dredging related to the project, the construction of the Stage 5 expansion will not affect the availability of raw materials in Denmark.

1.4.10 Population and health

In the chapter of the EIA report concerning population and health, the effects of the project on the general population and potential health effects are described and assessed with regards to: traffic safety, noise, air pollution, light pollution and visual disturbances. Furthermore, the potential effects of the project on any recreational activities in the area are described and assessed as well as any socio-economic effects following the environmental impacts of the project that were described in the EIA report. In the following section the effects of the construction and operation of the Stage 5 expansion are discussed. Lastly the collective effects from the existing port as well as the port expansion are discussed.

1.4.10.1 *The construction phase*

The impact of the construction of the port expansion on population, health and recreational interests is in many cases the same type and extent as the impact of the operation phase and for the impacts where this is the case, these are only described in the section concerning the operation phase. There are however a handful of impacts that are only present during the construction phase and thus are described and assessed in the following sections. None of the impacts during the construction phase will lead to socioeconomic effects and thus these are not discussed further in this section.

Noise

The construction of the Stage 5 expansion will lead to increased noise levels which can affect the population near the project area as well as the recreational value of the nearby areas of recreational interest. The main cause of noise during the construction phase will be sheet piling. In the section concerning noise (1.4.11), calculations have estimated that the noise contribution from the construction works will be roughly 50 dB(A) near housings in Esbjerg and roughly 40 dB(A) near housings on Fanø. The construction activities will only be audible during the daytime and primarily during the sheet piling. Dredging is the only construction activity that can take place during the night. The noise contribution of this activity is however below the general background noise levels in Esbjerg. Because of this it is assessed that the noise levels during the construction phase will not affect the health of people.

It is estimated that the noise from the construction works will only potentially affect two of the recreational interests in the area: the path "Trampestien" north of Esbjerg and the areas along the coast on the mainland close to the port that are used for walks, dog walking etc.. The noise from the port is not assessed to limit the recreational use of these areas and thus it is assessed that the impact of the construction of the Stage 5 expansion on the area will be negligible.

Emissions

The emissions of pollutants from industrial machinery, ship traffic and road traffic to the port during the construction phase are assessed in the section concerning air and emissions (1.4.17), to be insignificant compared to the general air quality in the area. The emissions are thus assessed not to affect the health of people.

The construction activities could potentially lead to dust nuisances in the areas along the coast just north of the proposed Stage 5 expansion. The dust nuisances will however be very limited in duration and extent and thus will not affect the recreational use of the path here.

Traffic safety

The increased traffic to the port during the construction phase will run through the motorway E20 where the risk of accidents is very low. The total increase in traffic during the construction will be small and thus will not affect the risk of accidents on E20. Because of this it is assessed that the increase in traffic will not affect the health of people.

Sediment spill

The dredging and disposal of dredged sediment during the construction phase will lead to minor sediment spill into the nearby water that could potentially affect the recreational activities such as bathing and angling. The results from the modelling of the sediment spill show that the areas that suffer temporary increases of sediment concentrations in the water are the ones in the immediate vicinity of where the dredging and disposal of sediment takes place. These fluctuations are negligible compared to the natural fluctuations in sediment concentrations in the Wadden Sea and North Sea. Therefore, the sediment released during the dredging and disposal will not affect bathing activities near the Port of Esbjerg or on Fanø. Likewise, the effects of the construction of the port expansion on angling will be negligible.

Restrictions during the construction phase

The construction works will not restrict the access to marinas on the mainland or on Fanø for the general public. The present instructions for any pleasure vessels approaching the Port of Esbjerg remain the same and in addition all people navigating the waters around the Eastern Port are instructed to exercise caution. All sailors in the area will be informed of the construction works via "Notices to Mariners". In conclusion it is assessed that the impact of the restrictions on the recreational sailing in the area will be minor.

1.4.10.2 The operation phase

The general public and the recreational use of areas of recreational interest near the project area can be affected by changed visual conditions, increased noise levels or changed light conditions during the night amongst other things. Like during the construction phase, the health of people could be affected if the activities during the operation of the Stage 5 expansion generate noise or harmful emissions. This is described in the following section.

The effects of noise

The noise contribution from the operation of the Stage 5 expansion will partly stem from the businesses that establish themselves here and partly from the traffic on and near the port. The noise contribution from all activities on the port expansion is estimated to be up to about 40 dB(A) near housings in Esbjerg which is quieter than the general background noise in Esbjerg. The increased traffic to and from the port following the construction of the Stage 5 expansion is estimated to cause a very slight increase in noise levels of roughly 0.5 dB. Such a small increase will hardly be discernable from the noise of the general traffic. Furthermore, it is assessed that there will be no nuisances caused by low frequency noise or infrasound from ships or traffic as the distance to the nearest housings is too great. In conclusion it is assessed that the impact of the noise from the operation of the port expansion will be minor. Based on this assessment and the fact that each business that establish itself on the new port has to comply to the noise limits it is concluded that there will be no risk of affecting the health of people. Furthermore it is assessed that regarding health, the socioeconomic effect of the noise from the operation of the port expansion will be negligible.

Another socioeconomic consequence of increased noise levels could be that residential areas that experience higher noise levels are often less attractive than similar areas with less noise. However, investigations have shown that only noise levels above 60 dB(A) have a significant effect on the prices of houses or apartments. Normally, it is either traffic or railroads that cause noise contributions high enough to affect house prices. The noise contribution from the operation of the Stage 5 expansion is also well below the 60 dB(A) level that causes this effect. Because of this the impact of the noise emitted by the operation of the port expansion on the house prices is assessed to be negligible.

There is a risk of noise nuisances caused by the noise contribution from the operation of the port expansion on the areas of recreational interest in the immediate vicinity of the port expansion to the north and along the coast to the east. These areas are not a designated recreative areas but rather natural areas and areas with wind turbines. The existing wind turbines are located east of the port and already contribute to the noise level in the area which is generally high. However in addition to the noise contribution, the areas are also vulnerable to visual disturbance from the port expansion and thus the impact of the port expansion on the recreational use of the areas is moderate.

The recreational use of the tidal flats near Esbjerg and on the eastern coast of Fanø will be unaffected by the construction and operation of the port expansion with the exception of the tidal flat area that is converted into the new port area. The tidal flats just east of the port expansion will experience higher noise levels, however the effects thereof will be similar to the effects experienced today on the tidal flat that is to be converted into new port area. The tidal flat near Halen on Fanø is highly used by tourists. In the section about noise and vibrations it is estimated that the increase in noise with a fully established Stage 5 will be up to 2 dB. This increase is evaluated as being insignificant in relation to the recreational activities of the tidal flats near Halen. The operation of the Stage 5 expansion is estimated to have a negligible impact on the recreational uses of the tidal flats and there are no socioeconomic effects of the noise contribution on these areas either.

Visual disturbances

From large parts of the city of Esbjerg, the port expansion will not (or at most partially) be visible as it is hidden behind the buildings of the city. In some places, roads provide vantage points from where the port expansion can be seen, for example Storegade, Ingemanns Allé and Skolebakken. From here, it is assessed that some people will experience the port expansion as a visual disturbance as it affects the view to a moderate degree.

If the view from residential areas is significantly affected it can have socioeconomic effects as the prices of the properties in question could potentially be affected over time. It is however expected that the current prices for the residential properties in the area already reflect the view to urban areas or tall structures on the existing port. Therefore, the socioeconomic effect of the visual disturbance caused by the construction of the Stage 5 expansion is assessed to be negligible.

The port will negatively affect the view from the coast east of the existing port by blocking the view to the Wadden Sea for 600 meters. This will affect recreational activities as you will have to walk longer before you reach the coast. The view will be completely blocked from the coastal area north of the Stage 5 expansion. The port expansion will also be highly visible from the coastal landscape to the south-

east and it will affect the current view of the Wadden Sea to the west and north-west. As this area is already influenced by the noise from the current port, it is assessed that the impact of the visual disturbance on the recreational value of the area is moderate. It is however assessed that there will be no socioeconomic effects of the visual disturbance of the areas used for recreational activities.

The tidal flat near Halen at Fanø, which is a popular area for tourists, will not be significantly affected by the modified views due to the operation of Stage 5. This is based upon the fact, that the area currently is visually affected by the existing harbor, and the visual impact of Stage 5 is thus assessed as being minor.

Light pollution

The future light conditions on the Stage 5 expansion during the night are assessed in section 1.4.19 concerning landscape and cultural environment. It is assessed that the change to the light conditions when viewed from Fanø as well as from Esbjerg has very little impact on the overall current light conditions in the direction of the port. When viewed from Esbjerg, it is assessed that the light from the Stage 5 expansion generally does not affect the extent or the character of the light conditions of the existing port area or the city. Here the effect is assessed as negligible. When viewed from Nordby on Fanø the port expansion will lead to negligible or minor effect on the overall light conditions depending on how visible the Stage 5 expansion will be.

Emissions to the air and water

The emission of pollutants into the air stemming from the operation of the Stage 5 expansion will primarily come from the increased amount of traffic and the new businesses that will establish themselves on the port. In section 1.4.17 concerning air and emissions it is assessed that the emissions will have a negligible impact on the air quality in the area. Based on this, it is also assessed that these emissions do not affect the health of people and the potential socioeconomic effects of the emissions will be negligible.

The operation of the Stage 5 expansion will not lead to any discharge of untreated waste water or environmentally hazardous substances into the marine environment. Because of this, the construction of the Stage 5 expansion will not affect recreational activities such as bathing on the nearby beaches like for example the beach in Nordby.

Traffic safety

The majority of the traffic to and from the port runs through the E20 motorway where the risk of accidents is very small and the traffic contribution of the port is less than 2 %. The change in the traffic safety on E20 is thus estimated as negligible as described in section 1.4.11.

Because of height limitations on the E20 motorway, a specialized route for very large transport vehicles transporting odd shaped goods such as parts for wind turbines has been established. The port expansion can lead to an increase in these large transport vehicles by up to 5-10 %. An increase of 10 % is equivalent to one vehicle per day. This can potentially bother some residents or vulnerable road users, as some are already bothered at current levels. The large transport vehicles will however drive very slowly on the road and an escort vehicle will increase the traffic safety as well. The slight increase in large transport vehicles is not assessed to affect the traffic safety on the specialized route.

Based on the above it is assessed that there will not be an increased risk for traffic accident that could affect the health of people or lead to socioeconomic consequences.

1.4.10.3 *Cumulative effects*

Cumulative effects are defined as the combined effects from the activities of the existing port in combination with the effects of the Stage 5 expansion. The only potential cumulative effects are the ones related to noise. In the section concerning noise and vibrations (1.4.11) the impact of the collective noise contribution is estimated to be moderate as the noise levels when the port is working at full capacity will be 10 dB or more louder than the noise limitations for individual businesses on the port (especially during the night). The housings that are currently most affected by the noise from the existing port will however experience a very small increase in noise levels after the construction of the Stage 5 expansion, in most cases less than 1 dB. Such a small change will not be audible compared to the background noise and thus the increased noise levels from the Stage 5 expansion are not assessed to affect the health of people. During the first public hearing, there were however several noise complaints concerning the current noise levels from the existing port activities. These noise complaints will be investigated and assessed by the Port of Esbjerg in collaboration with the Municipality of Esbjerg.

It should also be noted that the noise contribution from the ships that are loaded and unloaded at the port could potentially be reduced in the future by supplying power from land. The Port of Esbjerg are currently expecting to establish 5-10 power lines on the existing port before 2025.

1.4.11 Traffic

The traffic near the port runs smoothly under current conditions. The width of the roads, junctions and roundabouts (two-lane roundabouts) are based on the largest vehicles that use them. In most cases this means the roads are larger than needed for normal traffic loads near the port.

Most of the traffic to and from the port runs through the E20 motorway. A small portion of very large transport vehicles cannot pass under the motorway bridges, and thus have to use another more specialized route (see Figure 1.24).



Figure 1.24: Most of the traffic to and from the Port of Esbjerg is on the E20 motorway and Gammelby Ringvej (green and black route). Specialty transport vehicles use another route meant for tall vehicles (red and brown route).

The traffic load on the E20 motorway (green route) between Korskro and the Port of Esbjerg varies between 9,000 vehicles each day on sections between the airport (marked <75>) and port, to 24,000 vehicles each day on sections closest to the airport. The red route consists of smaller roads with a traffic load of about 1,000 vehicles per day, whereas Tjæreborgvej (brown route) has a traffic load approaching 15,000 vehicles per day.

It is estimated that a total of 4,356 trucks will drive goods to and from the project area during the Stage 5 expansion construction phase. This corresponds to 47 extra trucks per day if the entirety of the traffic load falls within one year. This corresponds to an increase in traffic of roughly 0.2 to 0.9 percent overall on the nearby roads. This will not pose a problem to the traffic flow on the roads, junctions and roundabouts near the port during the construction phase.

It is estimated that the Stage 5 expansion will cause an increase in the collective traffic (including goods traffic) to and from the port of 150 cars, 84 trucks and 36 specialty transports per day. It is estimated that one of these specialty transports will be too big to use the regular route and thus have to use the alternative route (red and brown route). Thus, the proposed port expansion will increase the traffic load to and from the port by roughly 0.1 to 1.7 percent. The existing road network can easily accommodate this small increase in traffic without posing any inconvenience to the remaining traffic.

Parts of the alternative route (red and brown route) are on relatively small roads without any dispensation for vulnerable road users (bicycle paths and the like). On the paved part of Krogsgårdsvej, the regular traffic moves at very high speeds making this an uncomfortable section for bikers to cycle along. The remainder of Krogsgårdsvej is very bumpy and narrow, and likely not a very comfortable place for cyclists even though the traffic moves at lower speeds in this section. On some parts of the alternative route, the larger transport vehicles could cause difficulties

for oncoming traffic to pass by, and as a result cyclists might have to wait at the side of road until vehicles pass. The Municipality of Esbjerg plans to create space for cars and bikes to wait for larger vehicles to pass. These spaces are in several places along Skads Mosevej which are too narrow for oncoming traffic to pass by the large transport vehicles.

The increased traffic load also increases the risk of traffic accidents. However, the risk of accidents is already very low on the roads in question, and thus, the roads are not estimated to become any less safe as a result of the port expansion.

1.4.12 Noise and vibrations

Many businesses on the existing port affect the city of Esbjerg by creating noise. Several of these have an environmental permit with set noise limits. Some of the businesses on the Port of Esbjerg do not create significant noise and are typically only active during the daytime or at least have their highest level of activity during the daytime. The Port of Esbjerg provides services for the shipping and freight industry and ships in the port. These activities can take place both during daytime and nighttime.

The noise from ships at the port primarily originates from the ships auxiliary engine which supplies power and from onboard ventilation systems. The noise from the ships depend on the size of the ship and thus on the size of the auxiliary engine, and to what extent berth operations are active – such as cranes, loading equipment etc.

The housings near the existing Port of Esbjerg experience noise levels between roughly 40 and 50 dB(A). On Fanø, the total noise level is roughly 35 dB(A) or less. As these measurements are based on the collective noise emissions from the entire port and all the activities there, the noise levels cannot be compared to the specific noise limits for individual businesses.

As the businesses and activities are typically active around the clock, the calculated noise levels can also occur during the nighttime. As the background noise levels are lowest during the nighttime, the activities from the port will be particularly audible when heard from housings in Esbjerg during this period. This corresponds well with the fact that Esbjerg residents have complained about noise from the port.

The noise contributions from future businesses on the port are not known but it is assumed that every business must comply with the existing noise limits near boundaries and housings in Esbjerg and on Fanø.

Future companies on the new port expansion will typically be of similar type as the ones on the existing port, i.e. businesses that handle cargo going in and out of port. Furthermore it is expected that some companies manufacturing wind turbine components will be established. The noise sources from these businesses will typically be moving machinery, cranes, compressors, ventilation noise etc.

The overall noise contribution from all activities during the operation of the Stage 5 expansion is roughly 40 dB(A) near housings in Esbjerg and less than 35 dB(A) on Fanø. This noise contribution cannot be compared directly to the noise limits for the area as these are for individual businesses.

Based on the above, calculations have been done on the overall noise contribution from existing businesses, new businesses and ships after the completion of the proposed Stage 5 expansion (see Figure 1.25).

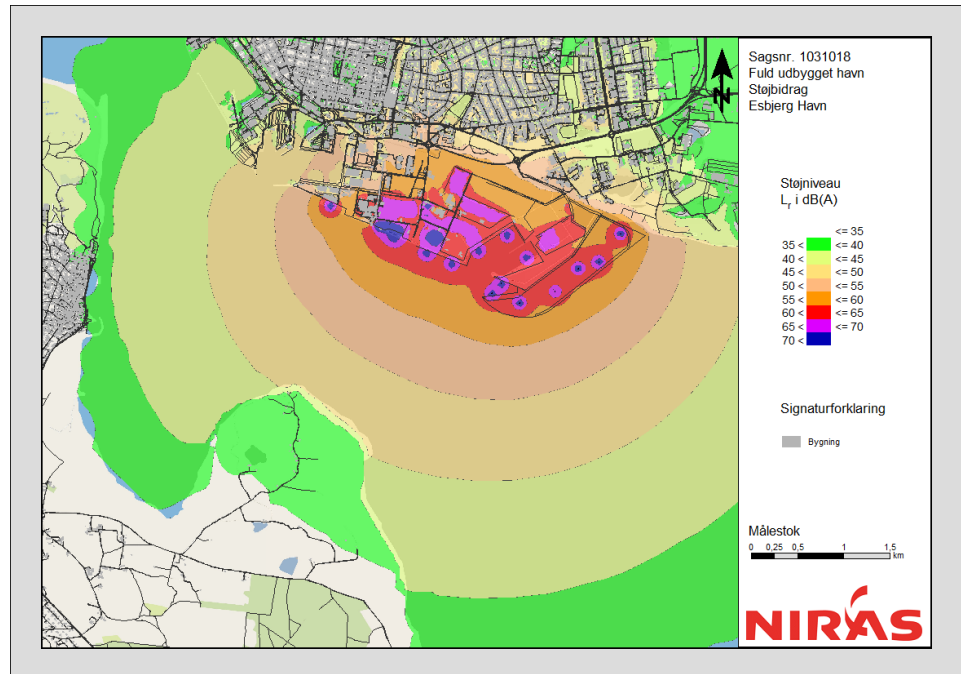


Figure 1.25: The collective noise contribution from the existing port along with the completed Stage 5 expansion.

The collective noise contribution at housings in Esbjerg is up to 50 dB(A) while roughly 35-40 dB(A) at housings on Fanø.

The noise levels in Nordby on Fanø are increased by roughly 1 dB and at housings in Esbjerg roughly 1-3 dB in most places. It will be up to 5 dB in a few select locations. Since the port is expanded eastwards it will primarily be housings in the eastern part of Esbjerg that will experience increased noise levels.

The housings that are most affected by noise from the port today will only experience a very minor increase in noise levels, typically less than 1 dB. Such a change will hardly be noticeable when compared to the existing background noise.

Overall, it is assessed that the collective noise contribution from the existing port activities as well as the new and the accumulated noise contribution will be moderate as the noise contribution (especially during nighttime) is 10 dB or more above the noise limits that are set for single businesses. This noise contribution will be audible in periods where the background noise from the city itself is low. However, it should be noted that these calculations are based on periods where all businesses on the port are performing at maximum capacity which will rarely occur.

Increased port activity will result in more traffic which will increase the noise contribution from traffic. Most of the large odd sized goods that are expected to be delivered to the new port expansion will likely be delivered by ship. However, a general increase in traffic on land is expected. Traffic related to the port expansion is expected to be less than 2 % of the collective traffic on the surrounding roads in 2026. During the construction phase, the noise contribution from traffic will be in the order of magnitude of 0.5 dB. Thus the expected increase in noise from traffic

will not be audible or distinguishable from the increased traffic in Esbjerg as a whole.

Overall the increased noise contribution from traffic is assessed to be a minor environmental disturbance.

Of the mentioned activities, only dredging will potentially occur during both day- and nighttime.

During construction, materials are transported to the project area, mostly by ship but also with trucks, vans and cars.

Figure 1.26 shows the exclusive noise distribution for sheet piling. Calculations show a noise contribution of up to 50 dB(A) at nearby houses in Esbjerg. On Fang it will be roughly 35 dB(A) or less.

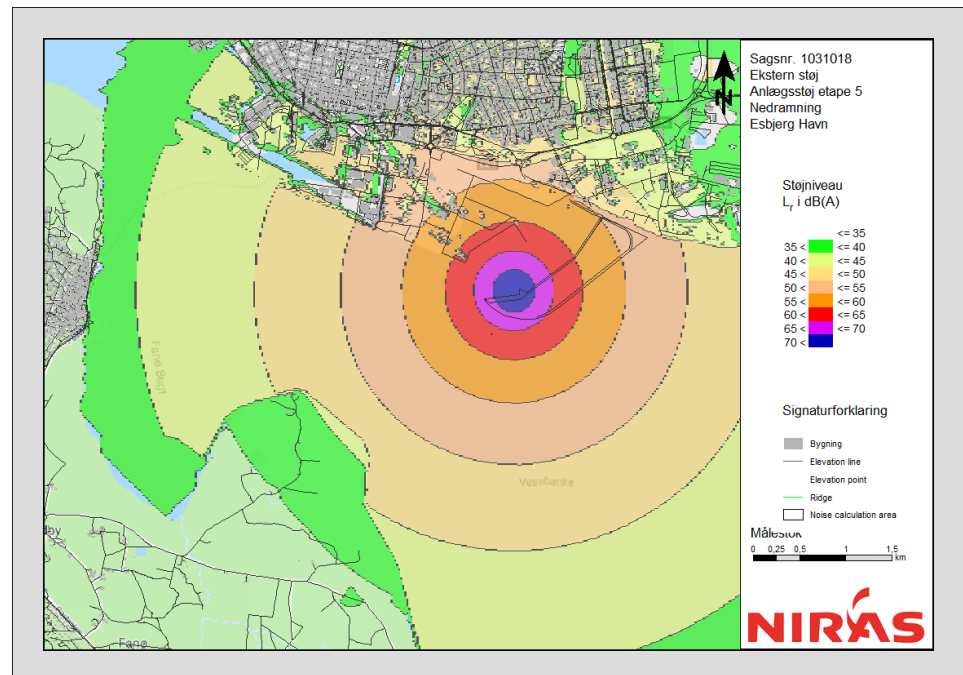


Figure 1.26: Noise map, showing the noise from sheet piling.

Figure 1.27 shows the noise distribution from a vessel dredging the channel. The noise contribution from these dredging activities will be less than 40 dB(A) at all housings. It will however vary depending on where the vessels are working. The dredging can, as opposed by the remaining construction activities, take place during the nighttime as well.

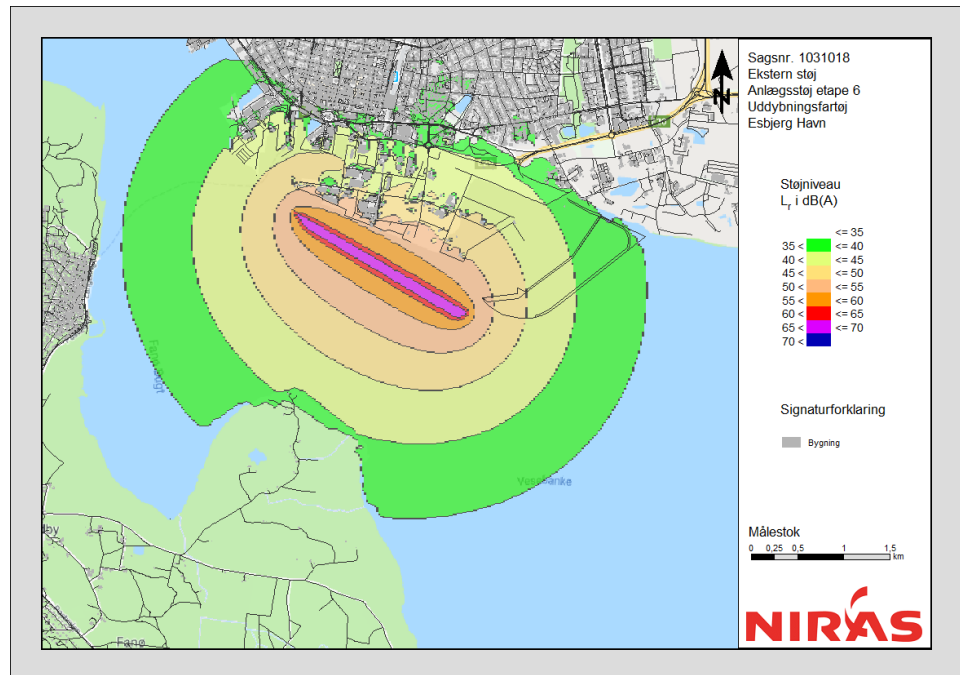


Figure 1.27: Noise map showing the noise distribution from a dredging vessel in the channel.

The above activities are the construction activities that will contribute the most to the overall noise levels.

Overall, activities during the construction phase will have a noise contribution of roughly 50 dB(A) near housings in Esbjerg and roughly 40 dB(A) near housings on Fanø at peak activity. This noise contribution will only be present during the day and will primarily be audible in periods with sheet pile driving. During the night, the only construction activity that takes places is the dredging which will have a noise contribution near housings in Esbjerg of roughly 40 dB(A). This noise level lies below the baseline background noise levels in Esbjerg.

Overall, it is assessed that the noise impact from the construction phase of the Stage 5 expansion will be minor.

1.4.13 Nature conditions on land

In addition to assessing the international nature conservation interests in the marine and terrestrial environments (as described in section 1.4.3), this EIA report also addresses the impact of the proposed port expansion on national nature conservation interests on land. This includes natural areas that fall under § 3 of the nature protection legislation as well as protected species.

In general, the construction work has no risk of impacting the natural conditions on the island of Fanø. The natural areas on the mainland that fall under § 3 of the nature protection legislation will not be directly impacted by construction of the port expansion either. Furthermore, there will be no temporary or permanent lowering of the ground water levels that could impact nearby natural areas or species that live there.

It is possible that there will be some minor disturbances of the nearest § 3 protected areas caused by dust during the construction phase. It is to be noted that the extent and duration of this dust disturbance will be extremely limited, and

thus, it will not pose a significant risk to any of the nearby § 3 protected areas, or the species that inhabit them.

During the construction phase there will be a minor increase in background noise levels. It is estimated that this increase will be negligible for the nearby areas as this is only a temporary disturbance. None of the construction work is done in the immediate vicinity of areas containing protected species. Furthermore, most of the species that are especially sensitive to noise disturbances are able to move to alternative areas in peak work hours, during which the noise levels might be slightly higher.

Lastly, it should be noted that most of the species that are found in close proximity to the project area are nocturnal, meaning they will not be disturbed by the construction work as the vast majority of this will be done during the daytime.

The port expansion will not disturb existing nature conditions during the operation phase, neither on Fanø or the mainland. The operation of Stage 5 will only cause a minor change in the background noise levels in areas that generally have no significant protected species. These areas already face significant background noise levels due to operation of the existing port, traffic etc. It can therefore be expected that the animals that inhabit or roam the areas surrounding the existing port, or near the project site are accustomed to such background noise levels. The additional noise generated by the port expansion will be of the same type and during the same time interval as the current background noise. As previously mentioned, many species that inhabit these areas are nocturnal, and thus, will be active when the noise levels from the port will be at their lowest. Overall it is estimated that the effects caused by the port expansion to protected species during the daily operation will be minor.

1.4.14 Land use

Today, the entire project area is under water and the area encompasses about 76 ha of the Wadden Sea of which about 59 ha will become reclaimed land area on the new port and about 17 ha will become new navigable areas and channels. When the construction of the port expansion is completed the land area of the Port of Esbjerg will be increased by roughly 57 ha.

The intention of the port expansion project and thus also the conversion of the submerged area is to meet the increasing demand for more space near quays on the port to service the windfarms in the North Sea. The demand for more area cannot be met via any of the investigated alternatives and it is not possible to establish the needed areas on land either.

Even though there are some environmental impacts of converting the area for the Stage 5 expansion, these impacts are assessed as negligible. It has been especially thoroughly investigated whether the construction of the port expansion could affect the Wadden Sea and all impacts thereof have been assessed as negligible.

Based on the above it has been assessed that the impact of the permanent conversion of the area for the port will be minor.

1.4.15 Soil and groundwater contamination

Before the expansion of the port it needs to be determined whether there is a risk of coming into contact with, or spreading existing soil or groundwater contamination during either phase of the project. Furthermore it should be assessed whether the Stage 5 expansion brings a risk of generating new contamination.

The project area has no direct interaction with designated drinking water aquifers with the closest drinking water interest area about 1 kilometer further north. There are several areas that are undoubtedly contaminated (V2 mapped) as well as areas that might be contaminated (V1 mapped) close to the project area. For instance, there are contaminated areas mapped near the recycling site and the Måde landfill, as well as the Zodiak disposal site where contaminated sediment from the port basins is stored, that are located close to the project area. The port depot is the site for disposal of contaminated sediment from the port.

The construction of Stage 5 requires the dredging of two areas. The sediment in these areas stems from natural depositions and thus is assessed to be uncontaminated. The project also includes the reclamation of land for Stage 5, which will be done using uncontaminated sand. During the construction precautions will be taken to minimize the risk of spills by the use of construction machines at the site. If a spill occurs the contaminated layers of soil will be removed ensuring there is no significant risk of contaminating the surface water. Because of these initiatives the construction of Stage 5 does not present a risk to the spreading of existing soil contamination, nor does it generate new soil or groundwater contamination.

It is not anticipated that daily operation of the port expansion will bring risks of generating new contamination of soil, groundwater or drinking water. Any new businesses that establish themselves on Stage 5 that could potentially pose a risk of contamination must follow the rules on environmental control by the municipality of Esbjerg. If a business poses a particular risk of contamination and wishes to establish itself at the port a new standalone EIA and/or environmental approval is necessary. The requirements and conditions for the operation of the business can be stated in order to minimize the potential risk for contaminating the surrounding environment.

1.4.16 Draining

The majority of the existing port has a sewer system that leads waste and process water to the wastewater treatment plant (WWTP) East. The surface water from the impervious areas is purified before being led to the port. Northeast of the proposed Stage 5 extension runs the Præstegårds-stream, which is important for drainage. The waste water from the WWTP East and the rain water get distributed through separate drainage/sewer system. The Præstegårds-stream has its outlet at an area of brackish water. Water from the Zodiak disposal site can also leak into this area (Figure 1.28).



Figure 1.28: Overview of the lower part of the Præstegårds-stream (Præstegårdsbækken) including the area of brackish water (Brakvandsområde) that flows along the Eastern Port of Esbjerg and into the Wadden Sea. The Zodiak disposal site (Zodiak Havnedepot) is also marked on the map.

During the construction phase, Stage 5 will be reclaimed using clean material and water will be displaced from the area. This water is uncontaminated and therefore will not affect any of the surrounding water. During the construction precautions will be taken to minimize the risk of spills using construction machinery at the site. If a spill occurs the contaminated layers of soil will be removed to prevent any significant risk of surface water contamination. Overall it is assessed that there will be no risk of contaminating any of the nearby water during the construction phase.

During the daily operation all waste water, including sanitary, will be led to WWTP East as is currently done for the existing Eastern Port. The water runoff from the impervious areas around the port is categorized as regularly loaded rainwater, meaning it needs to be purified before it is discharged into the port basins to avoid unnecessary contamination. The water run-off for Stage 5 is expected to be similar to the surface water from the existing impervious areas on the Eastern Port, as the activities will be similar. The Port of Esbjerg plans to use the same purification solutions for the rain water management system needed for Stage 5 as is already in place for the existing Eastern Port. These solutions can be described as BAT-solutions meaning they are based on best available technology in the field. Therefore it is assessed that the discharge of surface water from the Stage 5 expansion during the daily operation will not affect the water quality of the nearby aquatic environments.

The construction of Stage 5 will extend the area of brackish water where the Præstegårds-stream has its outlet. In the EIA report it is assessed that the extension of this area will not affect the water flow in the stream under normal conditions, or under storm conditions. The construction of Stage 5 will cause water to seep from the Zodiak disposal site into the area of brackish water instead of the Wadden Sea. The leaking water is however diluted during the entire period of operation for the depot. After it is done operating the concentrations of environmentally hazardous substances in the brackish water area will be below the maximum

allowed concentrations before the water flows into the Wadden Sea, and the Natura 2000 site.

1.4.17 Air and emissions

The location of Esbjerg on the western coast of Denmark ensures good conditions for the dispersal of air pollution. The latest measurements of the air concentrations of nitrous oxides (NO_x), sulfur dioxide (SO₂) and fine particulate matter (less than 2.5 µm (PM_{2.5})) done by Aarhus University/DCE (Danish Centre for Environment and Energy) show that the air contamination levels in and around Esbjerg are generally well below the national guideline values for these substances.

The current values were forecasted to 2030 by Aarhus University/DCE and these forecasts indicate that the concentrations of NO₃, SO₂ and PM_{2.5} in the atmosphere are likely to decline over the coming years. This is important for the assessment of the construction- and operational phase of the Stage 5 expansion. An important factor of the existing conditions is the planned decommissioning of the Esbjerg Power Plant in 2023, which is expected to have a positive effect on the background concentrations of air pollutants in and around Esbjerg.

1.4.17.1 The construction phase

The main contributor of air pollution (NO_x, SO₂ and particulates) during the construction phase will be from burning of fossil fuels by vehicles and machinery used for the construction works as well as dust emissions. The construction activities are not assessed to produce any malodor pollution.

The construction phase will be ongoing for several years and thus there will be long periods with relatively low construction intensity. The two to six vessels that are expected to work on the dredging and reclamation will have little impact on the air quality in Esbjerg when compared to the 6,000 ships that call the port yearly. In addition there will be land based construction activities with up to four industrial machines working at a time. Traffic to and from the construction site will consist of several trucks and cars. However, the contribution of air pollutants from these vehicles are assessed to be negligible when compared to the current annual average daily traffic in and around Esbjerg.

In conclusion, it is assessed that the impact of the emissions during the construction activities on the air quality in and around Esbjerg will be negligible.

1.4.17.2 The operation phase

The Stage 5 expansion will continue to service the currently established businesses on the Port of Esbjerg, especially wind power- and related industries. Furthermore, some businesses manufacturing necessary wind turbine components might establish themselves on the new port. The assessment is based on the establishment of five to ten manufacturing businesses, five of which are expected to be regulated by environmental permitting in accordance to the Environmental Protection Act. The emissions of air pollutants and dust from these businesses will thereby be regulated by the defined threshold values. The contribution to emissions of any future businesses on the port expansion is assessed to be negligible.

The assessment of the expected increase in the number of ships that call port is based on studies from the Ports of Copenhagen and Aarhus. The emission contributions of NO_x, SO₂ and PM_{2.5} of cruise ships in these ports have been thoroughly investigated. The enormous energy consumption of these ships results in them emitting roughly six times the amount of NO_x, SO₂ and PM_{2.5} as the larger vessels

normally operating in the Port of Esbjerg. By downscaling the emission contribution from cruise ships to the actual levels emitted by larger vessels operating in the Port of Esbjerg and comparing these levels and the effect on the background air pollutant concentrations, it is assessed that the increased number of ships that call and operate at the port following the construction of the Stage 5 expansion will not influence the background concentrations of Esbjerg significantly.

The increase in land traffic during the operation is estimated to be about 270 vehicles, 120 of which are estimated to be trucks. This increase is assessed to have a negligible impact on the background concentrations of NO_x, SO₂ and PM_{2.5} when compared to the emission contributions of the traffic on the existing port and in the city of Esbjerg.

1.4.18 Climate

As part of the EIA report two climate related effects of the port expansion are assessed. Firstly, it is assessed how the construction and daily operation of the port expansion will affect the climate as a result increased CO₂ emissions, and secondly it is assessed how the port expansion is prepared to adapt to future climate change scenarios.

The vast majority of the CO₂ emitted during the construction phase comes from the production and transport of materials. Most of the materials used in the port expansion are needed for reclamation. These materials stem from the dredging of the channels near the existing port, and thus the majority of the materials used in the construction phase do not contribute to the CO₂ emissions. The production and transport of the remaining material will lead to a total increase in the yearly national CO₂ emissions of 0.04 %.

During the daily operation activities on the new port areas will not lead to any significant increase in CO₂ emissions. However, it is expected that there will be a yearly increase in both ship and land traffic to the new port areas of roughly 360 ship calls and 270 land vehicles, of which 120 will be trucks. This will to a lesser extent affect the Danish obligation to reduce CO₂ emissions. However the collective contribution is negligible compared to the national CO₂ emissions for these areas.

The Danish Coastal Authority has calculated that the risk of flooding due to storm surge water levels in the Wadden Sea is set to increase in the future. As a result the dimensions of the quay will be adapted during the construction so the it and the areas behind it can be elevated by roughly 1 meter (to +6.0 m DVR90, DK standard 0), if deemed necessary due to climate change. This is in agreement with the Municipality of Esbjerg and is included in the project description and plans for the new port expansion.

In conclusion the impact on the climate is assessed as minor.

1.4.19 Landscape and cultural environment

The landscape around the Port of Esbjerg primarily consists of three different landscape types that could be disturbed by the port expansion. These three types are described as salt marsh and geest landscape along the coast of Jutland south of Esbjerg, and on the eastern coast of Fanø, the dune landscape of the northeastern parts of Fanø, and finally the coastal parts of the city landscape of Esbjerg. These three landscape types are shown in Figure 1.29.

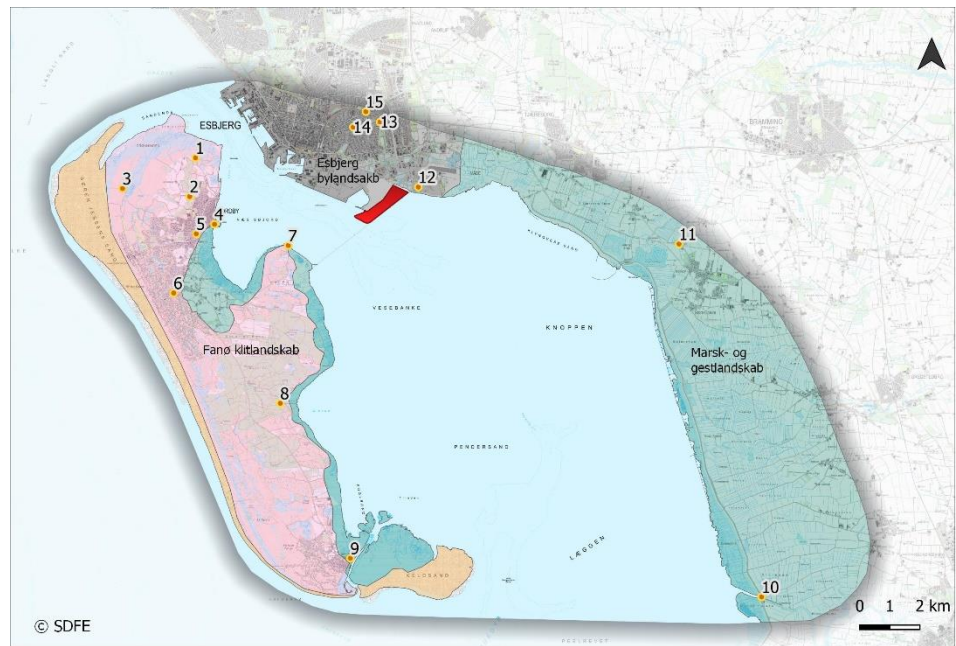


Figure 1.29: An overview of the three overall landscape types surrounding the Port of Esbjerg. The map depicts the salt marsh and geest landscape (blue), framing the Wadden Sea as well as the large dune landscapes on Fanø (pink). The map also shows the points from which the following visualizations have been done (also see appendix 6). Grey indicates urban areas and red shows the project area.

Due to the short distance between Fanø and Jutland, the coastal landscapes surrounding the Wadden Sea make up a continuous landscape of high conservation value. Today the landscape is dominated by the existing port, which takes up a large part of the coastal landscape and is very visible from the northeastern part of Fanø as well as the coastal landscape south of Esbjerg.

The proposed port expansion does not interfere with areas appointed by the Municipal plan as areas of significant cultural value and areas of cultural heritage. As such there will be no physical disturbance of such areas. The cultural value of these areas is largely tied to physical elements and structures, however, the visibility of the port expansion could lower the 'experience' value of the sites. There will be no disturbance to any of the landscape surrounding the churches that are of significance in the area.

The EIA report assesses the visual impact of the port expansion and whether it will change the visual character of the landscape around it.

During the construction phase, the construction work itself is not estimated to have a significant visual impact on the landscape as a whole. The additional work will not stand out compared to the existing port activities. During some periods the impact might be greater, however, the visual impact on the coastal landscape is still very limited, and there is no significant impact on the surrounding cultural landscapes.

The impact, visual or otherwise, on the landscape during the day-to-day operation of the port expansion is assessed using the nature of the existing landscape. To support the assessment of the visual impact a series of visualizations have been prepared based on views from the locations marked in Figure 1.29. Furthermore,

nighttime visualizations have been made from locations 4 and 15 to illustrate the changed light conditions that the construction of the Stage 5 expansion could bring. As it is unknown where lights will be present on the port expansion, the visualizations are meant illustrate the overall nighttime light conditions with light conditions on the port expansion similar to the conditions on the existing port. The visualizations are shown in appendix 6 and should be viewed in full page format to give a proper representation of the visual impact of the port expansion. This assessment is shown in Table 1.2 and further explained in the following sections. Some visualizations are included in the remainder of this section to support the descriptions given.

Table 1.2: Overview of the total assessed impact on the environment and landscape within the area of interest shown on Figure 1.29.

Area	Value of landscape	Visual or character-wise disturbance	Magnitude of impact
<i>Impact on the character of the landscape within the project area</i>			
Most of the area	Medium	Small	Minor
Outer parts	Medium	Medium	Moderate
<i>The salt marsh and geest landscape south of Esbjerg and on Fanø</i>			
South of Esbjerg	High	Small	Minor
On Fanø south of Halen	High	Small	Minor
On Fanø at and north of Halen	High	Small	Minor
<i>The urban landscape in the southern part of Esbjerg</i>			
City just northeast of the port	Low	Small	Minor
Area southeast of the port	Medium	Small	Minor
Remainder of Esbjerg (Generally)	Low	Negligible or small	Negligible or minor
Remainder of Esbjerg (Viewpoints)	Medium	Medium	Minor
<i>The dune landscape on Fanø</i>			
Northern part at Kiggebjerg	High	Medium	Moderate
At Halen and at the northern tip (Grønningen)	High	Small	Minor
The central and southern parts of Fanø	High	Negligible, locally minor	Negligible, locally minor

1.4.19.1 Impact to the character of the landscape within the project area

The port expansion changes the landscape within the project area from tidal flats into a port environment. This represents a change in a coastal landscape that as a whole is distinctive and valued highly. It is seen that the landscape is already heavily influenced by the existing Port of Esbjerg, which already reduces the overall value of the landscape. Because of this, the change to the landscape caused by the port expansion does not represent a novel influence but rather amplify the impact of the existing Port of Esbjerg to some degree.

The proposed Stage 5 is to be constructed as an extension to the Port of Esbjerg developing along the coast and the majority of the expansion does not protrude further into the Wadden Sea than the existing port. However, the outer part of Stage 5 (near the Aquarius Dock) does protrude further out into the Wadden Sea, thus having a greater visual impact than the rest of Stage 5.

As the port expansion is constructed as an extension of the existing port without impacting any particular features or changing the character of the landscape, the impact of the Stage 5 expansion on the project area is assessed as minor. The impact is not assessed as negligible due to the landscape being of particular conservation interest.

The impact of the outer part of Stage 5 on the landscape around the Wadden Sea is greater and is assessed as moderate.

1.4.19.2 Impact on salt marsh and geest landscape

The entire salt marsh and geest landscape is of high conservation value and the area is vulnerable to visual disturbances that could lower the aesthetic value of the area or change its character.

The visibility of the port expansion from the salt marsh and geest landscape south-east of Esbjerg will not have a big influence on the visual nature of the area, and thus, the impact here is assessed as minor.



Figure 1.30 (Point 10, Kammerslusen, before): Currently the Port of Esbjerg is visible in the landscape due to the tall bulky buildings and the chimney at the Esbjerg Power Plant.



Figure 1.31 (Point 10, Kammerslusen, after): The visual impact of the Port of Esbjerg on the environment after the completion of the Stage 5 expansion will not be significantly different from the existing impact. (Note that the visualization should be viewed in full page format in the appendix for a more accurate picture.)

From Fanø, the visual impact from the salt marsh landscape is greatest near Næs Søjord, which overlooks the Wadden Sea to the south. The visual impact here is largely dependent on the amount of stored project goods on the outer part of Stage 5. When seen from Næs Søjord the outer section protrudes into the Wadden Sea and to some extent blocks the view of the horizon. Near the coast close to Nordby, the visual impact is smaller as the view from here is dominated by ports on both sides of the Wadden Sea. In this location the impact is assessed as minor.

From Halen, the port expansion is seen as more of an extension to the existing industrial landscape, which is heavily influenced by the existing port area as well as the area around Måde. Even though the port expansion will be a relatively large increase in area when compared to the existing port, the impact when viewed from the marsh landscape on Halen is assessed as minor.



Figure 1.32 (Point 7, Halen, Before): Currently the view from Halen is dominated by the Port of Esbjerg and the chimney at the Esbjerg Power Plant. Thus, the coastline is dominated by an industrial landscape.



Figure 1.33 (Point 7, Halen, after): Stage 5 is a significant southeastwards expansion of the port area and will block the view to Måde south of Esbjerg. The view of the Wadden Sea to the south will not be blocked but to some degree influenced. (Note that the visualization should be viewed in full page format in the appendix for a more accurate picture.)

When viewed from Ringbysletten and the salt marsh south of Halen, the visibility of the port expansion will only affect the quality of the view minimally due to the low visibility and large distance. From this location the impact is assessed as minor.

1.4.19.3 Impact on the urban landscape of Esbjerg

When viewed from the areas northeast of the existing port, the urban landscape is dominated by the existing port environment and the landscape is not of any notable value. From here the port expansion will be highly visible but the magnitude of impact on the urban landscape is relatively small, and thus, the impact on the local urban landscape is assessed as minor.

When viewed from Måde, close to the city of Esbjerg, and southeast of the port, the proposed port expansion will be highly visible. However, this landscape is already dominated by the port environment, the Måde landfill and wind turbines that all lessen the experience value of the landscape. As a result of this, the landscape is only considered to be of moderate value. The port expansion will thus have a small to medium impact on the character of the landscape as it is already dominated by the view of the existing port. Thus, the impact on the areas close to the city of Esbjerg is assessed as minor.



Figure 1.34 (Point 12, Måde, before): From the coastal landscape just south of the existing port, the current view encompasses the Wadden Sea to the west and northwest and Fanø and Skallingen in the background.



Figure 1.35 (Point 12, Måde, after): From the coastal landscape near the city of Esbjerg, the view after the completion of the port expansion will be impacted by the tall buildings that can be seen here. This visualization represents a scenario in which the maximum amount of buildings allowed on the expansion by the Local Plan has been built.

The port expansion will generally not be visible from Esbjerg. Yet the places where visibility will be most affected are generally low quality landscapes, and therefore the impact is assessed as negligible or minor.

The port expansion will be highly visible from a few locations in the city, where roads form viewpoints. For example the view from Storegade improves the landscape quality of the city to medium. From here the visibility of the port expansion will have some influence on the quality of the view. The impact on the quality of the urban landscape is however still assessed as minor.



Figure 1.36 (Point 15, Storegade, before): Because of the sloping terrain, the view westwards from Storegade encompasses large parts of the city all the way to the existing port. The port is iconic and cements the city's identity as a port town. Fanø is visible on the horizon.



Figure 1.37 (Point 15, Storegade, after): Buildings and storage on Stage 5 will be very visible on the horizon, and as a result will limit the view to the coast and Fanø. (Note that the visualization should be viewed in full page format in the appendix for a more accurate picture.)

1.4.19.4 Impact on the dune landscape

The dune landscape on Fanø is of high value and is vulnerable to visual interference, lowering the quality of the landscape's character and visual experience.

When viewed from the northern part of Fanø the port expansion only represents a minor increase in the extent of the port, and is assessed to have little impact on the overall visual character of the landscape. The increased protrusion into the Wadden Sea, and the fact that the outer part of Stage 5 is used for storing tall goods, will however have an impact on the visual experience of the landscape and the visual association between the dunes to the Wadden Sea. The impact is assessed as being most severe for the area at Kiggebjerg, where it is assessed as moderate. Here the higher altitude allows for better views, and thus, the port expansion will be more visible. The impact when viewed from the dune landscape on the northern tip near Grønningen is assessed as minor.



Figure 1.38 (Point 2, Kiggebjerg, before): Currently the Port of Esbjerg is very visible from Kiggebjerg. It should be noted that the views to the south and southeast are much less disrupted by the port.



Figure 1.39 (Point 2, Kiggebjerg, after): After the completion of the port expansion the Port of Esbjerg will be more visible in the southeastern view, as Stage 5 protrudes further into the Wadden Sea. From Kiggebjerg, the expanded port extends further across the horizon. (Note that the visualization should be viewed in full page format in the appendix for a more accurate picture.)

When viewed from the dune landscape on Halen, the port expansion will be well incorporated into the existing industrial character of the view to the north, and the high voltage power line crossing the Wadden Sea to the south. In addition, Stage 5 does not protrude significantly deeper into the Wadden Sea when viewed from this area, and so the outline of the port remains similar to the current one following the completion of the port expansion. The impact is therefore assessed as minor. An important reason for this assessment is that the current coastal landscape behind the proposed Stage 5 expansion is already of an industrial character. In addition the views towards the Wadden Sea and the coastal landscape south of Esbjerg are not disturbed.

Looking from the remainder of the dune landscape the port expansion will be entirely or almost entirely hidden from view. As a result the impact on the visual character of the landscape is assessed as negligible and in some places minor.



Figure 1.40 (Point 8, Annedals Bjerg, before): The view is dominated by the Fanø dune plantation. In the background the tallest elements of the existing port are visible, but do not affect the view significantly.



Figure 1.41 (Point 8, Annedals Bjerg, after): The tallest elements on the port expansion will be visible from here, but due to the great distance they do not affect the view significantly. (Note that the visualization should be viewed in full page format in the appendix for a more accurate picture.)

1.4.19.5 Impact from lighting

The future light conditions on the Stage 5 expansion are unknown and thus the assessment of the impacts thereof is based on the light conditions on the existing port. The changes are assessed to have little impact on the general nighttime view of the port as it is seen today from Fanø and from Esbjerg.

When viewed from Nordby it is assessed that the impact of the changed light conditions caused by the Stage 5 expansion will be minor in places where there would normally be a view of the Wadden Sea with Esbjerg in the background and where the Stage 5 expansion is visible. The impact is assessed as negligible in places where the Stage 5 expansion is not or only slightly visible.



Figure 1.42 Nighttime view (Point 4, Nordby Marina): Visualization showing the existing light conditions from the port of Esbjerg and the city behind it.



Figure 1.43 Nighttime view (Point 4, Nordby Marina): The nighttime view of the port showing the Stage 5 port expansion with similar light conditions as on the existing port.

The light from the Stage 5 expansion is not assessed to significantly change the extent or the character of the light conditions of the existing port area and the surrounding city when viewed from Esbjerg. Thus it is assessed that the impact thereof is negligible.



Figure 1.44 Nighttime view (Point 15, Storegade): This photo shows the existing light conditions of the city with the existing port in the background.



Figure 1.45 Nighttime view (Point 15, Storegade): This visualization depicts the light conditions when viewed from the city of Esbjerg. The light conditions on the port expansion are similar to the conditions on the existing port.

Appendix 4



United Nations
Educational, Scientific and
Cultural Organization

Organisation
des Nations Unies
pour l'éducation,
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Organización
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Permanent Delegation of the
Kingdom of Denmark to UNESCO
UNESCO House

Ref.: CLT/WHC/EUR/20/12866

8 October 2020

**Subject: State of conservation of the transboundary World Heritage
property 'Wadden Sea'**

Dear Ms Lehn Petersen,

The World Heritage Centre is pleased to provide you with comments by IUCN regarding the Environmental Impact Assessments (EIAs) concerning the potential extension of the harbour of Esbjerg as well as on the new pier in the port of Romo within the boundaries of the transboundary World Heritage property 'Wadden Sea'.

Please find in the Annex, the comments transmitted by IUCN to the World Heritage Centre on the documents provided. The World Heritage Centre would like to express its thanks to the Danish authorities for consulting the World Heritage Centre and IUCN regarding the two projects in line with Paragraph 172 of the *Operational Guidelines for the Implementation of the World Heritage Convention*.

Thanking you for your continuous collaboration and support in the implementation of the *World Heritage Convention*, I remain,

Yours sincerely,

Isabelle Anatole-Gabriel
Chief of the Europe and North
America Unit

Enc.

cc. Permanent Delegation of Germany to UNESCO
Permanent Delegation of the Kingdom of the Netherlands to UNESCO
Danish National Commission for UNESCO
German Commission for UNESCO
Netherlands National Commission for UNESCO
National Focal Point for World Heritage
IUCN

Annex

IUCN comments on the Environmental Impact Assessments (EIAs) on the planned extension of the harbour in Esbjerg and the new pier in the port of Romo

1. Wadden Sea - Environmental Impact Assessment for a planned extension of the harbour in Esbjerg, Denmark

IUCN expresses its appreciation to the State Party for having submitted the EIA for the Esbjerg harbour extension project, in line with paragraph 172 of the *Operational Guidelines*, as previously announced. IUCN welcomes that the State Party has fully taken into account the IUCN World Heritage Advice Note on Environmental Assessment, including providing a separate chapter on World Heritage, and that it has examined in detail the impacts the harbour extension project may have on the Outstanding Universal Value (OUV) of the World Heritage property "Wadden Sea".

IUCN notes the EIA's conclusion stating that the expansion of "*Esbjerg harbour (stage 5) is considered to not cause any significant impact [on] the Wadden Sea World Heritage Site, or on the surrounding landscape and adjacent wider ecosystem*", which is a statement that appears to be underpinned by rigorous scientific data and analysis.

On the basis of the information provided in the EIA, IUCN does not raise concerns about impacts on OUV of the stage 5 expansion of the harbour. IUCN nonetheless recommends that the State Party prepare an Environmental Management Plan and carefully monitor any impacts during construction and operation of the new harbour facility. This is particularly important as stage 5 would extend Esbjerg harbour as far as to the boundaries of the property. Careful monitoring and adaptive management is considered to be crucial, in order to ensure that impacts will remain negligible, and to enable immediate management interventions in case of any potential impact.

Following completion of the project, IUCN recommends for the State Party to undertake a brief comparison between baseline data generated for this EIA, and new monitoring data obtained during and after completion of the harbour extension, so as to assess whether impacts have remained negligible as forecasted by the EIA, and whether any mitigation measures need to be taken after completion.

In addition to the assessment of the stage 5 expansion, IUCN notes that a stage 6 expansion may still be considered in future. Unlike stage 5, stage 6 would result in the creation of an artificial island and place docks and boulders into the near-shore waters bordering the property, which may have very different implications in terms of impacts on the OUV of the property, and which would need to be appropriately assessed. IUCN further notes forecasts in the EIA suggesting an increase of turnover of tonnage in Esbjerg harbour by approximately 20% from 2016 until 2030 and an increase of ship calls by approximately 15% from 2018 to 2026. IUCN underscores that Esbjerg harbour and its shipping lane are surrounded by the property which protects a highly dynamic, yet very sensitive ecosystem that may be impacted by any long-term increase in marine traffic and related facilities creating potential for higher incident risks. While impacts of the relatively small stage 5 expansion may remain limited, IUCN is concerned that the potential long-term development path of Esbjerg harbour may result in negative cumulative impacts on the World Heritage property. Therefore, if further infrastructure projects will be considered in addition to the stage 5 expansion of Esbjerg harbour, IUCN recommends that the State Party conducts, if not already done so, a Strategic Environmental Assessment, in line with the IUCN World Heritage Advice Note on Environmental Assessment.

2. Wadden Sea – Port of Romo: New pier assessment in relation to the Habitats Directive and the Wadden Sea as Natural World Heritage site

IUCN expresses its appreciation for the State Party's continued commitment to consult on projects that may affect the Outstanding Universal Value (OUV) of the transboundary World Heritage property "Wadden Sea" with the World Heritage Centre and IUCN, in line with paragraph 172 of the *Operational Guidelines*.

Regarding the proposed 40m pier extension in the Port of Romo harbour directly adjacent to the property, IUCN acknowledges the submission of a 7-page summary of assessments carried out in relation to 1) the EU Habitats Directive and 2) the Wadden Sea as a World Heritage site. The project is designed as a 1m x 40m extension to an existing pier with a planned construction period of 4 months, with the purpose "*to break the cross flow at the port inlet and thus ease the sailing conditions and increase the safety of entering and departing the Port of Romo*".

It is noted that in relation to the Habitats Directive, the assessment concludes that the project will have no significant impact on the environment, and that any temporary environmental disturbances associated with construction (including noise, vibration from sheet piling and sediment loading) are considered in relation to the species listed in Annex IV of the Habitats Directive. Measures taken to address temporary disturbance include timing the construction outside of breeding and molting periods of seals and breeding period of birds. The assessment considers the cumulative impacts of this and other planned or existing projects, such as the proposed development at Esbjerg harbour and offshore wind facilities (submitted separately to the World Heritage Centre for review by IUCN), to be insignificant.

Specifically regarding the consideration of World Heritage values, IUCN notes the State Party's report that a supplementary assessment was undertaken to ensure the Outstanding Universal Value (OUV) in accordance with the IUCN World Heritage Advice Note on Environmental Assessment. Specifically, the Natura 2000 assessment conclusion is referred to, i.e. "*that there will be no adverse impacts on natural habitats by means of sedimentation dynamics or land take and the timing of construction work will avert any potential adverse effect on marine mammals*". IUCN notes specifically the confirmation that the project will not impair, damage or affect the aesthetic values, the natural dynamics and the occurring biological processes of the property.

IUCN therefore recommends the State Party ensure that any identified temporary impacts, including noise and sediment loading, are minimised to the utmost extent during the construction phase and to ensure that such sediment loading does not negatively impact the important dynamic processes of the wider World Heritage property. It is positive that broader cumulative impacts are considered and, given that various other projects within or in close proximity of the property are currently under consideration (such as the Esbjerg harbour, offshore wind facilities and deepening of the Elbe channel), it is important that the broader indirect and cumulative impacts of all developments associated with the property are carefully considered going forward. IUCN underscores that the harbour is surrounded by the property which protects a highly dynamic, yet very sensitive ecosystem that may be impacted by a progressive increase in marine traffic and related facilities.