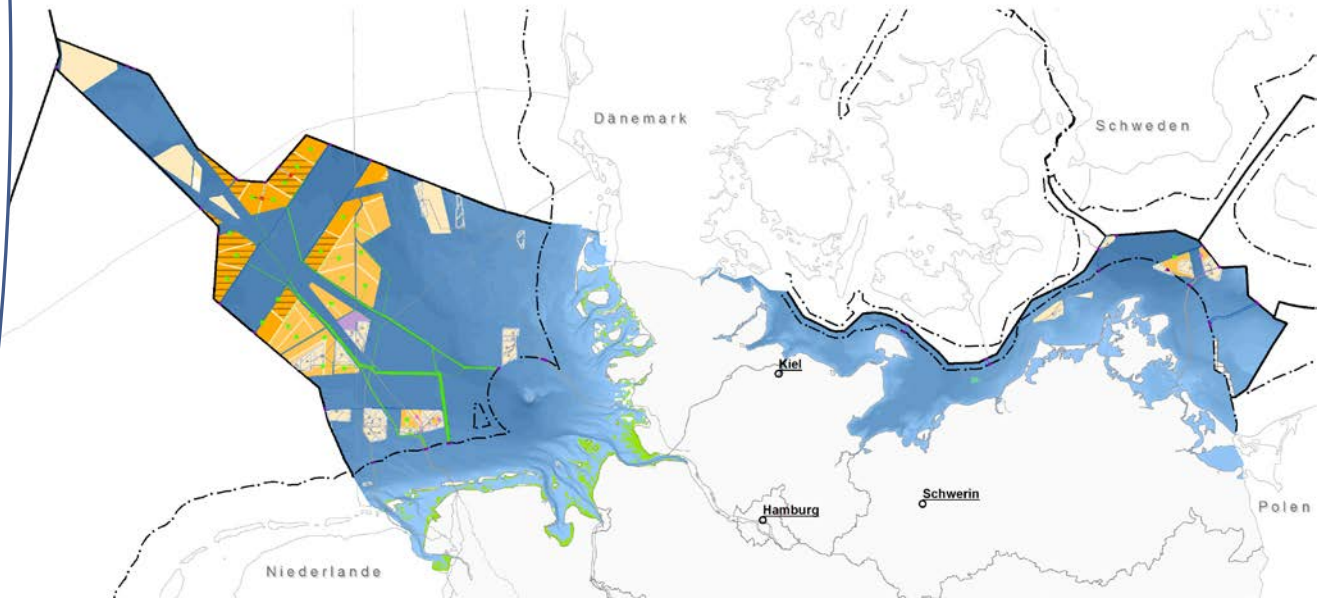
BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

Draft
Site Development Plan



Hamburg, 7th June 2024

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AIS	Automatic Identification System
EEZ	Exclusive economic zone
BfN	Federal Agency for Nature Conservation (Bundesamt für Naturschutz)
BGBl	Federal Law Gazette (Bundesgesetzblatt)
BMDV	Federal Ministry of Transport and Digital Infrastructure (Bundesministerium für Digitales und Verkehr)
BMU	Federal Ministry for Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit)
FNA	Federal Network Agency
BSH	Federal Maritime and Hydrographic Agency (Bundesamt für Seeschifffahrt und Hydrographie)
BT-Drs.	Parliamentary publication (Bundestags-Drucksache)
cm	Centimetre(s)
DC	Direct current
DIN	German Institute for Standardisation (Deutsches Institut für Normung)
DIN EN	German Institute for Standardisation, European Standard (Deutsches Institut für Normung, Europäische Norm)
DSC	Digital selective calling
ESCA	European Subsea Cables Association
EnWG	Energy Industry Act
EU	European Union
GDWS	Directorate-General for Waterways and Shipping
GIS	Gas insulated switchgear
GW	Gigawatt(s)
HVDC	High-voltage direct current
K	Kelvin
km	Kilometre(s)
km²	Square kilometre(s)
kV	Kilovolt(s)
LEP M-V	Regional Spatial Development Programme for Mecklenburg-Western Pomerania (Landesraumentwicklungsprogramm Mecklenburg-Vorpommern)
m	Metre(s)
MARNET	Marine Environmental Monitoring Network in the North Sea and Baltic Sea
MARPOL	International Convention for the Prevention of Marine Pollution from Ships
MHz	Megahertz
MW	Megawatt(s)
OGCS	Offshore grid connection systems
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
OWF	Offshore wind farm
OWT	Offshore wind turbine
PFAS	Per- and polyfluoroalkyl substances
QI, QII, QIII, QIV	Quarters of a calendar year
ROP	Maritime spatial plan (Raumordnungsplan)
SF6	Sulphur hexafluoride
sm	Sea mile(s)

SMV	Maritime Traffic Technology (System Maritime Verkehrstechnik)
SOLF	Standard Offshore Aviation for the German Exclusive Economic Zone
UNCLOS	United Nations Convention on the Law of the Sea
StUK	Standard “Investigation of impacts of offshore wind turbines” (Standard “Untersuchung von Auswirkungen von Offshore-Windenergieanlagen”)
SEA	Strategic environmental assessment
t	Tonne(s)
TBT	Tributyl tin
TCM	Transmission capacity management
TSO	Transmission system operator
VSC	Voltage sourced converter
WT	Wind turbine
WindSeeG	Offshore Wind Energy Act
WindSeeV	Ordinance on the Implementation of the Offshore Wind Energy Act (Verordnung zur Durchführung des Windenergie-auf-See-Gesetzes)

Preliminary Remark: *This draft of the Site Development Plan is based on the Federal Government's bill for an "Act to implement the EU Renewable Energy Directive in the field of Offshore wind energy and grids for changing the Offshore Wind Energy Act (WindSeeG) and other regulations" (BT Drs. 20/11226 dated 29.04.2024), hereinafter referred to as: Draft Offshore Wind Energy Act, for the regulations of Energy Industry Act (EnWG) changed with the aforementioned bill: Draft Energy Industry Act. With the amending law, updates in the Offshore Wind Energy Act, in particular, should be included, which are provided in the Renewable Energy Directive (EU) 2018/2001 in its current version, which has last been changed by the Directive (EU) 2023/2413[1] (hereinafter referred to as: Directive (EU) 2018/2001). The aforementioned statutory updates are especially relevant for the designations in Site Development Plan and assessments and evaluations as a part of the environmental reports because now the so-called acceleration sites should be defined. The procedure for designation of acceleration sites can be found in Section 2. Furthermore, the amendment entails that the Federal Maritime and Hydrographic Agency should now designate infrastructure areas for the implementation of network projects in line with Article 15e Directive (EU) 2018/2001 in a plan (infrastructure area plan) for certain routes and route corridors as well as converter sites for offshore grid connection cables in the EEZ, see Section 12j Draft Energy Industry Act. These network projects in line with Article 15e Directive (EU) 2018/2001 are areas for network and storage infrastructure, which are required for the integration of renewable energy in the power system. The infrastructure area plan is based on available data for large-scale space and environmental situation (Section 12j, para. 1, sentence 1, 12j, para. 4 of the Draft Energy Industry Act) and (as provided in Section 12j, para. 6, sentence 2 Draft Energy Industry Act) on the strategic environmental assessment, which has been conducted for the present draft of the Site Development Plan. The Federal Maritime and Hydrographic Agency designates preventive and mitigation measures in view of the respective potential impacts on the environment assessed for the acceleration site as well as the infrastructure areas. The public participation in this infrastructure area plan for the EEZ is in accordance with Section 12j, para. 8, sentence 7 Draft Energy Industry Act in the context of public participation in the present draft of the Site Development Plan.*

The entry into force of the new Offshore Wind Energy Act is to be awaited for the period of completion of the Site Development Plan (3rd and 4th quarter 2024). Therefore, the Site Development Plan will also be able to consider all the statutory changes in the Offshore Wind Energy Act presumably up to its announcement.

I. Objective

The Offshore Wind Energy Act[2] provides that a total of at least 70 GW installed capacity from offshore wind turbines should be achieved in the EEZ of the Federal Republic of Germany until 2045. In order to reach this overall goal, the Site Development Plan must be revised. The goal of this revision includes designating areas and sites in the shipping route SN10 designated in ROP 2021 and to the west of it and to identify

[1] Available at: https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:02018L2001-20231120

[2] Offshore Wind Energy Act dated 13 October 2016 (Federal Law Gazette I Pg. 2258, 2310), last amended by Article 10 of the Act on changing the EEG and other regulations under the energy law dated 8.5.2024 (Federal Law Gazette 2024 I no. 151).

and secure sufficient sites for an installed capacity of at least 70 GW until 2045. 50 GW should already be installed in 2035. This Site Development Plan further makes designations of time for commissioning of sites and offshore grid connection systems (OGCS) until 2037 in parallel to the planning horizon of the Network Development Plan (NDP) 2037/2045 (2023).

For achieving and permanent fulfilment of the long-term expansion target, it is to be taken into consideration that a grid feed will not be possible at times due to the demolition and rebuilding of grid connection systems and wind farms in the course of subsequent use of sites and route corridors in parts of the wind energy sites. The overall sites, route corridors and gates to the territorial sea to be provided for wind energy usage must therefore be sufficient for the permanent operation of an installed capacity of at least 70 GW plus further sites, route corridors and gates through which there is occasionally no feed due to deconstruction or rebuilding activities. The average proportion of sites or route corridors and gates through which there can be no feed depends on different factors and can presently not yet be reliably determined. The operating hours of OWF and OGCS as well as the period between end of operation of an old OWF and the commissioning of a new OWF. Currently, the Federal Maritime and Hydrographic Agency estimates an average non-availability of around 10 per cent of the sites so that in total, sites, route corridors and gates with a potential of around 78 GW will be required for safeguarding the expansion target of at least 70 GW in the long-term.

The designations of the Site Development Plan, as an instrument of Federal sectoral planning, form the basis for the preliminary investigation of sites according to Sections 9 et seq of the Offshore Wind Energy Act as well as the planning approval procedure and planning permission according to Sections 66 et seq of the Offshore Wind Energy Act and are thus required for the proper planning and construction of offshore wind turbines (WT) and offshore grid connection cables.

The construction of wind turbines and offshore grid connection cables is of overriding public interest and serves the public security and health according to Section 1, para. 3 of the Offshore Wind Energy Act.

II. Designations

Section 5, para. 1, sentence 1 of the Offshore Wind Energy Act governs that the Site Development Plan for the period from 2026 makes designations for the EEZ and territorial sea. Here, the Site Development Plan contains the designations listed under numbers 1 to 11 in accordance with Section 5, para. 1 of the Offshore Wind Energy Act.

1 Areas and sites

The Site Development Plan defines the areas and spaces shown in Table 1. Table 1 further has the designations of the expected capacity to be installed on the sites. A cartographic illustration can be found in Figure 2.

The new designations in this Site Development Plan are limited to the North Sea and include among other things expansions of Areas N-6, N-9, N-12, and N-13 as well as the inclusion of the Areas N-14, N-16, N-17, N-19 and the area in general operating plan N-20. The areas N-4 and N-5, which already fully or partly overlap with the existing WT are designated in a partly changed layout for a subsequent use in future.

The spatial expansions of Areas N-9, N-12, N-13, N-14, N-16 and N-17 constitute the preliminary state of the joint investigation with the relevant authorities of the Netherlands and Denmark for identification of sites for wind energy in the area of shipping route SN10 and other shipping routes. A final decision on these sites is still pending; the variant preferred from the planning

perspective forms the basis for the Site Development Plan draft. Compared to the status of ROP 2021 here there is a significant expansion of the areas for the Offshore wind energy with simultaneous safeguarding of the concerns of maritime, especially the safety and efficiency of traffic. With the sites in Areas N-9, N-12, N-13, N-14 and N-16 redefined in this Site Development Plan, an additional expansion with an expected capacity to be installed of 28 GW can be achieved. Commissioning of the majority of wind farms on these sites with an expected capacity to be installed of 24 GW is envisaged for the period until the end of the year 2037. Thus, together with the already approved or under construction OWFs as well as the sites already designated in the Site Development Plan 2023 for commissioning until the year 2032, there arises an expected total capacity of approx. 60 GW for the year 2037. An expansion status of approx. 50 GW is expected for the year 2035.

Areas N-17, N-19 and the area under review N-20 together with the Sites N-13.3, N-13.4, and N-16.6, not ranked temporarily until now for tender, yield an additional maximum expected expansion potential of a total of 14 to 17 GW. Thus, under full use of all the areas named, the expansion target of an installed capacity of at least 70 GW could presumably be achieved until 2045. As shown above, there arises the need for designation of sites with a total expected potential of 78 GW for the long-term safeguarding of an installed capacity of at least 70 GW. To do this, the designation of other sites in the context of another revision procedure of the Site Development Plan is likely to be necessary.

North Sea

Area N-6 is expanded by Site N-6.8 already designated in Site Development Plan 2023 (referred to as N-21.1 in Site Development Plan 2023). Areas N-9, N-12, and N-13 are expanded by Sites N-9.4, N-9.5, N-12.4, N-12.5, and N-13.4. Areas N-14 with three sites and N-16 with six sites as well as Areas N-17 and N-19 are first designated to the west of the shipping route SN10. In addition, an area under review is designated with N-20[3]. A relatively small-scale inconsistency in the planning of Site Development Plan 2023 is corrected for Area N-13 as well as Site N-13.1.

There arise deviations from the priority and reservation areas of Offshore wind energy designated in ROP 2021 in case of spatial expansions of Areas N-5, N-9, N-12, N-13, N-14, N-16 and N-17 of the Draft Development Plan. In this respect, a procedure to deviate from objectives of ROP 2021 is carried out in the course of the current revision procedure of the Site Development Plan, which is explained in detail in section IV.6.

To some extent, there is an overlap with the reservation area of ROP 2021 for fishery of Norway lobster in Sites N-12.4, N-13.4 and N-16.1. In the reservation area for Norway lobster, fishery of Norway lobster is thus to be attributed a special emphasis. A preliminary rough research has revealed that a multiple use within the overlap areas of the uses can be possible. In order to be able to take further information in the consideration, the consultation matters F1 to F3 were included at the end of the section.

Site N-13.4 has a partial overlap with the seasonally limited reservation area for harbour porpoises designated in ROP 2021. Furthermore, a part of area N-13.4 in ROP 2021 is designated as conditional priority area wind energy EN13-

[3] The associated Area EN20 is designated in ROP 2021 as reservation area of Offshore wind energy from 01.01.2027, unless the Federal Ministry responsible for fishery research proves to the Federal Ministry responsible for maritime spatial planning by 31.12.2026 that keeping the area free of development by wind turbine system is indispensable for fishery research.

North[4] and a temporary reservation area shipping SN19[5]. The area of Site N-13.4, which overlaps with Area EN13-North, is designated as the site under review.

Area N-14 has a partial overlap with the reservation area hydrocarbon extraction KWN2 designated in ROP 2021.

Area under review N-20 spatially corresponds to the conditional reservation area EN20 of ROP 2021.

Areas N-4 and N-5 are within the main distribution area of harbour porpoises, N-5 is completely within the main concentration area harbour (MCA) of divers and overlaps with the priority area shipping route SN8. Area N-4 is largely in the MCA of divers.

[4] Area EN13-North is designated in ROP 2021 as priority area Offshore wind energy from 01.01.2030, unless the Federal Ministry responsible for shipping proves by 31.12.2025 that this area will be needed for shipping for urgent reasons of safety and efficiency of shipping (see 2.2.2. para. 1 and sub-para.2 of ROP 2021).

[5] Area SN19 is designated as reservation area shipping temporarily until 31.12.2030. The limitation lapses when the Federal Ministry responsible for shipping proves to the Federal Ministry responsible for maritime spatial planning by 31.12.2025 that this area will be needed for shipping for urgent reasons of safety and efficiency of shipping (see 2.2.2. para. 1 and sub-para.3 of ROP 2021).

Questions for consultation

Overlapping of sites with the reservation area for fishery Norway lobster FiN1

The reservation area fishery Norway lobster FiN1 of ROP 2021 was designated by ROP 2021 in the area of southern mudflat as reservation area for fishery of Norway lobster. According to the current planning status of the Site Development Plan, the reservation area fishery Norway lobster FiN1 overlaps with parts of Site Development Plan Sites N-12.5, N-13.4 and N-16.1 (see Figure 1). In order to consult whether a multiple use in the overlapping areas of FiN1 with the sites of wind energy can be facilitated, we ask for your kind participation.

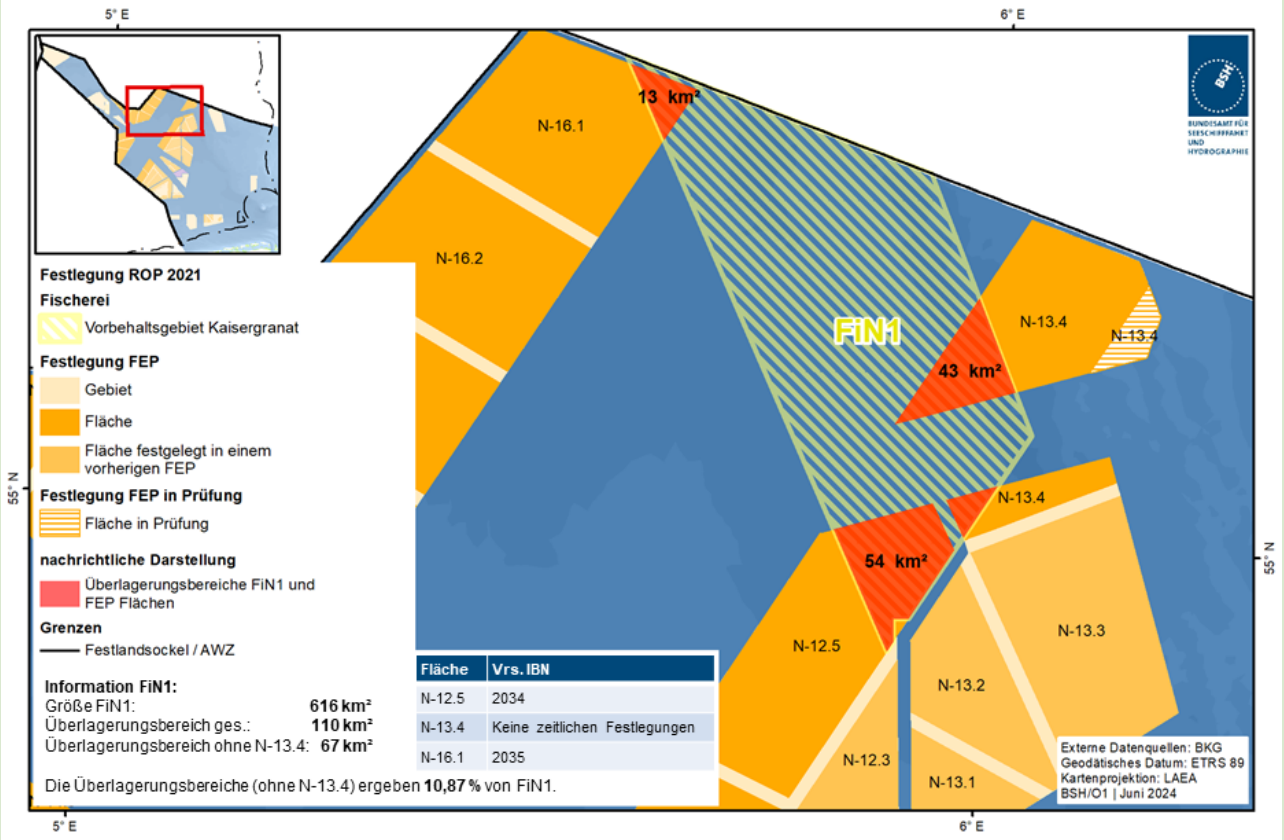

Figure 1: Presentation of overlap areas of the reservation areas FiN1 for fishery of Norway lobster with the designations of sites for wind energy from the Site Development Plan.

F1. Going by the current knowledge of to what extent can fishery of Norway lobster *Nephrops norvegicus* with passive fishing gears be implemented within the overlapping area? While answering the question, please also take into consideration the passive fishing gears for Norway lobster under development or trial (for example, cages or fish traps).

F2. What are the requirements to be fulfilled by a wind farm so that passive fishery of Norway lobster could be implemented in the overlapping area?

F3. Primary research results from other marine areas indicate that passive fishing gears can possibly increase the economy of fishery of Norway lobster (siehe etwa Leocádio, Whitmarsh, & Castro, 2012). Do you think there are insights on this in the area of North Sea?

Baltic Sea

Presently, no new area and site designations are envisaged in the Baltic Sea.

Table 1: Designations on areas and sites

Designation Area	Base Area [km²]	Designation Site	Base Site [km²]	expected installed capacity [MW]
N-1	79			
N-2	223			
N-3	308	N-3.5	29	420
		N-3.6	33	480
		N-3.7	17	225
		N-3.8	23	433
N-4[a)]	148			
N-5[a)]	396			
N-6	~~249~~ 543	N-6.6	44	630
		N-6.7	16	270
		~~N-21.1~~ N-6.8	~~242~~ 246	2000
N-7	163	N-7.2	58	980
N-8	124			
N-9	~~453~~ 782	N-9.1	158	2000
		N-9.2	157	2000
		N-9.3	106	1500
		N-9.4	141	2000
		N-9.5	146	2000
N-10	195	N-10.1	151	2000
		N-10.2	31	500
N-11	378	N-11.1	205	2000
		N-11.2	156	1500
N-12	~~494~~ 964	N-12.1	193	2000
		N-12.2	187	2000
		N-12.3	80	1000
		N-12.4	209	2000
		N-12.5	213	2000
N-13	~~367~~ 573	N-13.1	~~50~~ 49	500
		N-13.2	91	1000
		N-13.3	195	2000
		N-13.4[b)]	194	2000
N-14	577	N-14.1	191	2000
		N-14.2	193	2000
		N-14.3	157	2000
N-16	1095	N-16.1	172	2000
		N-16.2	174	2000
		N-16.3	172	2000
		N-16.4	173	2000
		N-16.5	177	2000
		N-16.6	149	2000
N-17	396			

Designation Area	Base Area [km²]	Designation Site	Base Site [km²]	expected installed capacity [MW]
N-19	560			
N-20[c)]	68			
O-1	129	O-1.3	25	300
O-2	177	O-2.2	102	1000
O-3	28			

Colour coding:
Designations in a previous Site Development Plan | Designations in a previous Site Development Plan with changes | New designation

[a)] Area for subsequent use
[b)] A part of Site N-13.4 with a size of approx. 15 km² is designated as a site under review.
[c)] Area under review

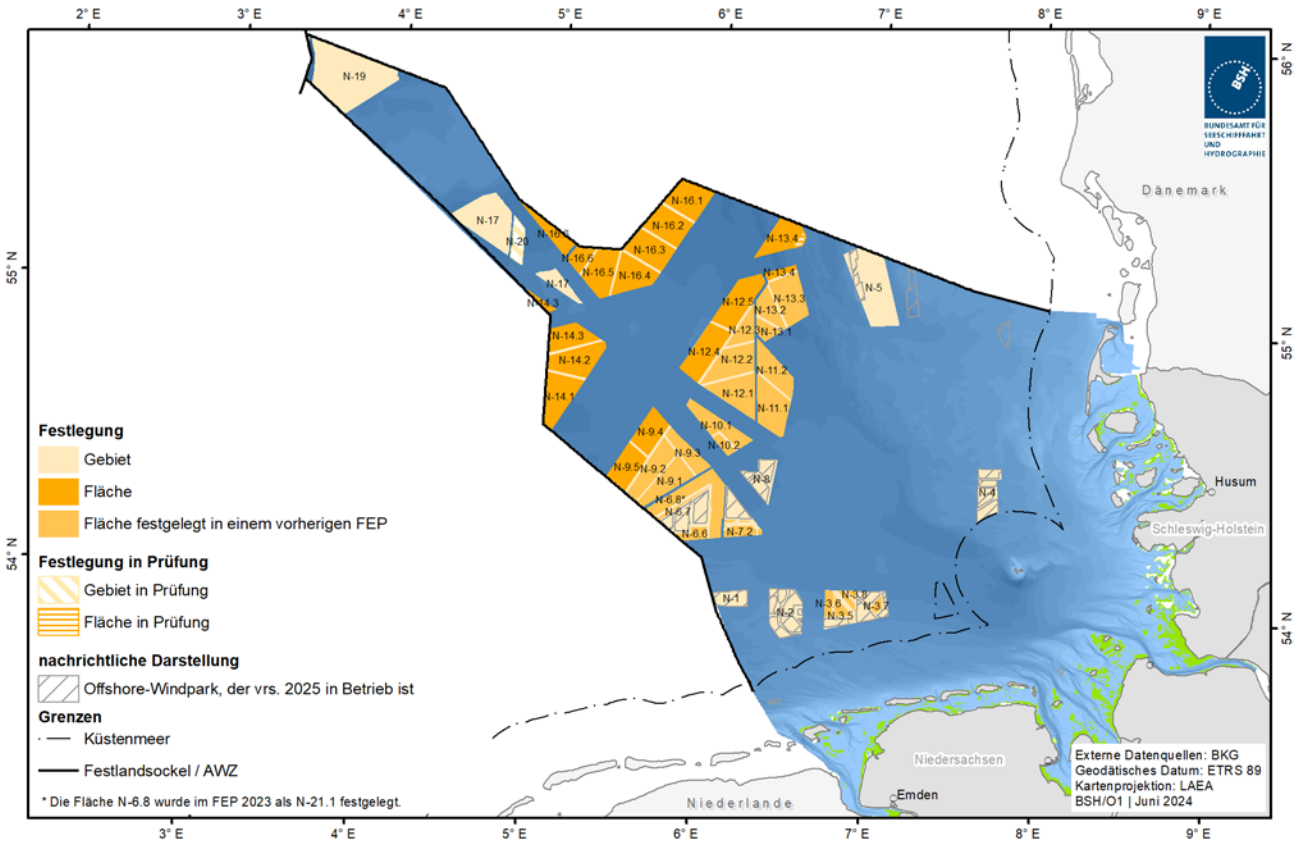

Figure 2: Designations on areas and sites in the EEZ of North Sea

2 Acceleration sites

2.1 Designation of acceleration sites by the Site Development Plan

In accordance with Section 5, para. 2b of the Draft Offshore Wind Energy Act, the Site Development Plan designates the acceleration sites shown in Figure 3.

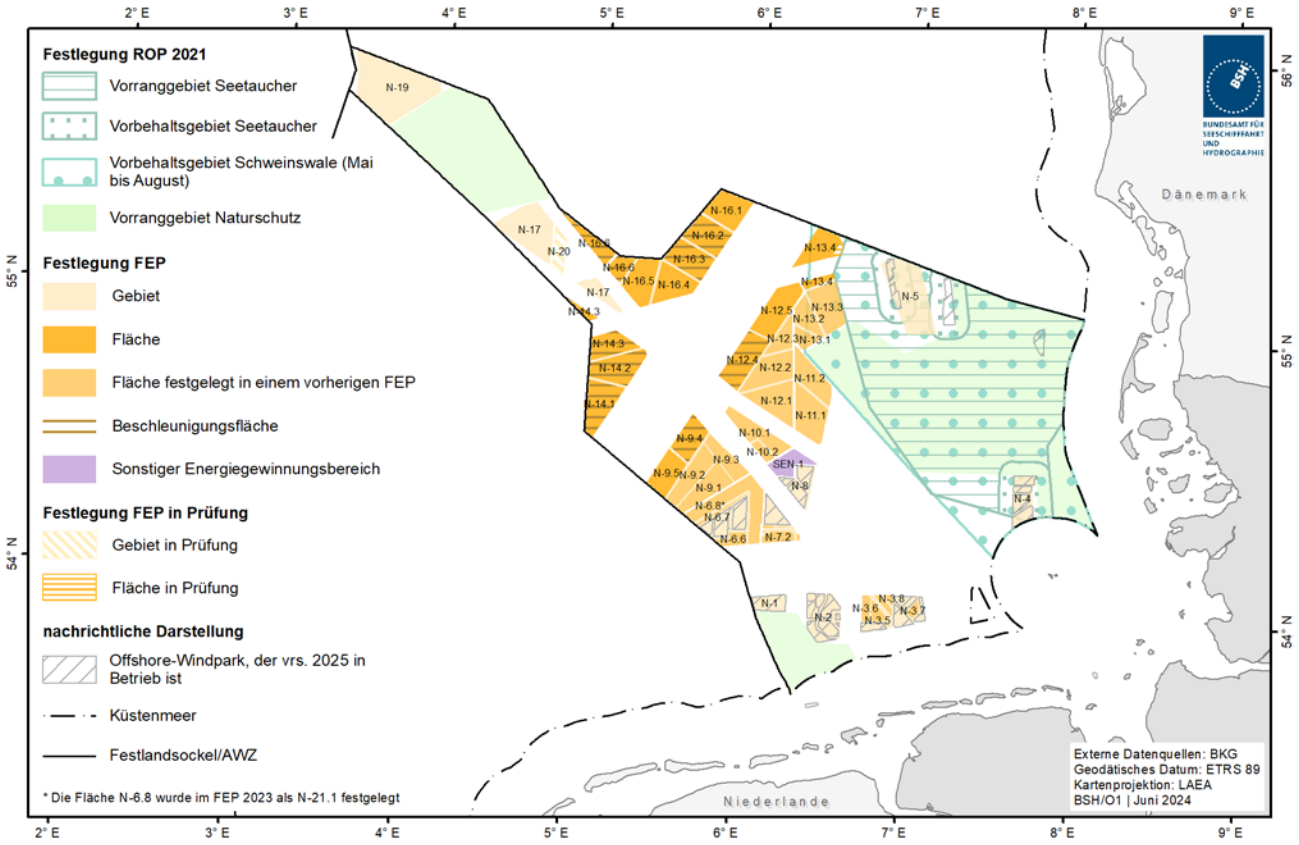

Figure 3: Designation of acceleration site in the North Sea

According to Section 5, para. 2c of the Draft-Offshore Wind Energy Act, the Site Development Plan designates effective and proportional mitigation measures or rules for mitigation measures for all acceleration sites to avoid possible negative impacts on the environment or, if this is not possible, to considerably reduce them where applicable. Specifically, the mitigation measures as well as rules for mitigation measures listed in

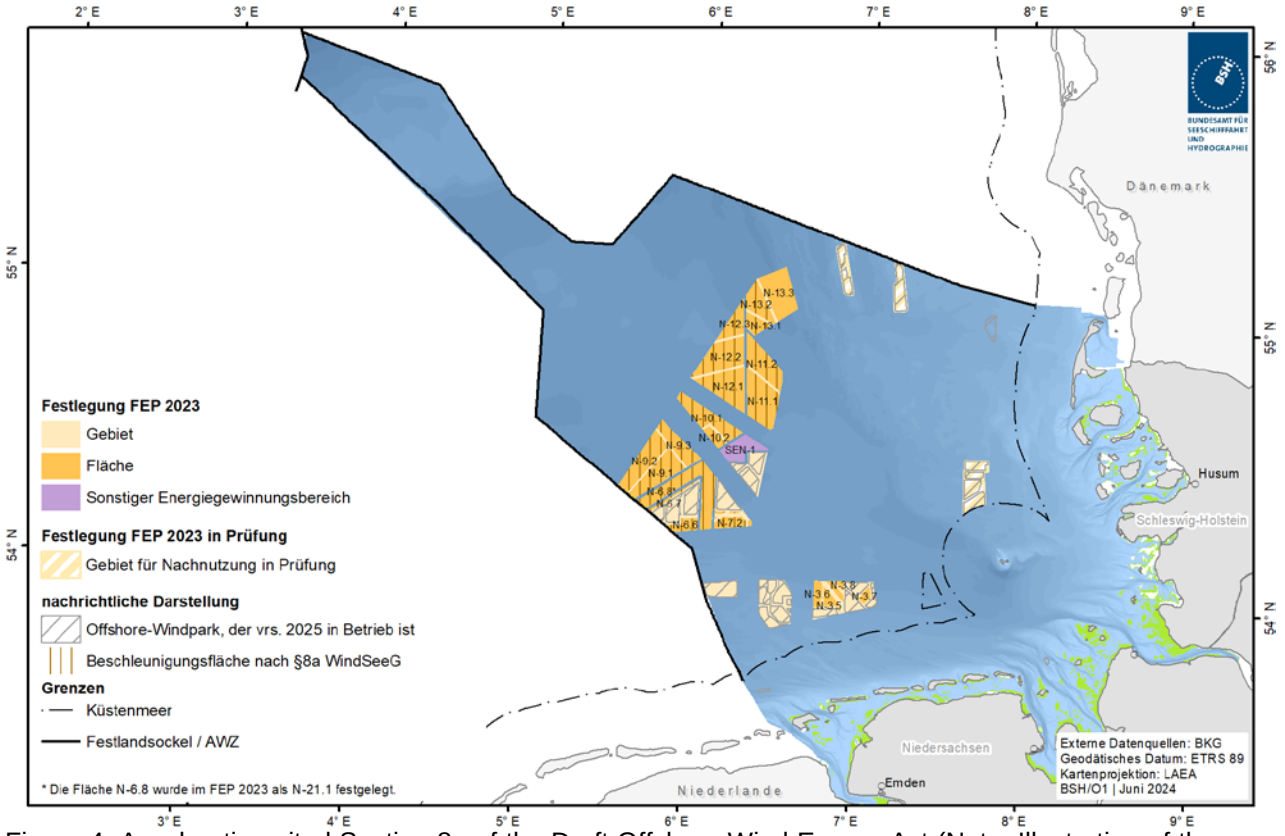

Figure 4: Acceleration sited Section 8a of the Draft Offshore Wind Energy Act (Note: Illustration of the areas and sites of Site Development Plan 2023)

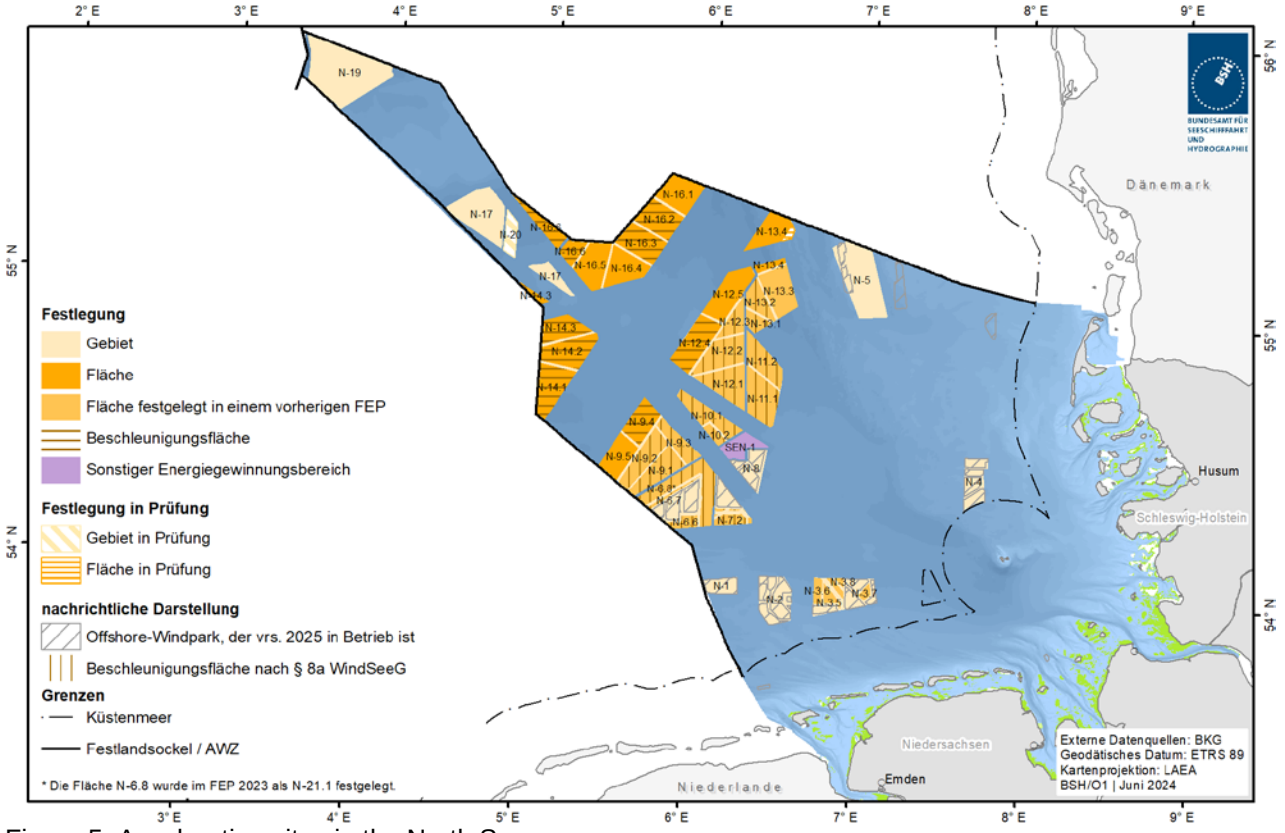

Figure 5: Acceleration sites in the North Sea

for the respective acceleration sites are designated. Details of mitigation measures can be found from the sources in the Planning principles, the environmental report as well as the catalogue in Section 5.2 in the Appendix.

Compliance with the statutory provisions of Offshore Wind Energy Act and the Draft Offshore Wind Energy Act and the other special laws and the designations according to Section 5, para. 1 of the Offshore Wind Energy Act such as even the planning principles of Site Development Plan remains unaffected by this.

Table 2: Acceleration sites and associated mitigation measures

Designation of site	Base Site [km²]	expected installed capacity [MW]	Designated mitigation measures from Section 5.2 in Appendix
N-9.4	141	2000	A to S
N-12.4	209	2000	A to S
N-14.1	191	2000	A to S
N-14.2	193	2000	A to S
N-14.3	157	2000	A to S
N-16.2	174	2000	A to S
N-16.3	172	2000	A to S
N-16.6	149	2000	A to S

2.2 Acceleration sites according to Section 8a of the Offshore Wind Energy Act shown for information

The legislature has made use of the facility from Article 15c of Directive (EU) 2018/2001, last amended by the Directive (EU) 2023/2413, to declare already identified sites for wind energy as acceleration sites. In accordance with Section 8a Draft Offshore Wind Energy Act, areas and sites in the North Sea designated in the Site Development Plan 2023, for which, the year of tender is already designated, with the exception of the Area N-3, are acceleration sites. According to this, the following sites are acceleration sites: N-6.6, N-6.7, N-7.2, N-9.1, N-9.2, N-9.3, N-10.1, N-10.2, N-11.1, N-11.2, N-12.1, N-12.2, N-12.3, N-13.1, N-13.2, N-21.1 (now N-6.8). These sites are shown for information in Figure 4. Figure 5 is the overall setting of the acceleration sites, which to be taken under consideration of the sites designated in this Site Development Plan under Section 2.1.

Mitigation measures A-S are designated for these acceleration sites. The measures can be found in Section 5.2 of the Appendix.

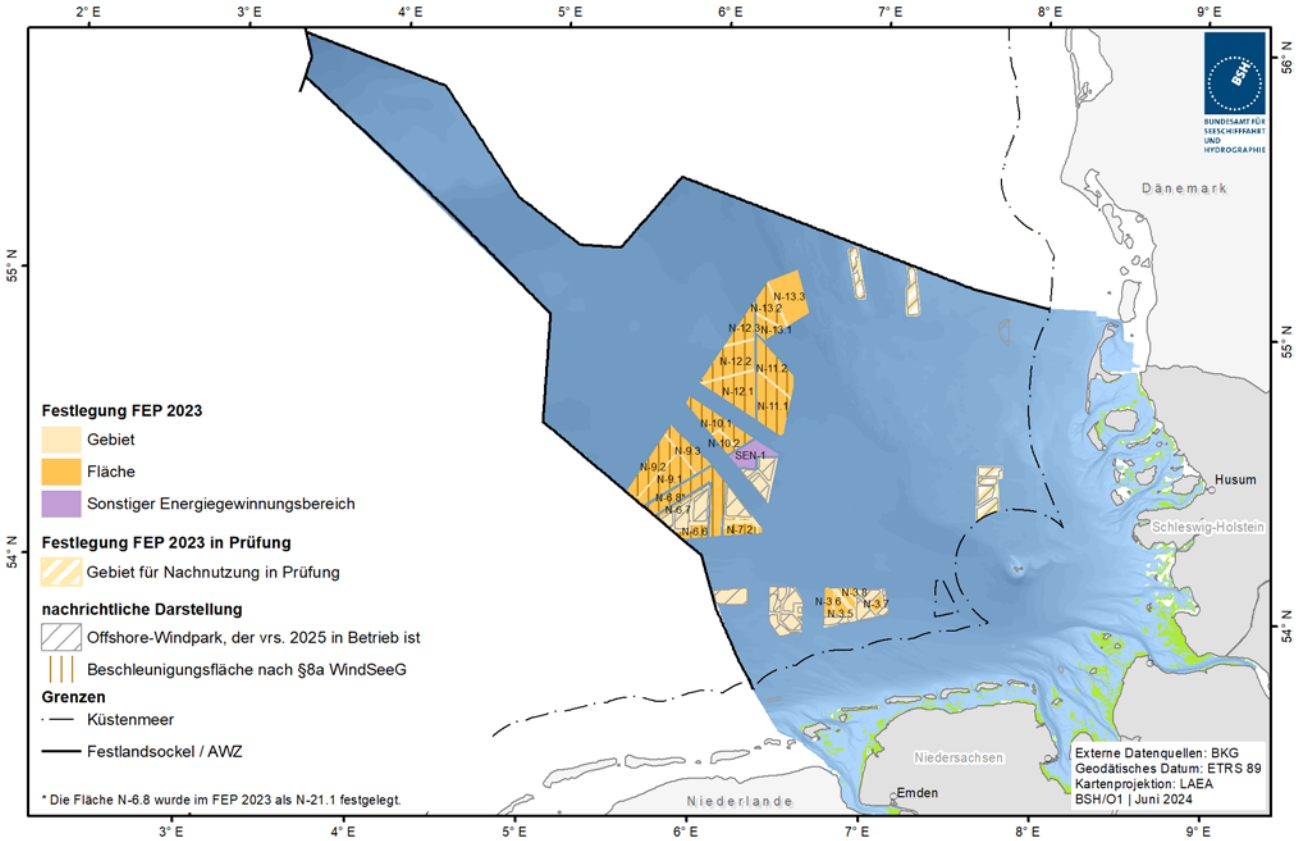

Figure 4: Acceleration sited Section 8a Draft Offshore Wind Energy Act (Note: Illustration of the areas and sites of Site Development Plan 2023)

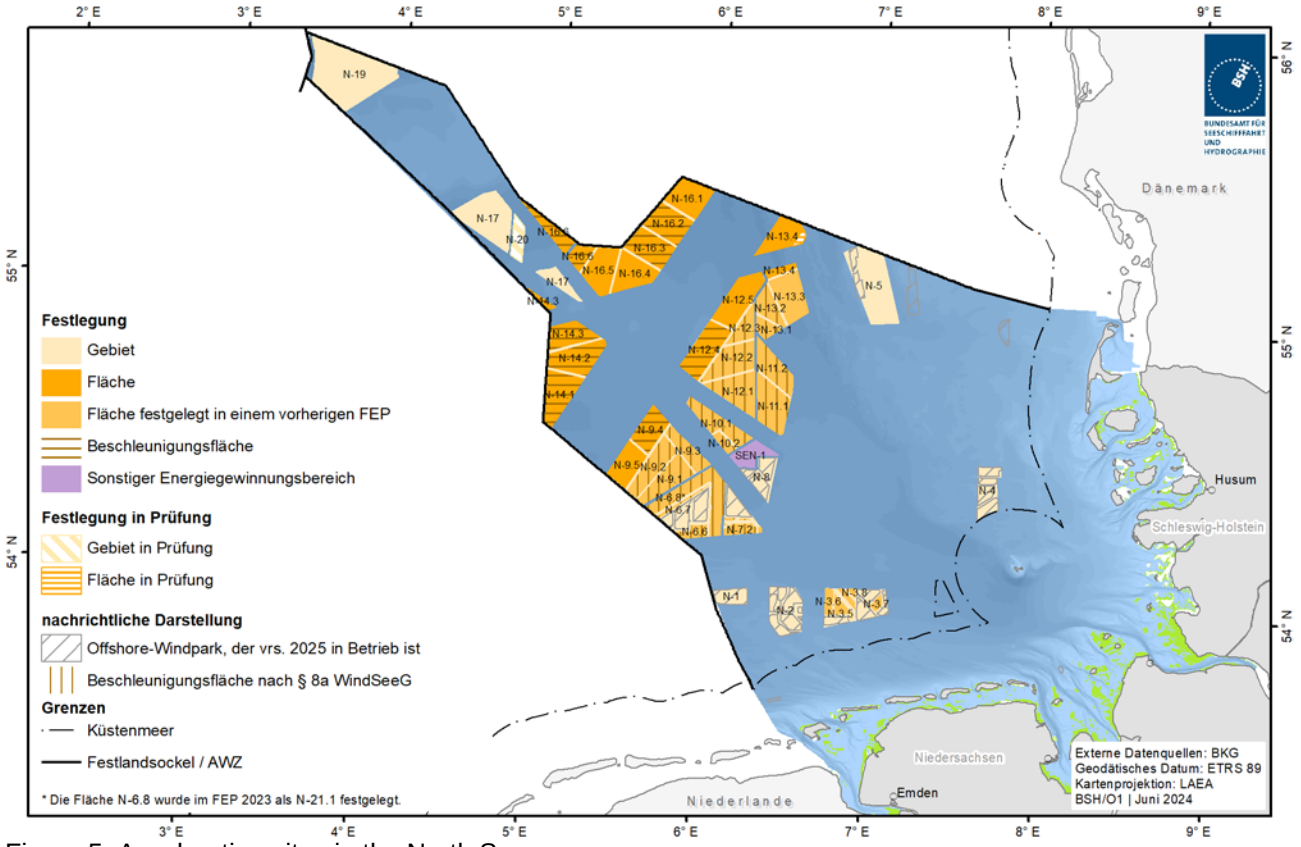

Figure 5: Acceleration sites in the North Sea

3 Subsea cables

3.1 Gates to the territorial sea

According to Section 5, para. 1, No. 8 of the Offshore Wind Energy Act, the Site Development Plan shall designate locations, where the offshore grid connection cables cross the boundaries between the EEZ and the territorial sea (so-called gates).

In table 3, the gates from the EEZ to the territorial sea for the North Sea and Baltic Sea are listed. Every gate is additionally assigned existing subsea cables and subsea cables envisaged or designated in the Site Development Plan; this includes OGCS and interconnectors.

The currently known gates to the territorial sea and their respective expected capacities are probably adequate to lead the OGCS designated in this revision on land to the corresponding grid connection point. In contrast, sufficient gate capacities are not yet identified for the OGCS beyond this to achieve the expansion target of at least 70 GW until 2045 and other offshore capacities as a part of cooperation projects with neighbouring coastal states of the North Sea and Baltic Sea based on the targets of the Offshore Network Development Plans. To this end, the Federal Maritime and Hydrographic Agency has initiated a cooperation process with the responsible states of Lower Saxony and Schleswig-Holstein and with the Federal Network Agency and the TSO.

Table 3: Allocation of subsea cables to the gates to the territorial sea

Gate _	Subsea cables
N-I	(1) NOR-1-1 (2) NOR-8-1 (3) NOR-2-3 (4) COBRAcable
N-II	(1) NOR-7-1 (2) NOR-3-1 (3) NOR-2-2 (4) NOR-2-1 (5) NOR-6-1 (6) NOR-6-2 (7) NOR-3-3 (8) NOR-3-2 (9) NOR-6-3 (10) NOR-9-1 (11) NOR-10-1 (12) NOR-6-4
N-III	(1) NOR-9-3 (2) NOR-9-2 (3) NOR-12-1 (4) NOR-11-2 (5) NOR-13-1 (6) NOR-9-4 (7) NOR-9-5 (8) NOR-14-1 (9) NOR-14-2 (10) NOR-16-3 (11) NOR-16-4 (12) NOR-16-5 (13) NOR-14-3 (-) NeuConnect
N-V	(1) NOR-7-2 (2) NOR-11-1 (3) NOR-12-2 (4) NOR-12-3 (5) NOR-12-4 (6) NOR-16-1 (7) NOR-16-2 (8) --
N-IV	(1) NOR-4-2 (2) NOR-4-1 (3) NOR-5-1 (4) NordLink
O-I	(1) OST-1-1 (2) OST-1-2 (3) OST-1-3 (4) OST-2-1 (5) OST-2-2 (6) OST-2-3 (7) OST-1-4 (8) OST-2-4 (9) Subsea cables for Bornholm Energy Island (10) Subsea cables to Denmark
O-II	(1) OST-2-1
O-III	(1) OST-3-1 (2) OST-3-2 (3) Subsea cables to Sweden (4) Subsea cables to Sweden
O-IV	(1) Kontek (2) Subsea cables to Denmark
O-V	(1) Subsea cables to Denmark
O-XIII	(1) Subsea cables to Denmark (2) Subsea cables to Denmark

3.2 Offshore grid connection systems

The OGCS shown in Table 4 are designated and serve as grid connection of the sites designated in Section 1.

With the OGCS designated in Table 4, the sites designated in this draft can be connected with commissioning up to and including 2037.

Table 4: Designations for OGCS

OGCS (Sequence analogous to overview table)	designa-tion NDP, as appli-cable	Transmission capacity [MW]	Gate	Grid connection point (for information on the basis of NDP 2037/2045)
OST-1-4		300	O-I	Lubmin
NOR-7-2		980	N-V	Büttel
NOR-3-2		900	N-II	Hanekenfähr
NOR-6-3		900	N-II	Hanekenfähr
NOR-9-1		2000	N-II	Wehrendorf
NOR-9-2		2000	N-III	Wilhelmshaven 2
NOR-9-3		2000	N-III	Unterweser
OST-2-4[a)]		2000	O-I	Brünzow/Kemnitz
NOR-10-1[a)]		2000	N-II	Westerkappeln
NOR-11-1		2000	N-V	Heide/West
NOR-12-1		2000	N-III	Unterweser
NOR-12-2		2000	N-V	Heide/West
NOR-11-2		2000	N-III	Wilhelmshaven 2
NOR-13-1		2000	N-III	Rastede
~~NOR-21-1~~ NOR-6-4		2000	N-II	Lower Rhine
NOR-9-4		2000	N-III	Blockland/new
NOR-9-5		2000	N-III	Kusenhorst
NOR-12-3		2000	N-V	Search space of municipalities Pöschendorf
NOR-14-1	NOR-x-1	2000	N-III	Rommerskirchen
NOR-12-4		2000	N-V	Search space of municipalities Pöschendorf
NOR-14-2	NOR-x-2	2000	N-III	Kusenhorst
NOR-16-1	NOR-x-3	2000	N-V	Sahms/North
NOR-16-3	NOR-x-4	2000	N-III	Kriftel
NOR-16-2	NOR-x-6	2000	N-V	Hardebek
NOR-16-4	NOR-x-5	2000	N-III	Oberzier
NOR-14-3	NOR-x-7	2000	N-III	Search area Nüttermoor
NOR-16-5	NOR-x-8	2000	N-III	Search area Ried

Colour coding:
Designations in a previous Site Development Plan | Designations in a previous Site Development Plan with changes | New designation

[a)] spatial change

The standard concept based on direct current technology with a transmission capacity of 2,000 MW is designated for all the newly designated OGCS in Table 4.

For the grid connection concepts of the OGCS going into operation up to including 2031, see designations of Site Development Plan 2023, Section 2.2.

According to Section 5, para. 1, no. 6 of the Offshore Wind Energy Act, the Site Development Plan shall designate locations of converter platforms, collector platforms and, if required, transformer stations. According to Section 5, para. 1, no. 7 of the Offshore Wind Energy Act, the Site Development Plan shall designate routes or route corridors for offshore grid connection cables.

Converter platforms as well as cable routes are designated only for grid connection to the sites, for which even a quarter of the commissioning is designated. A designation of transformer platforms is not needed due to direct grid connection concept.

The converter locations should strictly be placed within the sites to be connected. In variation from this, a converter location each at the edge of the site to be connected is designated for the converter locations NOR-9-4, NOR-9-5, and NOR-14-3. Figure 6 shows the spatial designations.

The converter location OST-2-4 as well as an alternative location were designated in the course of Site Development Plan 2023. The competent TSO has declared the designated location OST-2-4. There is a free connection capacity of 1,000 MW at the OGCS OST-2-4. There is the option of grid connection of an OWF from an adjacent EEZ in order to use this capacity. Therefore, a corresponding route corridor to a gate in the Danish EEZ is designated under Section 3.3. Figure 7 shows the spatial designations.

Questions for consultation

Location of converter platforms in sites

F4. The converter platforms NOR-9-4, NOR-9-5, and NOR-14-3 designated on the border of the sites were shifted starting from the border of site by approx. 500 m into the site. The basis of this designation is a corresponding suggestion of TSO in its comment on the preliminary draft, according to which, a corresponding shift would facilitate the introduction of interarray subsea cables for converter platform due to the larger sites available. Do you think the shift of the converter platforms makes sense in the scope shown?

3.3 Interconnectors

Interconnectors within the meaning of this plan should be understood as subsea cables, which run through the territory or the EEZ of at least on other neighbouring coastal states of North Sea or Baltic Sea.

Multiple interconnectors run through the German EEZ of the North Sea. For one thing, there is the interconnector called “NorNed” in operation, which connects the countries of Norway and Netherlands with each other. Furthermore, the ‘COBRAcable’ project for connection between the Netherlands and Denmark is in operation. In addition, the NordLink project, a link between Norway and Germany, is in operation in the German EEZ. The “Viking Link” project to connect Denmark with Great Britain is in operation since the end of 2023. Another interconnector is scheduled parallel to the “Viking Link”. The “NeuConnect” project between Germany and Great

Britain from gate N-III to gate N-XVII was approved. Another interconnector is reserved for a connection of Denmark via gate N-VI to Germany and ends at a bundling point to the west of “Europipe 2”.

Two route corridors for two interconnectors to the north and one route corridor for an interconnector to the south along shipping route SN10 are designated. The spatially designated routes of the interconnectors are not to be evaluated as conclusive under the current site setting.

Other interconnectors to the neighbouring countries of Netherlands and Denmark are designated: One connection goes from platform NOR-16-5 to the newly designated gate N-VIIIb to Denmark. In addition, a route for connection between NOR-16-3 with Denmark is designated via gate N-VIIIa. The other connection goes from platform NOR-14-3 in the westward direction via the newly designated gate N-XIV in Netherlands.

Interconnectors in operation also run in the German EEZ of the Baltic Sea: “Kontek” (connecting Denmark and Germany) and “Baltic Cable” (between Sweden and Germany). Furthermore, the “Kriegers Flak Combined Grid Solution” interconnector is in operation. This project links Denmark and Germany by connecting a Danish OWF project to a German OWF project. The interconnector is intended for grid connection of “Bornholm Energy Island” for the route from gate O-XI to gate O-I.

Three interconnectors to gate O-X are designated from the converter platform OST-2-4 in site O-2.2 to facilitate a grid connection from sites in the Danish EEZ for use of free grid connection capacity on OST-2-4.

In addition to the routes designated in Site Development Plan 2023 for an interconnector, which runs between “NordStream 1” and “NordStream 2” from gate O-XII to gate O-XIII, two routes are designated in parallel position to the north of “NordStream 2”. However, military concerns must still be comprehensively scrutinised regarding the route taken to the north of “NordStream 2”.

Table 5 constitutes the gates and routes for interconnectors designated in the Site Development Plan. Implementation of the European and respective national expansion targets necessitating more interconnectors is to be anticipated. The designation of more interconnectors will probably me done in the further revisions of the Site Development Plan.

Table 5: Gates and routes for interconnectors

Subsea cables[a)]	Point A	Point B	Country A	Country B	Name (if known)
North Sea					
I-NOR-11	N-IX	N-XIII	Denmark	UK	
I-NOR-5	N-III	N-XVII	Germany	UK	"NeuConnect"
I-NOR-6[b)]	Bundling point	N-VI	Germany	Denmark/Norway	
I-NOR-7[b)]	N-VI	N-XVI	Denmark/Norway	Netherlands	
I-NOR-8[b)]	N-VII	N-XV	Denmark/Norway	Netherlands	
I-NOR-9[b)]	N-VII	N-XV	Denmark	Netherlands	
I-NOR-10a	N-VIIIa	NOR-16-3	Denmark	Germany	
I-NOR-10b	N-VIIIb	NOR-16-5	Denmark	Germany	
I-NOR-12	NOR-14-3	N-XIV	Germany	Netherlands	
Baltic Sea					
I-OST-9	O-V	O-VI	Germany	Denmark	
I-OST-8	O-IV	O-VII	Germany	Denmark	
I-OST-4	O-III	O-IX	Germany	Sweden	
I-OST-5	O-III	O-IX	Germany	Sweden	
I-OST-7[b)]	O-I	O-X	Germany	Denmark	
I-OST-6[b)]	O-I	O-XI	Germany	Denmark	"Bornholm Energy Island"
I-OST-10 to -12	OST-2-4[c)]	O-X	Germany	Denmark	
I-OST-13	O-XIII	O-XII	Germany	n.n.	
I-OST-14	O-XIII	O-XII	Germany	n.n.	
I-OST-15	O-XIII	O-XII	Germany	n.n.	

Colour coding:
Designations in a previous Site Development Plan | Designations in a previous Site Development Plan with changes | New designation

[a)] new: Clear naming (I-NOR-X or I-OST-X)

[b)] spatial change

[c)] The connection of OST-2-4 to gate O-X consists of three subsea cables with a voltage level of 220 kV.

3.4 Cross connections between installations

According to Section 5, para. 1, no. 10 of the Offshore Wind Energy Act, the Site Development Plan has designations for routes or route corridors for potential cross connections of offshore installations, grid connection cables, and interconnectors as well as locations of converter platforms with each other. The so-called cross connections are subsea cables, which can connect the individual grid connection systems (by direct current (DC) or alternating current (AC) grid connection concept) and thus the OWF with each other. They thus contribute to ensuring system security and increase feed-in security through (partial) redundancy, thereby reducing outage damage. In addition, the offshore interconnection generally enables a grid serving distribution of the offshore feed at the on the land-based grid connection points. The Site Development Plan secures the spatial prerequisites for any cross connections between installations. The decision on whether and when a cross connection between installations within the German EEZ is implemented is made by Federal Network Agency on a case-by-case basis. Two cross connections between platforms are designated in NDP

2037/2045: The M273_neu measure should connect the OGCS NOR-9-4 and NOR-9-5. The M272_neu measure was confirmed under the reserve that the Site Development Plan designate the necessary cross connection between the sites. Therefore, the OGCS NOR-16-2 and NOR-16-3 are designated in this plan for cross connection with each other for the M272_neu measure. In addition, a route for a potential cross connection between NOR-16-4 and NOR-16-5 is secured. This is an alternative option to M272_neu. Table 6 constitutes the routes designated in the Site Development Plan for cross connections between installations within the German EEZ. The cross connections designated earlier in the Site Development Plan 2023 are replaced by these cross connections. The Site Development Plan thus creates the conditions for a meshing.

In order to implement the shortest possible route for the cross connections of converter platforms, direct cross connections to the platforms are designated; see planning principle (b).

Additional transfer areas at the site boundaries are designated for these cross connections. The allocated bidder of a site is granted flexibility in the planning of the wind turbine system layout as long as firstly, leading a route through the designated transfer area on the site boundaries is enabled. Secondly, the possible route for a cross connection after the wind turbine system layout planning may be longer than the direct route from the converter platform up to the transfer area at the site boundaries by 20 per cent at the most. Crossings between multiple interconnecting lines as well as between connecting cable and interarray cabling should be avoided wherever possible. See Figure 11 here.

Table 6: Routes for cross connections between installations

Designation of NDP	Platform A	Platform B
North Sea		
M273_neu	NOR-9-4	NOR-9-5
M272_neu	NOR-16-2	NOR-16-3
–	NOR-16-4	NOR-16-5
Baltic Sea		
–	–	–

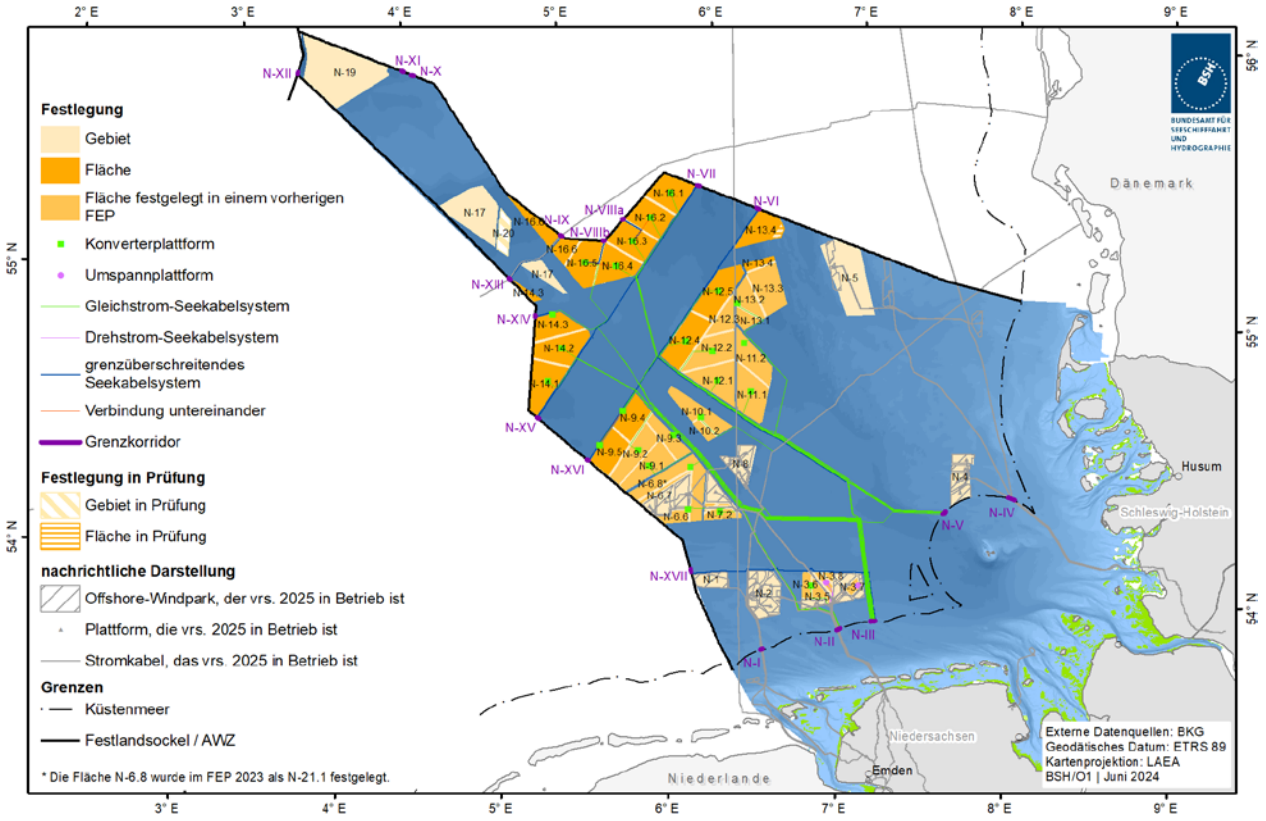

Figure 6: Designations on cables in the EEZ of North Sea

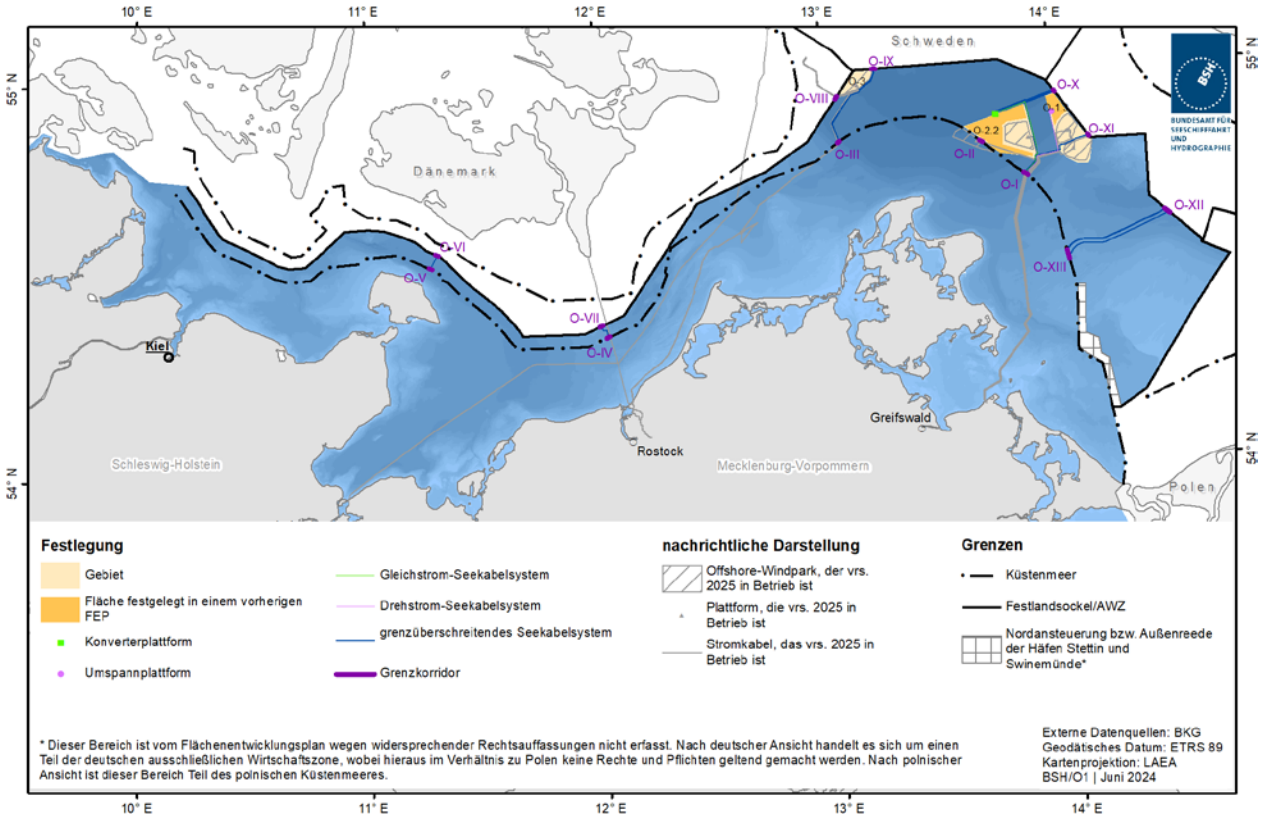

Figure 7: Designations on cables in the EEZ of Baltic Sea

4 Designations for the territorial sea

In accordance with Section 4, para. 1, sentence 2 of the Offshore Wind Energy Act, the Site Development Plan may also make sectoral planning designations for areas, sites, the chronological order in which the sites are put out to tender, the calendar years of commissioning, and the expected generation capacity as well as for testing grounds and areas for other energy generation for the territorial sea.

There are no new designations in the area of the territorial sea compared to Site Development Plan 2023.

5 Central site investigation and calendar years of tender and commissioning

According to Section 5, para. 1, no. 3 of the Offshore Wind Energy Act, the Site Development Plan makes designations on the time sequence, in which the designated sites should come for tender, including the naming of the respective calendar years and the designation whether the section should be centrally pre-investigated and according to no. 4, designations as to in which quarter of the respective calendar year the allocated wind turbine system and the corresponding OGCS should be commissioned.

In order to ensure a synchronisation between OWF and OGCS, the Site Development Plan further designates the quarter of the respective calendar year, in which the feeding of the interarray cabling of the OWF to be connected in the converter platform of the TSO should happen.

5.1 Central site investigation

The central site investigation is outside the acceleration sites designated in the Site Development Plan according to Section 5, para. 2b Draft Offshore Wind Energy Act, Section 9, para. 1, sentence 1 Draft Offshore Wind Energy Act. In accordance with Section 2a, para. 2 of the Offshore Wind Energy Act, the tender volume starting with the year 2027 is basically divided in half to centrally pre-investigated and non-pre-investigated sites. Figure 8 constitutes the sites according to Section 9, para. 1 of the Offshore Wind Energy Act, the centrally pre-investigated sites for the EEZ North Sea.

There is no additional designation for the EEZ of Baltic Sea compared to Site Development Plan 2023. For the the existing designations on the central site investigation of sites see Figure 19.

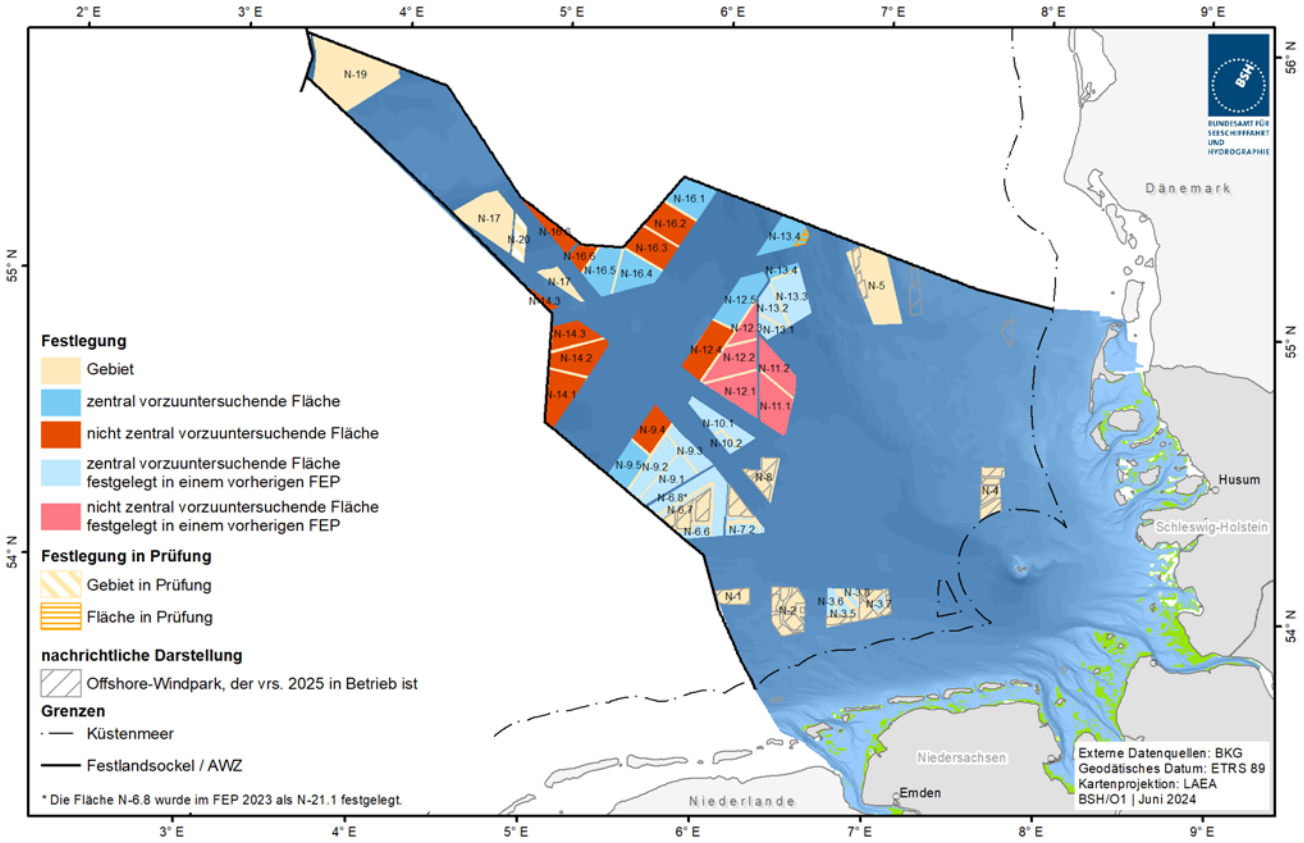

Figure 8: Designations on the central site investigation of sites

5.2 Calendar years of tender and commissioning

Table 7 and Table 8 constitute the designations of time sequence of tender and commissioning of the designated sites and OGCS. Sites that are centrally pre-investigated are shown in Table 7; sites without central site investigation are shown in Table 8. For a complete overview, please refer to Table 14 in the Appendix of this document.

There are no temporal designations for Sites N-13.3, N-13.4 and N-16.6 in this revision.

Table 7: Overview of the calendar years of tender and commissioning for wind turbine system and the associated OGCS including the respective quarters (QI - QIV) in the calendar year - Sites with central site investigation

Designation of site	Expected installed capacity [MW]	Tender year	Commissioning of the wind turbine system installed on the respective sites	Feeding of interarray cabling of the wind turbine system installed in platform	Designation of OGCS	Commissioning of OGCS
N-3.7	225	2021	2026 (QIII)	n/a	NOR-3-3	n/a
N-3.8	433	2021	2026 (QIII)	n/a		
O-1.3	300	2021	2026 (QIII)	2026 (QII)	OST-1-4	2026 (QIII)
N-7.2	980	2022	2027 (QIV)	2027 (QIII)	NOR-7-2	2027 (QIV)
N-3.5	420	2023	2028 (QIII)	2028 (QI)	NOR-3-2	2028 (QIII)
N-3.6	480	2023	2028 (QIII)	2028 (QII)		
N-6.6	630	2023	2028 (QIV)	2028 (QI)	NOR-6-3	2028 (QIV)
N-6.7	270	2023	2028 (QIV)	2028 (QII)		
N-9.1	2000	2024	~~2029 (QIII)~~ 2030 (QIII)[a)]	~~2029 (QI-II)~~ 2029 (QIII-IV)[a)]	NOR-9-1	~~2029 (QIII)~~ 2030 (QIII)[a)]
N-9.2	2000	2024	~~2029 (QIII)~~ 2031 (QIV)[b)]	~~2029 (QI-II)~~ 2031 (QIII-IV)[b)]	NOR-9-2	~~2029 (QIII)~~ 2031 (QIV)[b)]
N-9.3	1500	2024	2029 (QIV)	2029 (QI)	NOR-9-3	2029 (QIV)
N-10.2	500	2025	2030 (QIII)	2030 (QI)		
N-10.1	2000	2025	2030 (QIII)	2030 (QI-II)	NOR-10-1	2030 (QIII)
N-13.1	500	2026	~~2031 (QIII)~~ 2031 (QIV)[b)]	~~2031 (QII)~~ 2031 (QIII-QIV)[b)]	NOR-11-2	~~2031 (QIII)~~ 2031 (QIV)[b)]
N-13.2	1000	2026	2031 (QIII)	2031 (QII)	NOR-13-1	2031 (QIII)
~~N-21.1~~ N-6.8	2000	2027	2032 (QIII)	2032 (QI-II)	~~NOR-21-1~~ NOR-6-4	2032 (QIII)
N-9.5	2000	2028	2033 (QIII)	2033 (QI-II)	NOR-9-5	2033 (QIII)
N-12.5	2000	2029	2034 (QIII)	2034 (QI-II)	NOR-12-4	2034 (QIII)
N-16.1	2000	2030	2035 (QIII)	2035 (QI-II)	NOR-16-1	2035 (QIII)
N-16.4	2000	2031	2036 (QIII)	2036 (QI-II)	NOR-16-4	2036 (QIII)
N-16.5	2000	2032	2037 (QIII)	2037 (QI-II)	NOR-16-5	2037 (QIII)

Colour coding:
Designations in a previous Site Development Plan | Designations in a previous Site Development Plan with changes | New designation

[a)] Change in Site Development Plan 2023 due to delays in the implementation of the OGCS by the responsible TSO, see comment of the Federal Maritime and Hydrographic Agency regarding the designations of Site Development Plan to be expected on the network development plan Electricity 2037/2045 and the tenders Offshore wind energy 2024 to the Federal Network Agency dated 26.01.2024 - https://www.bsh.de/DE/THEMEN/Offshore/Meeresfachplanung/Laufende_Fortschreibung_Flaechenentwicklungsplan/Anlagen/Downloads/Stellungnahme_BSH_Planungsstand_FEP.html

[b)] Change in Site Development Plan 2023 due to a probable completion date of OGCS differing from the designation of Site Development Plan 2023 announced by the responsible TSO in accordance with Section 17d para. 2 clause 3 of Energy Industry Act (EnWG) - https://netztransparenz.tennet.eu/de/strommarkt/transparenz/transparenz-deutschland/offshore-netzanschluesse/

Table 8: Overview of the calendar years of tender and commissioning for wind turbine system and the associated OGCS including the respective quarters (QI - QIV) in the calendar year - Sites without central site investigation

Designation of site	Expected installed capacity [MW]	Tender year	Commissioning of the wind turbine system installed on the respective sites	Feeding of interarray cabling of the wind turbine system installed in platform	Designation of OGCS	Commissioning of OGCS
N-11.1	2000	2023	2030 (QIII)	2030 (QI-II)	NOR-11-1	2030 (QIII)
N-12.1	2000	2023	2030 (QIII)	2030 (QI-II)	NOR-12-1	2030 (QIII)
N-12.2	2000	2023	2030 (QIV)	2030 (QI-II)	NOR-12-2	2030 (QIV)
O-2.2	1000	2023	2030 (QIII)	2030 (QI-II)	OST-2-4	2030 (QIII)
N-11.2	1500	2024	~~2031 (QIII)~~ 2031 (QIV)[a)]	~~2031 (QI)~~ 2031 (QIII)[a)]	NOR-11-2	~~2031 (QIII)~~ 2031 (QIV)[a)]
N-12.3	1000	2024	2031 (QIII)	2031 (QI)	NOR-13-1	2031 (QIII)
N-9.4	2000	2025	2032 (QIII)	2032 (QI-II)	NOR-9-4	2032 (QIII)
N-12.4	2000	2026	2033 (QIII)	2033 (QI-II)	NOR-12-3	2033 (QIII)
N-14.1	2000	2027	2034 (QIII)	2034 (QI-II)	NOR-14-1	2034 (QIII)
N-14.2	2000	2028	2035 (QIII)	2035 (QI-II)	NOR-14-2	2035 (QIII)
N-16.2	2000	2029	2036 (QIII)	2036 (QI-II)	NOR-16-2	2036 (QIII)
N-16.3	2000	2029	2036 (QIII)	2036 (QI-II)	NOR-16-3	2036 (QIII)
N-14.3	2000	2030	2037 (QIII)	2037 (QI-II)	NOR-14-3	2037 (QIII)

Colour coding:
Designations in a previous Site Development Plan | Designations in a previous Site Development Plan with changes | New designation

[a)] Change in Site Development Plan 2023 due to a probable completion date of OGCS differing from the designation of Site Development Plan 2023 announced by the responsible TSO in accordance with Section 17d, para. 2, sentence 3 of Energy Industry Act (EnWG) - https://netztransparenz.tennet.eu/de/strommarkt/transparenz/transparenz-deutschland/offshore-netzanschluesse/

6 Standard technical principles

According to Section 5, para. 1, no. 11 the Offshore Wind Energy Act, standard technical principles are to be laid down in the Site Development Plan for the purpose of planning. With regard to technical grid connection concepts, there is a distinction between the North Sea and Baltic Sea up to Site Development Plan 2020. This differential is not applicable from Site Development Plan 2023 and only one standard concept is designated.

The standard grid connection concept was designated until Site Development Plan 2023 with a 66 kV direct grid connection. This continues to be applicable for all the previous designations up to and including the designations in Site Development Plan 2023. The designation of a 132 kV grid connection concept made in Section 6.9 refers to all the designations in this Site Development Plan as well as the upcoming designations, provided no new regulations are made in the following Site Development Plan revisions.

6.1 Standard concept DC system

The standard concept is a direct current system.

6.2 Interface between TSO and OWF project developer

The primary interface[6] between TSO and OWF project developer is the input of 132 kV subsea cables on the converter platform (cable sealing box of 132 kV subsea cable).

(a) The responsibility for grid connection of wind turbine system to the converter platform is with the OWF project developer.

(b) The 132 kV subsea cables are fed to the platform by the direct pull-in concept[7], according to which, the OWF project developer routes the subsea cables up to the gas-insulated switchgear (GIS).

(c) For the grid connection of the 132 kV subsea cable, the OWF project developer ensures a freely usable length (from cable hang-off) of the subsea cable of 15 m after direct pull-in on the platform. The measurement of the required freely usable length of the subsea cable is measured in individual case according to the requirement of the TSO.

(d) Optionally, the TSO may specify the interface at a connector as a result of the platform design. In this case, the 132 kV subsea cables routed up to a connector pre-installed on the platform, which also constitute the boundary of the property. The connector then forms the transition point between the interarray subsea cables and a pre-installed platform cable connection leading up to the GIS. The OWF project developer carries out the submarine cable pull-in and termination with a suitable plug for the pre-installed plug connection on the platform. Here, too, the designation of the maximum usable length (from cable hang-off) is 15 m to the plug connection applies. The TSO shall announce the concept prior to the tender of the respective sites.

(e) The start of the quarter designated for the respective sites or OGCS for the feed of the park-internal cabling is the time until which, the TSO must have completed all the necessary prerequisites that are required for feeding the interarray cabling.

(f) All the cables of interarray cabling, which must be fed in the platform of TSO, are fed by the OWF project developer within the quarter designated in the Site Development Plan, taking into consideration the platform-specific framework conditions. Feeding the interarray cabling for all the allocated wind turbine system is to be completed by the end of the quarter designated in the Site Development Plan.

(g) The TSO shall carry out the required steps on the platform by the end of the respective quarter designated for the site (feed of interarray cabling) for all the AC cables of interarray cabling fed to the platform to the extent that a complete commissioning of all the allocated wind turbine system of a site to be connected is possible.

(h) All the sides have to find out about the project-relevant developments and coordinate the dates in all the phases.

6.3 Self-commutated converter

The existing OGCS and those planned as a part of the Site Development Plan are made in self-commutated converters (the so-called voltage sourced converter (VSC)).

[6] Interface in the context of standard technical principles of Site Development Plan is basically understood as the border of property between TSO and OWF project developer.

[7] The direct pull-in method is defined as direct feed of cable to the platform up to the GIS or the pre-installed connector.

6.4 Transmission voltage +/- 525 kV

A transmission voltage of +/- 525 kV is designated for the OGCS envisaged as a part of the Site Development Plan.

6.5 Standard power 2,000 MW

A standard transmission power of 2,000 MW is designated for the high-voltage DC power transmission systems (HVDC).

6.6 Version with metallic return conductor

HVDC systems are to be designed as a bipolar system with a metallic return conductor for the purpose of increased reliability and improved controllability.

6.7 Connection on the converter platform/switch bays to be provided

(a) For a connection power of 1,000 MW at transmission voltage 132 kV, 8 switch bays and J-tubes each are to be earmarked and provided by the TSO.

(b) At a connection power deviating from 1,000 MW, the number of switch bays to be provided changes accordingly, depending on the connection power.

6.8 Prerequisites for cross connections between installations / switch bays to be provided

In principle, every converter platform should provide for two connection facilities for direct current connection, consisting of positive and negative terminal, metallic return conductors as well as fibre optic cables and the necessary J-tubes to ensure cross connections between platforms. Thus, the basis for a future meshing of OGCS will be ensured.

6.9 Grid connection concept

The 132 kV grid connection concept is designated as a standard grid connection concept for the connection of wind turbine system with the converter platform. The connections are made in three-phase technology with 50 Hz mains frequency and a transmission voltage of 132 kV.

6.10 Interconnectors: Bundled subsea cables

Interconnectors are to be implemented in direct current technology and designed with the highest possible transmission capacity. The connections should each be made with supply and return conductors, which are laid bundled with fibre optic cables of sufficient dimensions.

6.11 Interconnectors: Consideration of overall system

Planning and construction of interconnectors have to take into consideration the designations of this plan.

6.12 Interconnectors: Version with metallic return conductor

Interconnectors, which have the facility of a cross connection with an OGCS according to the standard concept should be made as a bipole with metallic return conductors.

6.13 Deviation possibilities

It is in general not possible to deviate from the standard technical principles.

Exceptions to this can be made solely in the justified individual cases, especially if it is necessary or sensible based on new insights or due to foreseeable technical innovations. Owing to the most likely significant impacts on the planning and implementation process as well as the interface between TSO and OWF operator, deviations should be introduced very early, justified and agreed upon with all the parties involved.

7 Planning principles

In accordance with Section 5, para. 1, no. 11 of the Offshore Wind Energy Act, the Site Development Plan contains designations for the planning principles.

The planning principles apply to the area of German EEZ and build on the objectives as well as principles of ROP 2021 for the German EEZ. In all the planning principles, the overriding public interest in the construction of wind turbine system and OGCS and their significance for public safety and health according to Section 1, para. 3 of the Offshore Wind Energy Act must be taken into consideration in the deliberations. In the concrete application of the planning principles in the planning approval procedure or planning permission procedure, the overriding public interests must be taken into consideration when weighing up the concerns.The planning principles also apply for installations and areas for other energy generation.

7.1 No threat to the marine environment

The following principles have a specific reference to environmental protection and nature conservation. They should not be understood as conclusive in this sense. Planning principles, which are listed as sub-points among other things, can affect concerns of environmental protection and nature conservation.

7.1.1 Observance of environmental and nature conservation framework conditions

For the location and route selection and as a part of the construction, operation and deconstruction or any plans of subsequent use of wind turbine system, platforms, subsea cables and other forms of energy generation, the framework conditions under environmental protection and nature conservation law must be followed.

In addition, economic uses should be sustainable and as far as possible, economical in space according to the principle 2.2.1 (1) of ROP 2021.

The principle 2.4 (6) of ROP 2021 for the requirement of preventive and mitigation measures within the identified bird migration corridors is accordingly applicable for this sectoral plan.

7.1.2 Overall temporal coordination of the construction and installation work and maintenance and repairs works

In order to prevent or mitigate cumulative impacts on the marine environment, an overall temporal coordination of the construction and installation work should be provided, taking into consideration the project-specific framework conditions.

It is necessary to strive for an overall temporal coordination for the construction work of wind turbine system, platforms as well as other forms of energy generation and the installation work of subsea cables in physical proximity of each other (see also planning principle 7.1.4 for noise protection).

This also includes the reduction of shipping traffic for the construction and operation and the associated acoustic and visual adverse effects to a minimum by optimum construction and temporal planning (for this, also see planning principle 7.1.8).

7.1.3 Avoidance and reduction of emissions

General information

(a) Emissions are to be avoided or, if they are unavoidable, reduced.

(b) An emission study to survey the emissions arising from the respective design and equipment variant or their avoidance must be prepared in the enforcement procedure. An emission concept should be submitted in

the approval procedure as a part of the application documents since the requirements for an emission study generally cannot yet be fulfilled due to the early design phase.

(c) Structures shall be planned and implemented in such a way that neither their construction nor their operation cause emissions that are avoidable according to the latest technological advancements or, insofar as the causing of emissions is unavoidable as a result of the actions that are absolutely necessary in order to fulfil the safety requirements (e.g. of shipping and air traffic) and these shall cause the fewest possible impacts on the marine environment without generating electromagnetic waves capable of interfering with the functioning of customary navigation and communication systems as well as frequency ranges of the correction signals.

(d) During operation of the wind turbine systems and platforms, lighting that is as compatible with nature as possible must be provided in order to reduce attraction effects as far as possible taking into consideration the requirements of safe shipping and air traffic and occupational safety (e.g. switching obstacle lights on and off as needed and selecting suitable light intensities/spectra and lighting intervals).

(e) Environmentally compatible operating materials are to be used as far as possible for the operation of the installation and that biodegradable operating materials are to be preferred, if available.

(f) Operating materials that have no or the lowest possible greenhouse gas potential should be used in switchgear, cooling and air-conditioning systems as well as fire protection systems. In particular, as far as technically feasible and available, switchgear without SF6 must be used.

(g) All technical installations and infrastructure used on the facility shall be secured by structural safety systems and safety measures in accordance with the latest technological advancements and shall be monitored such that pollutant accidents and environmental discharges are prevented and that in the event of damage, the Project Developer can take counter measures as quickly as possible. Organisational and technical precautionary measures must be taken for changes of operating materials and refuelling measures to prevent pollutant accidents and environmental discharges.

Waste

(h) The dumping and discharge of wastes into the marine environment is prohibited. Waste must be taken ashore and disposed of there according to the applicable waste disposal regulations.

Corrosion protection

(i) The corrosion protection used for the installation must be as free of pollutants and low in emissions as possible.

(j) Wherever possible, external current systems shall be used as cathodic corrosion protection on foundation structures.

(k) If the use of galvanic anodes should be unavoidable, it is permissible only in combination with coatings on the foundation structures. The content of minor components of the anode alloys, in particular zinc, cadmium, lead, copper, and mercury, shall be reduced as far as possible.

(l) The use of zinc anodes is prohibited.

(m) The use of biocides to protect the technical surfaces from the undesired settlement of organisms is prohibited.

System cooling

(n) A closed cooling system should be used for system cooling, with no discharges of cooling water or other substances (anti-fouling

agents or biocides) into the marine environment.

Sewage water

(o) The project developer shall in principle collect sewage water from sanitary devices, sanitation facilities, kitchens and laundries in a professional manner, transport it ashore and dispose of it there in accordance with the applicable designations of waste management.

Oil content of the drainage water

(p) Drainage water may not exceed an oil content of 5 milligrams per litre during discharge.

(q) The oil content of the drainage water must be continuously monitored at the outlet using sensors. The current values measured with the sensors must be readable remotely.

(r) If the threshold value of 5 mg per litre is exceeded, the use of appropriate automatic valves must ensure that the drainage water is not discharged into the marine environment. Instead of it, the drainage water can, for example, be directed into collection tanks or recirculated.

Extinguishing foam on helidecks

(s) Drainage systems connected to the helicopter landing decks must have bypass systems, which ensure that the arising extinguishing foam is automatically drained in a collection tank bypassing the oil separator. The extinguishing foam must not be discharged into the marine environment via the drainage system.

(t) Fire-fighting exercises must only be performed using water.

Diesel generators

(u) Diesel generators used on platforms must be certified to the emission limits of stage III of MARPOL Annex VI, Regulation 13, para. 5.1.1 or to emission standards equivalent to the emission standards defined in MARPOL Annex VI, Regulation 13, para. 5.1.1. This shall be demonstrated.

(v) For wind turbines, the use of diesel generators for emergency power supply is to be avoided.

(w) Insofar as the operation of diesel generators should be planned, the lowest possible sulphur fuel must be used.

Grouting method and grouting material

(x) If grouting methods should be used, the grouting material must be as free of pollutants as possible. Corresponding technologies and devices for the grouting process (installation phase) must be used, which prevent the grout material from entering the marine environment as far as possible.

7.1.4 Noise protection in the foundations and operation of installations

(a) For the foundations and installation of a system, a construction process and a working method, which is as quiet as possible under the circumstances found according to the latest technological advancements, must be used.

(b) If wind turbine system or platforms and other forms of energy generation are installed using impulse ramming, then the use of effective technical noise mitigation measures according to the latest technological advancements in science and technology must be provided while ramming the foundations. The provisions of the noise mitigation concept of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMU 2013) must be observed here.

(c) Fauna must be deterred from the danger zone using a configurable system according to the latest technological advancements

before executing the pile driving. In case of noise-intensive pile driving, the highest possible sound input already at the beginning of the pile driving (soft start) is to be avoided.

(d) The duration of the ramming process including the deterrence must be limited to a minimum in pile driving.

(e) The draft of noise protection concept of a concrete project is to be submitted to the Federal Maritime and Hydrographic Agency at least 12 months before the start of construction if pile driving or similar noise-intensive foundation procedure is envisaged for installation of a turbine. Selection of the envisaged foundation structure, construction process, work method, and noise mitigation measures as well the noise forecast shown in the draft of the noise mitigation concept are to be justified. The noise forecast must take into consideration the envisaged foundation structure and construction process.

(f) The measures for mitigation of noise and prevention of damage to the marine environment according to the state of science and technology under comparable offshore conditions should be tested in good time before start of construction if they are not yet the latest technological advancements and have not yet been tested in a comparable way.

(g) The project developers must coordinate their construction site activities considering the project-specific framework conditions with other projects of other project developers simultaneously under construction such that as far as possible, the noise-intensive construction activities are not done in the same time or spatial context for prevention or mitigation of the significant cumulative impacts and compliance with the provision of the noise mitigation concept of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMU, 2013). If required, an overall temporal and spatial coordination of the pile driving work can be ordered within the framework of the subordinate approval procedure.

(h) Blasting is generally not permitted. If blasting for the removal of ammunition that cannot be transported in the project site or on the routes of grid connection line should be unavoidable, a noise mitigation concept must be submitted to the Federal Maritime and Hydrographic Agency in good time beforehand.

(i) The Project Developer shall select the installation design that is as low in operating noise as possible according to the latest technological advancements.

7.1.5 Minimisation of scour and cable protection measures

(a) Scour protection measures must be reduced to a minimum. Introduction of hard substrate must be limited to the minimum level necessary for establishing protection of the respective installation. Only fill made of natural stones or inert and natural materials are to be used as scour protection on wind turbine system and platforms. The use of alternatives made of concrete or those based on plastic or plastic-like materials (e.g. geotextile sand containers, [recycled] plastic nets filled with natural stones, concrete mats covered with plastic) is not permissible as scour protection on wind turbine system and platforms.

(b) If crossing constructions cannot be avoided, they must be reduced to a minimum. Introduction of hard substrate must be limited to the minimum level necessary for establishing crossing construction. Crossing constructions should be

made of natural or biologically inert materials. The use of concrete mattresses is to be limited to what is absolutely necessary. In case of an unavoidable use of concrete mattresses, plastic coatings must be avoided. The use of geotextiles be excluded.

(c) Preferably fill made of natural stones or inert and natural materials are to be used as other cable protection, for instance, on wind turbine system and platforms. The use of cable protection systems containing plastic is only permitted in exceptional cases and must be kept to a minimum. Rockbags may be used only if they are made of natural fibres, are biologically inert and do not have harmful additives, which dissolve in the seawater.

The use of CPS (Cable Protection Systems) made of plastics must be limited to the absolutely necessary extent – especially if they rest openly on the sediment or are located in water columns.

7.1.6 Bird collision monitoring

For the monitoring of bird collisions with wind turbine system, state-of-the-art collision detection systems should be installed in OWF always within all sites and areas for other energy generation designated in the Site Development Plan. This provision is applicable even outside the bird migration corridor in reference to Section 77, para. 1, sentence 1, no. 1 and Section 77, para. 3, no. 1 of the Offshore Wind Energy Act. In terms of time, a duration of 10 years should be assumed. The exact configuration of the collision monitoring, e.g. the locations, number, and technical specifications of the survey devices, shall be coordinated with the Federal Maritime and Hydrographic Agency on a procedure- and site-specific basis. The methods of monitoring must be suitable to interpret the location-specific collision risk in relation to the location-related migration intensity and evaluate it with respect to the impacts of weather conditions and operating status of wind turbine system or correlate them. The following requirement should be fulfilled for the respective configuration of collision monitoring, provided it is the latest technological advancements.

(a) Combined surveys of location-related overall migratory activity, the number of birds flying through the rotor range and-detected collisions of birds, and accompanying data on weather and operating status of the wind turbine system should be conducted with various systems (e.g., using radar systems, camera systems, weather sensors).

(b) Methods suitable in terms of a continuous and automated survey (day and night) should be selected, at least during the main migration periods.

(c) The number and position of the measurement points should be selected such that the species composition and number of birds can be representatively surveyed.

(d) The survey systems must be calibrated and the calibration documented.

(e) Specialised bird radars for survey of migration intensity and migration phenology must be used, provided they are the latest technological advancements.

7.1.7 Increase of sediment temperature

When laying subsea cables, potential adverse effects on the marine environment caused by cable-induced increase of sediment temperature should be reduced as far as possible. The “2 K criterion”, which defines a maximum tolerable temperature increase of the sediment by 2 degrees (Kelvin) at a sediment depth of 20 cm in the German EEZ, should be observed as a precaution for nature conservation. According to Section 17d, para. 1b, sentence 2 of the Energy Industry Act, warming of greater than 2K is permissible, among other things, if it does not last a

total of more than ten days. Here, greater warming in individual hours should be added as long as the threshold value of ten days or 240 hours per year is reached. Furthermore, greater warming is permissible if it affects less than 1 km length of OGCS. It is also applicable for interarray subsea cable of sites and areas for other energy generation and interconnectors. In all cases, the maximum length of 1 km refers to the total length of the project. Accordingly, stronger heating at different sections is approval as long as a total length of 1 km is not exceeded.

(a) For this purpose, the cable system must be laid at a depth that ensures compliance with the 2 K criterion. Please refer to 7.13.6 planning principle.

(b) A proof of the maximum increase of sediment temperature to be expected or compliance with the 2 K criterion should be produced in the context of project approval procedure considering the expected operating mode of the subsea cable.

(c) Compliance with the 2 K criterion in ongoing operation should be reviewed by the TSO using model procedures such as transmission capacity management (TCM) II.

7.1.8 Traffic logistics concept

For projects, whose vessel-related service traffic crosses the main concentration area harbour of divers or the partial area II and the future partial area III of nature conservation area “Sylt Outer Reef and Eastern German Bight”, a traffic logistics concept for service traffic should be submitted in the context of project approval procedure and agreed upon with the Federal Maritime and Hydrographic Agency. The logistics concept makes, among other things, regulations on access and exit routes, for highest permissible speed and frequency of trips of service ships within periods sensitive for seabirds and resting birds. The concept is to be delivered to the ship’s command of the vessels concerned. The developer of the project must ensure the execution of the concept by corresponding instructions to the ship’s command. The traffic logistics concept should lead to a reduction of the traffic load in the above mentioned areas.

7.2 No adverse effect on the safety and efficiency of shipping traffic

The safety and efficiency of shipping must not be affected by the construction and operation of wind turbine system, platforms, subsea cables and other forms of energy generation.

(a) Safety zones are constructed around the facilities, especially around the adjacent priority or reservation areas for shipping as well as for the integrity of installations, according to Section 74 of the Offshore Wind Energy Act, generally 500 m around the wind turbines, platforms, or other forms of energy generation to ensure the safety of shipping. Within the designated areas and outside the designated sites, the safety zone shall be defined in such a way that it is contiguous and gaps are avoided. The safety zone shall be established outside the priority and reservation areas for shipping (ROP 2021).

(b) Structural installations must be designed according to the latest technological advancements in a way that in case of a vessel collision, the damage to the hull is as less as possible and the facility does not fall on the vessel; this includes the construction and operation of the working vehicles. Compliance with the latest technological advancements is presumed if the requirements of

"Standard construction –minimum requirements for design of offshore structures in the EEZ"[8] are met.

(c) The construction of platforms on the border of the area as well as the development of sites should blend in the overall ensemble of the development of area in which the platform or the site lies and happen cohesively.

(d) In addition, the concerns of shipping (especially in relation to priority and reservation areas) are taken into consideration in the course of conflict minimisation in the selection of routes of subsea cables. The routes run as far as possible away from the main shipping routes. However, in case of sufficient driving depth, the planning at the border of those priority and reservation areas, which are adjacent to the OWF project to be connected, is also feasible provided no negative impact on the route is expected from laying the subsea cables.

(e) Wind turbine system, other forms of energy generation, platforms and other relevant obstacles should be equipped with the latest technological advancements devices for marking, which ensure the safety of shipping and air traffic, up to their distance from the maritime area. In the construction of further sites or areas for other energy generation directly adjacent to the respective site, the developer of the project must adjust the marking for safety of shipping traffic in agreement with the developers of adjacent projects according to the overall development situation in the traffic area.

(f) A maritime surveillance according to the latest technological advancements must be conducted for sites, areas for other energy generation and platforms.

(g) From the start of installation and during the entire installation phase of wind turbine system, other forms of energy generation and platforms, a traffic safety vehicle should be used in the site environment for safeguarding the environment of the site and prevention of collisions with vessels. The traffic safety vehicle shall be used from the start of preparatory construction measures insofar as this is necessary for traffic safety. The traffic safety vehicle is to be used exclusively for the purpose of traffic safety. The traffic safety vehicle and its use shall correspond to the latest technological advancements. Until the commissioning of the regular marking, the wind turbine system, other forms of energy generation, and platforms must have temporary visual and radio marking in accordance with the latest technological advancements. The site environment must have the latest technological advancements marking as a general danger zone by public display of lighted cardinal marks.

(h) All the implements and vehicles used including the traffic safety vehicle must conform in their marking and traffic behaviour to the Ordinance on International Regulations of 1972 for Prevention of Collisions at Sea dated 13 June 1977 (Federal Law GazetteI Pg. 813), last amended by Article 1 of the ordinance dated 7 December 2021 (Federal Law GazetteI Pg. 5188) and meet the safety standard required for the federal flag or a demonstrably equivalent standard in relation to the equipment and crew. The safety requirements of the Ship safety division of

[8] Available on the website of the Federal Maritime and Hydrographic Agency at: https://www.bsh.de/DE/PUBLIKATIONEN/_Anlagen/Downloads/Offshore/Standards/Standard-Konstruktive-Ausfuehrung-von-Offshore-Windenergieanlagen-Aktualisierung-01-06-21.pdf;jsessionid=49FE57D6F4DF6C4C2C40A4F6AE5ACFF0.live11311?__blob=publicationFile&v=10

the trade association for traffic and transport are to be taken into consideration.

(i) The Federal Maritime and Hydrographic Agency can order measures, especially the provision of additional towing capacity with suitable bollard pull by the developer of the project to mitigate the risk to the safety and efficiency of shipping.

(j) The OWF project developers of sites in the traffic area of shipping route SN10 of ROP 2021 are obliged to ensure that additional towing capacities of adequate dimensions, for which the competent authorities have an authority to issue instructions and access right if needed, are always maintained on site in the catchment area of SN10 for the shipping traffic and danger prevalent there. Project developers of sites in the catchment area of SN10 are obliged to maintain the towing capacities in such a way that every developer is obliged to bring about the entire provision, but it is required only once in the catchment area of shipping route SN10 (joint and several obligation). The obligation is expected to come into effect at the time of the first development of sites in Areas N-11 or N-12. Any requirements for the necessary design of other additional towing capacities, especially in other traffic areas remain unaffected by this regulation.

7.3 No adverse effect on the safety and efficiency of air traffic

The safety and efficiency of air traffic must not be affected by the construction, operation, and deconstruction of wind turbine system, platforms, subsea cables and other forms of energy generation.

(a) It is necessary to adhere to the regulations of the “Standard Offshore Aviation for the German Exclusive Economic Zone”[9] (SOLF) of the Federal Ministry for Transport and Digital Infrastructure (BMDV) in its respective valid version in this regard for the planning, construction, and operation of wind turbine system, platforms, subsea cables, and other forms of energy generation and the facility and operation of air traffic infrastructures.

(b) Existing and planned offshore airfields should be prevented from becoming unusable due to the increase in obstacles in their surroundings. To this end, obstacle limitation areas and sectors are designated in the approval procedure, up to which objects may rise in air space. As much as possible, there must be an underlying holistic, i.e., area-wide and if required, cross-area, strategy. Changes in the obstacle setting can also make it necessary to adapt the obstacle limitation areas and sectors. The parties involved have to coordinate among themselves the obstacle limitation areas and sectors with respect to orientation and dimensioning in the planning.

(c) If acceptable under air transport safety, obstacle limitation areas and sectors of helicopter landing decks should be planned such that sites or third-party areas for other energy generation are adversely affected as little as possible. They may not be located beyond the boundaries of the German EEZ, if the express consent of the neighbouring state, whose EEZ is affected is not available.

(d) For helidecks, whose obstacle limitation areas are made in the form of flight corridors, obstacles along these flight corridors should

[9] Available at https://www.verwaltungsvorschriften-im-internet.de/bsvwvbund_12082022_LF156116525.htm

be equipped with a tower beacon if the corridors should also be operated at night and a tower beacon is required according to the provisions of SOLF. If third-party flight corridors are in a site or an area for other energy generation or are directly adjacent to it or them, then the third party should be allowed the installation and operation of these tower beacons.

7.4 No adverse effect on the safety of the military

Security of the military must not be affected by the construction and operation of wind turbine system, platforms, subsea cables and other forms of energy generation.

(a) The concerns of military should be taken into consideration in the course of conflict minimisation while selecting locations for wind turbine system as well as platforms and other forms of energy generation or routes of subsea cables.

(b) If the construction and operating work touches the reservation areas for defence (exercise or prohibited area of the military) or the use of acoustic, optic, optoelectronic, magnet-sensory, electrical, electronic, electromagnetic, or seismic measuring devices and unmanned underwater vehicles is planned, as a rule, this plan should be communicated at least 20 working days in advance to the navy command specifying the coordinates of the respective area and period of use in accordance with Section 77, para. 3, no. 3 of the Offshore Wind Energy Act. The use of measuring equipment shall also be limited to what is necessary.

(c) Vehicles of the Bundeswehr [Federal Armed Forces] may navigate the OWF and their safety zones according to the principles of good seamanship, provided the operation and maintenance of the OWF is not affected or affected negligibly.

(d) Sonar transponders should be installed at the suitable corner positions of OWF, platforms, and other forms of energy generation in accordance with Section 77, para. 3, no. 2 of the Offshore Wind Energy Act. The arrangement and specification of the sonar transponders shall be adapted to the requirements of the Bundeswehr with regard to functionality.Use of mobile sonar transponders is strictly barred.

(e) It should be possible for the Federal Armed Forces to install and operate fixed devices such as transmitters and receivers on installations for energy generation – especially on platforms. This is subject to the proviso that the operation of military installations on installations for energy generation is necessary from a military point of view for defence, and that the operation of installations for energy generation are thereby adversely affected as little as possible.

7.5 Removal of installations

If the planning approval or planning permission becomes invalid, the installations should be removed in accordance with Section 80, para. 1, sentence 1 of the Offshore Wind Energy Act. Section 80, para. 1a of the Draft Offshore Wind Energy Act is additionally applicable for installations under the Directive on Industrial Emissions.

(a) The installations are to be removed with the aim of ensuring the complete subsequent use of the site as well as the restoration of the performance and functionality of the site. The Federal Maritime and Hydrographic Agency shall decide on the scope of removal considering the concerns named in Section 69, para. 3, sentence 1, no. 1 to 4 of the Offshore Wind Energy Act, the latest technological advancements in science and technology, and the generally recognised international standards as well as the requirements of an Ordinance under Section 96, no. 7 of the Offshore Wind Energy Act.

(b) After deconstruction, the reuse of removed components before recycling and this, before any other, especially energetic recovery should be strived if possible, otherwise the removed components should be – demonstrably – properly removed on land.

7.6 Investigation and consideration of objects

A subsoil investigation and route investigation according to the Federal Maritime and Hydrographic Agency standard subsoil investigation should be conducted and evaluated as a basis for the planning and execution of the installations. The available cables, subsea cables and pipelines, wrecks, cultural assets, and material assets as well as other objects on the site, route, platform site, or the area for other forms of energy generation should be determined in this context.

(a) Any sites where objects have been found should be taken into consideration when selecting the site or route. The developer of the project is responsible for the resulting necessary measures (e.g., adaptation of farm layout, protective measures or recovery and removal).

(b) If there is unexploded ordinance on the site, route, platform site, or the area for other forms of energy generation, protective measures should be taken. If unexploded ordinance is found, proceed according to the instructions of the Federal Maritime and Hydrographic Agency “UXO Survey and Procedure in finding unexploded ammunition in the area of German EEZ of the North Sea and Baltic Sea”10. In particular, the reporting obligations must be followed and measures should be taken.

7.7 Consideration of cultural assets

Known sites where cultural assets have been found should be taken into consideration when selecting the site or route. If previously unknown shipwrecks of cultural and historical value be found in the seabed during the planning or construction of wind turbine system, platforms or subsea cables, and plants for other forms of energy generation, exclusion zones with a radius of generally 50 m around the dimensions of the place of recovery should be provided. No impacts whatsoever on the seabed or the previously found shipwreck are permitted in this exclusion zone. Measures to safeguard the cultural asset while safeguarding the overriding public interest in the development of offshore wind energy can be taken. The authorities responsible for the preservation of monuments and archaeology should be involved at an early stage in the case of discoveries.

7.8 Official standards, provisions or concepts

Official standards, provisions and concepts in their respective currently applicable version should be followed while following the overriding public interest of construction of wind turbine system and OGCS for the planning, construction and operation of the wind turbine system, platforms, subsea cables and other forms of energy generation. The overriding public interest in the construction of wind turbine system and OGCS must be taken into consideration in weighing up the protected assets.

7.9 Communication and monitoring

In order to ensure the safety of installations as well as the safety and efficiency of traffic, suffi-

[10] Available at https://www.bsh.de/DE/THEMEN/Offshore/Offshore-Vorhaben/_Anlagen/Downloads/Hinweise_Munition.pdf?__blob=publicationFile&v=3w

cient communication infrastructure and monitoring shall be ensured in the vicinity of the wind turbine and platforms.

(a) The latest technological advancements facilities for coastal radio stations in maritime mobile service approved for bidirectional communication with shipping should be developed and operated on suitable wind turbines or installations in areas for other energy generation within a site or other energy generation area. This includes the survey of Automatic Identification System (AIS) data. A cover of at least 15 sm around the outer limit of the site or area of other energy generation, with a vessel antenna height of 5 m to be considered is designated for range requirement for the installations. Furthermore, meteorological environmental data (wind direction, wind force, temperature, and visibility) are to be recorded and transferred with the aforementioned data. The data are to be sent out or handed over to the WSV according to their specifications.

(b) OWF project developers have ensure that a the latest technological advancements mobile network is operated within a site and in its immediate vicinity.

The principles (a) and (b) are not applicable if a coverage of OWF and the surrounding traffic space is from land.

7.10 Consideration of all existing, approved[11], and designated uses

Due consideration should be given to existing and approved uses as well as designations made in the context of this plan and other concerns worth protection. Where subsoil conditions do not require greater distances, the following principles shall apply:

7.10.1 General information

(a) Other designations and existing and approved uses, usage rights and other concerns worth protection should be considered in the concrete selection of locations of wind turbine system, platforms, other forms of energy generation as well as routing of subsea cables.

(b) Planning, construction and operation of the wind turbine system, platforms and subsea cables should be executed in close coordination between the TSO and OWF project developer.

(c) For use in fishery, it is designated that fishery vehicles should be able to pass through OWF in operation on the way to their fishing grounds. To do this, the shortest possible route should be selected. Apart from that, the automatic identification system (AIS) should be continuously switched on during the passage, if available. Passive fishery with fish traps and cages should be possible in the safety zones in accordance with Section 74 of the Offshore Wind Energy Act of OWF; but this does not apply for the area surrounded by the outer installations of OWF, and for the area directly adjacent to the outer installations. Clauses 1 and 2 apply provided the operation and maintenance of OWF is affected as little as possible, and subject to opposing technical regulations.

(d) For use of sites for wind energy, which fully or partially overlap with the reservation areas for scientific research, fishery, and production or raw materials of ROP 2021 in the EEZ of North Sea, the concerns of the respective use should especially be taken into consideration. If possible, a multiple use should be permitted in the overlapping areas. Apart

[11] It is clarified that “approved” means all approval procedures.

from the designations of this planning principle, other detailed and site-specific designations can be found in Section 1 as applicable.

(e) In areas of sites for wind energy overlapping with reservation areas of scientific research in the EEZ of North Sea, which were designated by ROP 2021, the concerns of scientific research should especially be taken into consideration. If possible, multiple use should be permitted in these areas, and the fishery research should be enabled in the nature and scope in which it was done until now. For the affected overlapping areas, it is designated that for every two corridors that are at a 90-degree angle with each other must be kept free of wind turbine systems in the planning of the farm layouts. The corridors should have a total length of 5 sm and a total width of 1.025 sm and ensure that scientific research vessels can perform a half-an-hour haul with seabed touching fishing gears that are freely towed in the water column (trawls) at a speed of 4 kn. Please refer to the planning principle 7.13.6. The safe access and exit of the corridors should also be ensured and the ground in the area of the corridor should be kept free of obstacles. After the award of the site concerned, there has to be an independent exchange between the parties concerned for the specific design of multiple use. The requirements named apply exclusively for offshore wind turbines, which are firmly anchored on the seabed.

(f) In the areas overlapping with marine research areas of the Thünen Institute, which were designated in the ROP 2021 as reservation areas for scientific research, the developer of the project should enter into a dialogue with the Thünen Institute, on the extent to which the scientific research activities and especially the surveys for long-term series can be continued in these areas consistent with the concerns of offshore wind energy.

7.10.2 Pipelines

Impacts on the seabed should be strictly avoided in a protection zone of 500 m on both sides of the pipelines. Exceptions are permissible only if an influence within the 500 m is justified and unavoidable and agreed upon with the operator of pipelines. Compliance with the current standards for technical and organisational safety measures must be ensured.

7.10.3 Subsea cables

(a) A distance of 500 m on both the sides must be maintained to the third-party subsea cables through the wind turbine system, interarray cabling, platforms of the OWF operator or other forms of energy generation. The interarray cabling of OWF or areas of other energy generation should be designed such that existing, approved, or envisaged pipeline as well as subsea cables that are existing, approved, and designated as a part of this plan should not be crossed if possible. If a crossing is unavoidable, the provisions of the planning principle 7.13.4 to Crossings are applicable.

(b) In parallel laying of subsea cables, a distance of 100 m between the individual systems in alteration and a distance of 200 m after every second cable system must be maintained. Here, especially in the Baltic Sea, the concrete ground conditions must be taken into consideration. The deviations from the Site Development Plan routes should be limited to a structurally required minimum and as far as possible, a laying radius of 250 m should not be exceeded at turning point.

(c) If the routes for cross connections of installations with each other cross designated sites and do not run parallel to the grid connection system of TSO, the so-called overlapping areas between two neighbouring sites are designated. A width of 500 m is designated for these overlapping areas. It must be ensured that cross connections of

installations with each other can be routed through overlapping areas at the site boundaries. While selecting the locations of wind turbines, it is to be taken into consideration that the routes for a cross connection of installations with each other may be at the most 20 per cent longer than the direct route from the converter platform to the site boundaries. The route of cross connection of installations with each other should also be as straight as possible. The necessary distances between wind turbine system and subsea cables must be taken into consideration.

Since the cross connection of installations with each other would be done only after tender for a site, the OWF project developer can propose a different, crossing-free route within a corridor with a maximum width of 1,000 m in the context of the developer's own approval procedure.

Questions for consultation

Distance of subsea cables in parallel laying in certain areas

In parallel laying of subsea cables, a distance of 100 m between the individual systems in alteration and a distance of 200 m after every second cable system must be maintained at present. With growing infrastructure, planning with the most efficient use of space is gaining importance in some areas. An example is the gate N-III to the north along the roadstead and along the priority area shipping or military submarine exercise area Weser. Here, the stress of other usage concerns by reducing the distance in parallel laying of routes could be reduced.

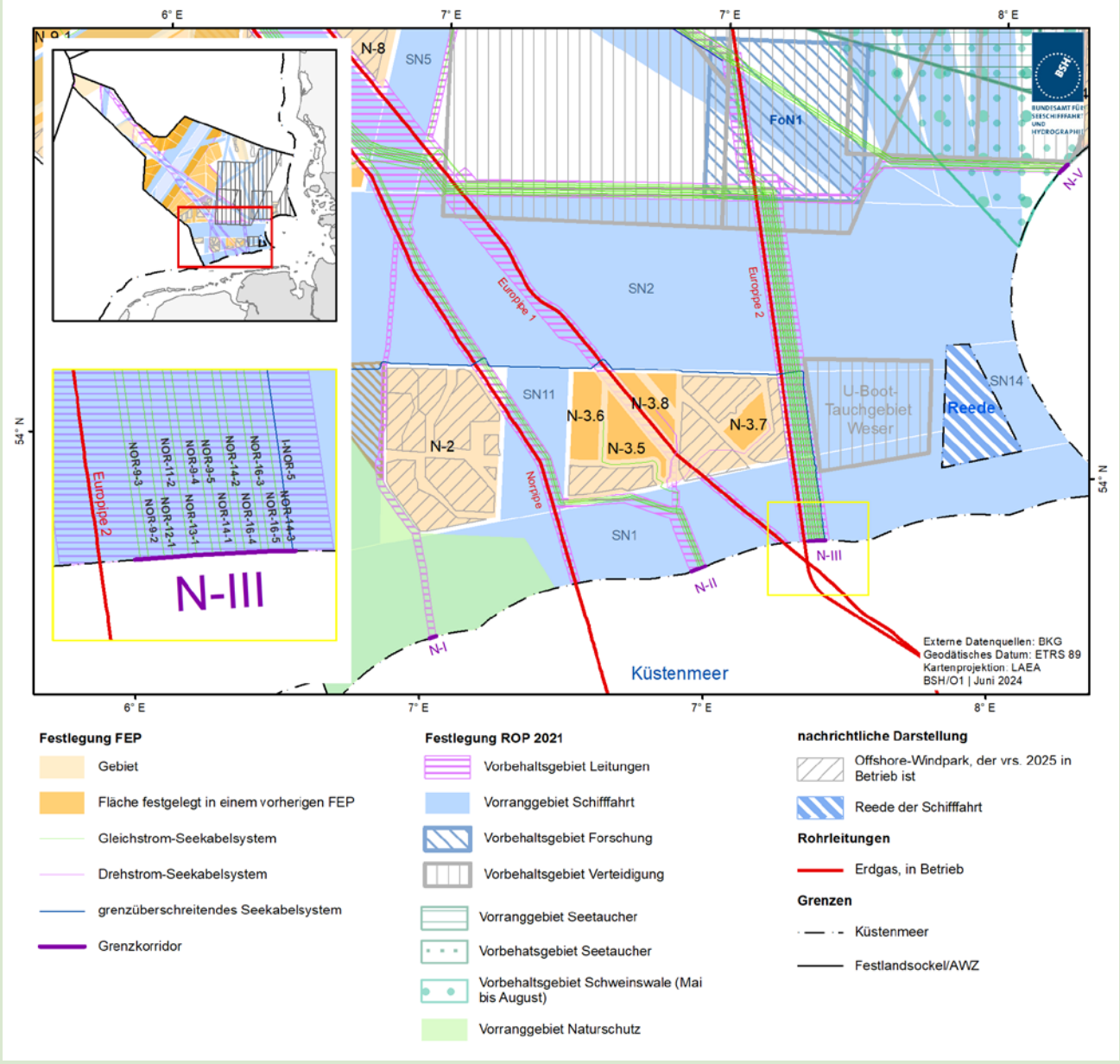

Figure 9: Presentation of pipeline corridor from ROP 2021 on gates N-I, N-II, N-III und N-V

F5. Can the distance of 100 m and – 200 m in alteration be reduced in parallel laying of subsea cables in certain areas or along certain route sections?

F6. Where are the threshold values in this regard?

F7. Which parameters determine the threshold values?

F8. Should anything else be considered in your experience?

7.10.4 Platforms

Wind turbine systems should strictly not be constructed in a protection zone of 1,000 m around the location of converter platform designated in Site Development Plan. Exceptions to this are possible in agreement with the TSO within an area of 500 to 1000 m around the site. Work within the entire 1000 m protection zone may be carried out only in agreement with the responsible TSO.

7.10.5 Wind turbines and other forms of energy generation

Wind turbine system and other forms of energy generation must maintain a sufficient distance from the wind turbine system of neighbouring sites or areas for other energy generation

(a) A distance of at least five times the respective sizes of rotor diameter must strictly be maintained between wind turbine system of neighbouring sites or areas for other energy generation. This includes wind turbine systems that are approved or are in planning. In case of adjacent OWF, which is in planning in the same period, a proof of coordination with the respective project developer must be produced in the context of project approval procedure.

(b) Wind turbine systems must strictly maintain a distance of at least two and half the times of the rotor diameter of the wind turbine system placed within the respective site or area for other energy generation from the centre line, which arises from the boundaries of two neighbouring sites or areas for other energy generation or the boundaries of a site and a neighbouring area for other energy generation.

(c) Wind turbine systems must strictly maintain a distance of at least five times the larger rotor diameter from the approved wind turbine system in exclusive economic zones or territorial seas of neighbouring countries. In case of a simultaneous planning of neighbouring wind farm, there should be coordination between the respective project developers for conformance to a corresponding distance.

(d) OWF including their wind turbine systems should be designed such that wind turbine systems can be constructed in neighbouring sites or areas for other energy generation at a distance of five times the rotor diameter, without this resulting in an adverse effect on the structural stability of your own wind turbine system.

(e) The construction of wind turbine systems and plants for other forms of energy generation is permitted only within the designated sites or in areas for other energy generation.

The principles (b) and (c) are applicable only for wind turbine system within sites and areas for other energy generation, which are designated from this Site Development Plan (see Table 1), and for SEN-1 and N-13.3.

7.11 Specific planning principles for sites and wind turbines

Planning principles for sites, primarily for the construction and operation of wind turbine systems are listed below.

7.11.1 Deviation of the actually installed capacity from the allocated grid connection capacity

The number of wind turbine systems to be installed on the site and, if applicable, any installed capacity in excess of the allocated grid connection capacity shall be determined as part of the approval procedure.

(a) If the scope of increase in installed capacity does not exceed a proportion of ten per cent of the allocated grid connection capacity, the OWF project developer does not have to provide any additional proofs. In contrast, if the operator intends an increase of over ten percent of the allocated grid connection capacity in the installed capacity, TSO's approval regarding the compliance with the maximum temperatures of TSO's equipment is required.

(b) The additional wind turbine systems are to be constructed within the allocated site.

7.12 Specific planning principles for platforms

Planning principles for platforms are listed below. Platforms generally cover converter platforms, collector platforms, transformer platforms, platforms for other forms of energy generation, accommodation platforms and other platforms, which are in areas or areas for other energy generation.

7.12.1 Planning and public display of platforms

During planning, construction, operation and deconstruction of the platform, particular attention shall be paid to structural safety, supply and disposal, including the provision of drinking water, sewage water treatment and occupational health and safety concerns, including escape routes and means of rescue.

(a) The compliance of this planning principle should be presented in the project approval procedure.

(b) The accommodation of personnel on platforms should take place in accommodation already provided for this purpose during the planning of the platform. The later installation of residential units, which were not planned in the concept in terms of residential units already considered in the planning of the platform (so-called temporary living quarters), is to be avoided.

(c) For a platform, at least two and for the purpose of escape and rescue, independent means of access and egress should be provided, which shall use different transport systems.

(d) A helicopter hoist platform can be set up on platforms as a rescue area for emergencies. Their use is in principle restricted to the prevention of danger to life and limb of persons (emergency) or to necessary measures; regular access of persons to the platform by means of helicopter hoist operation is not permitted.

(e) The greater arrival times and maximum ranges (return journey) due to greater distances of the resources and emergency forces from the coast should be taken into consideration while assessing the rescue facilities and means for prevention of hazards.

7.13 Specific planning principles for subsea cables

The planning principles for subsea cables are listed below, meaning power cable systems in line with this plan, such as OGCS, interconnectors, cross connections of installations with each other and subsea cables for other forms of energy generation. For subsea cables of the inter-array cabling also of other energy generation areas, the following planning principles apply with the exception of 7.13.2 and 7.13.3.

7.13.1 Bundling

(a) The biggest possible bundling in line with a routing parallel with each other should be sought while laying the subsea cables.

(b) The routing should be as parallel as possible to existing structures and structural installations.

7.13.2 Routing through gates

(a) Subsea cables that land in Germany should strictly be routed through gates N-I to N-V or O-I to O-V designated at the boundaries to EEZ and the 12 sm zone.

(b) Interconnectors are also to be routed through gates N-VI to N-XVI or O-I to O-XIII designated at the boundaries to EEZ and the 12 sm zone.

(c) Interconnectors that do not land in Germany should not be routed through gates N-I to N-V.

7.13.3 Crossing of shipping lanes

Subsea cables should be routed through traffic separation zones, the continuations of these, and the Kiel-Baltic Sea route by the shortest possible route if parallel routing to existing structural installations is not possible.

7.13.4 Crossings

Crossings are to be kept to the minimum necessary from a planning and technical point of view.

(a) Intersections of subsea cables with each other and with pipelines should be avoided as far as possible.

(b) If crossings cannot be avoided, they are to be the latest technological advancements, and should be designed at right angle as far as possible and in agreement with the owners of the affected, laid, or approved subsea cables and pipelines.

(c) Crossings between subsea cables designated in the Site Development Plan are to be designed free of construction, e.g., by laying the first system to be crossed in the expected crossing area sufficiently deep, provided the local geological conditions permit it.

(d) The design of crossing structure must be as environment-friendly as possible depending on the seabed conditions (see also the regulations under planning principle 7.1.5).

(e) If possible, crossing structures should be designed such overfishing can be done in the area for fishery, even with seabed touching trawls.

(f) When planning a crossing construction, the subsoil conditions and the respective laying radii of the cables must be taken into consideration.

(g) In the case of crossings, the conditions of planned crossings are to be contractually agreed with the owners of affected, laid or approved underwater cables and pipelines.

(h) In the event of cutting of decommissioned cables (out-of-service cables), these cables shall be laid down and their cable ends fixed in the seabed in such a way that any adverse effects on shipping and fishery is permanently ruled out. Sealing of the seabed by fixing must be limited to what is absolutely necessary. Please refer to planning principle 7.5.

7.13.5 Minimally disruptive cable laying procedure

According to Section 17d, para. 1a of the Energy Industry Act, all the technically suitable methods can be used for the construction of OGCS. In order to protect the marine environment, the gentlest possible cable laying procedure should be chosen from those available in each case as long as this allows parallel laying of multiple OGCS and the timely laying.

(a) Any anchor positions should be placed such that significant adverse effect of legally protected biotopes is avoided as far as possible.

(b) When clearing stone, avoid clearing over large areas. The clearing of individual stones must be carried out within a 20 m wide impact zone (10 m to the right and left of the route) or 30 m in curved areas. The stones

shall be deposited as close as possible to their recovery site, preventing uplift from the water body, and no more than 20 m outside the working strip within the biotopes. Area clearance and clearance outside the impact zone must be applied for separately and approved by the Federal Maritime and Hydrographic Agency.

(c) In the case of reef occurrences, a minimum distance of 50 m is to be maintained where this is technically possible. Please refer to planning principle 7.1.

7.13.6 Covering over

In the designation of covering over of subsea cables to be ensured for long-term, the concerns of protection of marine environment, shipping, defence, fishery, fishery research and the system security should be taken into consideration while also considering the overriding public interest of Offshore wind energy as a part of the deliberations.

(a) A covering over of at least 1.5 m should be designated for all subsea cables in the EEZ of the North Sea outside the areas and areas for other energy generation designated in the Site Development Plan.

(b) A covering over of at least 1.5 m should be designated for all subsea cables in the EEZ of the North Sea for the corridors for scientific research vessels in the overlapping areas of sites for wind energy with reservation areas of scientific research.

(c) In an individual procedure, the designation of covering over for subsea cables in the Baltic Sea is based on a comprehensive study in agreement with the Directorate General of Waterways and Shipping (GDWS) and including the Federal Agency for Nature Conservation (BfN). The study and the proposed covering over of the various route sections based on it are to be submitted to the Federal Maritime and Hydrographic Agency in principle with the application documents.

7.14 Deviation possibilities

The possibility of deviating from planning principles depends, among other things, on whether the planning principles are based on binding regulations from sectoral law. If special provisions can be found from the sectoral law, any deviations from this should be measured. There can be deviations from the mandatory regulations, e.g., the right to renewable energies or nature conservation law.

Thus, for example, a deviation from the objectives under Section 4, para. 1 of ROG and thus the obligations to follow in spatially important plans given under ROP is possible only under the prerequisites given there.

With regard to existing official standards, provisions and concepts, the Site Development Plan does not make any new designations but rather refers only to existing rules. Accordingly, it does not make any statements on the possibilities for deviation regulated within this framework.

Furthermore, in justified cases, it is possible to deviate from planning principles that are not based on mandatory sectoral law or which do not represent maritime spatial planning objectives. This concerns cases in which compliance cannot or can no longer be guaranteed because of special framework conditions. Furthermore, some situations are conceivable in which not all principles can be implemented at the same time because they partly serve conflicting concerns and must therefore be offset.

Provided the sectoral law does not give rise to any binding provisions, options for deviations for already anticipatable (individual) cases are given in the respective planning principles themselves.

Project developers, who apply for construction and operation of wind turbine system including the corresponding ancillary installations, other

forms of energy generation, OGCS, cross connections of installations with each other, or interconnectors with the Federal Maritime and Hydrographic Agency, can deviate from planning principles allowing deviations in justified cases if a simultaneous compliance of all the planning principles allowing deviations is not possible.

In an overall consideration, it is necessary that the deviation fulfils the objectives and purposes of the respective principle and of the plan pursued by the rule in an equivalent manner or does not adversely affect them in a significant manner. The basic principles of planning may not be affected. Following the principles developed within the framework of the ROG, atypical individual cases in particular may be an indication of such possible deviations.

Section 1, para. 3, of the Offshore Wind Energy Act must be taken into consideration in designing the decision on deviation.

8 Pilot offshore wind turbines

The grid connection capacities available for pilot offshore wind turbines according to Section 95, para. 2 Offshore Wind Energy Act are shown in Table 9. This is a free capacity on the converters or DC grid connection systems in the North Sea and AC grid connection systems in the Baltic Sea, for which, neither an unconditional grid connection confirmation under Section 118, para. 12 of the Energy Industry Act nor an allocation under Section 17d, para. 3, sentence 1 or Section 118, para. 19 of the Energy Industry Act nor an award under Section 14a, Section 23 or Section 34 of the Offshore Wind Energy Act, has been issued until now.

Table 9: Grid connection capacities available for pilot offshore wind turbines

Grid connection	Available grid connection capacities for pilot offshore wind turbines
North Sea	
NOR-2-2 / DolWin1/alpha	38.44 MW
Baltic Sea	
OST-1-3	15 MW
OST-2-1	3 MW
OST-2-3	23.75 MW

In order to prevent spatial conflicts, the Site Development Plan also sets out the following provisions for the grid connection of pilot offshore wind turbines at sea for the area of the German EEZ:

(a) In accordance with Section 5, para. 2 of the Offshore Wind Energy Act, pilot offshore wind turbines at sea may be constructed only in the areas designated in the Site Development Plan.

(b) The planning principles under 6 must be followed for consideration of public and private concerns.

9 Areas for other energy generation

The area for other energy generation SEN-1 was designated in Site Development Plan 2023 in the North Sea EEZ. This draft makes no new designations for areas for other energy generation compared to Site Development Plan 2023.

The planning principles of the Site Development Plan and the objectives and principles of ROP 2021 must be complied with.

A grid connection of area SEN-1 to existing and planned pipelines exclusively transporting the final energy sources is obligatory. For a grid connection to an existing pipeline, the required stub cable should be planned to a shortest possible

route within the area for other energy generation and crossings with own cables as well as third-party cables should be avoided as far as possible.

The pipeline operator must ensure the facility of discrimination-free connection of more areas for other energy generation operated by third parties if the final energy source is taken away through such a pipeline.

Questions for consultation

Potential route to grid connection of SEN-1

A potential routing for a hydrogen line, via which even SEN-1 can be connected, leads from SEN-1 towards south-east to reservation area defence. It should bend to the south and run to the west of N-2 to gate N-I. Alternatively, a routing towards N-III is consulted:

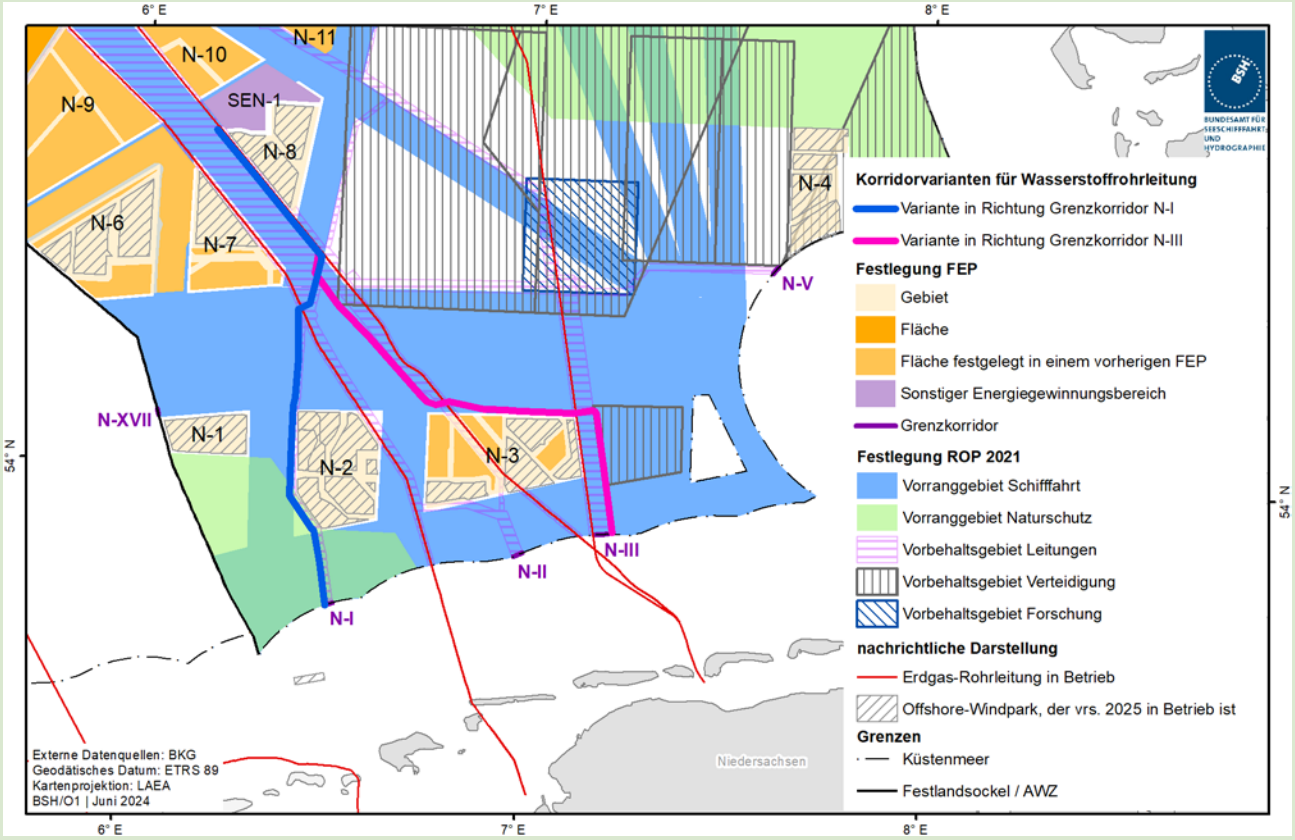

Figure 10: Hydrogen pipeline - potential routing between SEN-1 and territorial sea

F9. Are there fundamental objections to the described routing in your view? In that case, would the alternative of leading the route from the reservation area defence to the east from Area N-3 to gate N-III be beneficial? Please justify this.

III. Justification

Amendment and revision of the Site Development Plan in agreement with the Federal Network Agency, Section 8, para. 1, para. 4, sentence 2 in conjunction with Section 6 of the Offshore Wind Energy Act is the responsibility of the Federal Maritime and Hydrographic Agency. Designations for an installed capacity of wind turbine system of at least 30 GW, connected to the grid were already made with the Site Development Plan 2023. Therefore, to attain a total of at least 70 GW up to year 2045 in the long-term according to Section 1, para. 2, sentence 1 of the Offshore Wind Energy Act, will need further revisions. Amendments can become necessary due to changes, such as those of the statutory framework conditions or from insights or plans, even beyond these designations. Accordingly, in the context of this procedure, the Site Development Plan should be revised and changed with a view of the future.

1 Areas and sites

Results of coordination with Netherlands and Denmark

The spatial designations of Areas N-9, N-12, N-13, N-16 and N-17 constitute the preliminary intermediate result of an ongoing coordination with the relevant authorities of the Netherlands and Denmark. In this process, different variants for additional wind energy areas in the area of shipping route SN10 were investigated regarding their consistency with the concerns of shipping (vgl. ABL Group, 2022; ABL Group, 2023). The variants were additionally investigated with respect to their contribution for wind energy use, specifically, in relation to additional size of the site and potential installed capacities. Furthermore, the expected energy yield and the generation efficiency, e.g., expressed as full load hours, is investigated for many variants (vgl. Dörenkämper, et al., 2023; Vollmer & Dörenkämper, 2023; Vollmer & Dörenkämper, 2024a; Vollmer & Dörenkämper, 2024b).

Basically, variants of a central strip for wind energy as well as alternative variants of a so-called framework conditions envisaged in ROP 2021 were considered. In the international coordination, solely the peripheral development has proved to be an implementable option.

In a second phase, different variants of peripheral development were investigated in depth for their impacts on the safety and efficiency of shipping. The results of these investigations are currently summarised in a report by the expert. The coordination meetings with the responsible ministries and authorities in the Netherlands, Denmark, and Germany run parallel to these investigations. The draft constitutes the current intermediate result of this coordination and the variants preferable from the point of view of Federal Maritime and Hydrographic Agency.

It became clear in the preliminary investigations of the expert that the option of a peripheral development of SN10 with a simultaneously closed SN17 and an alternative route through Denmark is basically suitable with respect to the safety risk for shipping. This option reduces potential risks for shipping, especially in the crossing area of shipping routes SN10, SN15 and SN17 and simultaneously opens up other areas for Offshore wind energy. Denmark, Netherlands, and Germany have intensively exchanged ideas on various options of northbound route based on the insights from the expert report. In this context, no concerns regarding the safety and efficiency of shipping could be identified at this time for the route preferred by Germany. For this reason, this draft takes this preferred variant as the basis for further site development planning for Offshore wind energy and thus puts it for international consultation.

Adaptations in the routing of international shipping routes SN10, SN15 and SN16 form the basis of the preliminary intermediate result shown

in this draft. Shipping route SN17 is not provided further.

Shipping route SN10 is provided with lesser width compared to the designations of ROP 2021. This is consistent with the concerns of shipping since a corridor of around 15 sea miles of sufficient dimension is further provided for shipping. This also confirms the preliminary results as a part of the international Formal Safety Assessment, which is conducted jointly with Denmark and Netherlands. The areas not needed for shipping are therefore provided for use by wind energy in this Site Development Plan. This allows the expansion of Areas N-9, N-12 and N-13 to the north west and a designation of Areas N-14 and N-16, which go beyond the designations of reservation areas EN14 and EN16 of ROP 2021 in their spatial expansion.

The course of shipping route SN15 is slightly adjusted compared to the designations of ROP 2021 and now runs a little to the north. The adjusted route considers areas for extraction of hydrocarbons in the Dutch EEZ. An adjustment of the neighbouring areas for wind energy compared to the designations of ROP 2021 is required to ensure a coherent route, but which have no impacts on the overall expected generation capacity. The width of shipping route SN15 remains unchanged.

The course of shipping route SN16 is adjusted to the north compared to the designation of ROP 2021, with the aim of enlarging the partial sites of area for wind energy N-17 located to the south of shipping route SN16. As a consequence, the north-most partial site of reservation area EN17 of ROP 2021 is no longer taken into consideration for wind energy. The width of shipping route SN16 remains unchanged. The course of adjusted shipping route SN16 overlaps with the nature conservation area Doggerbank. The course of this route was also agreed upon in the course of international coordination with Denmark and Netherlands and taken into consideration in the expert report.

Shipping route SN17 of ROP 2021 is not considered further. Instead of it, a routing of northward traffic via shipping routes SN10 and S7 in Denmark is planned in the current intermediate result. This leads to a reduction of collision risks in the crossing area of shipping routes SN10, SN15, and SN17. As a result, the wind energy area N-16 can be expanded by the area no longer needed for shipping.

The adjustments of shipping routes consider the overriding public interest in the implementation of offshore wind turbine system and as a result, lead to a comprehensive expansion of the areas for wind energy use. Apart from the expansions and adjustments described, Area N-14 covers major parts of reservation areas for wind energy EN14 and EN15 designated in ROP 2021, Area N-14 covers major parts of reservation areas for wind energy EN16 and EN18.

Area N-13 and Site N-13.1

Between Sites N-11.2 and N-13.1, Site Development Plan 2023 does not designate a distance of 1,000 m regularly provided for sites with a commissioning after 2030. This inconsistency in planning is corrected and Area N-13 as well as Site N-13.1 are accordingly reduced on the south-west edge by a strip of around 280 m width.

Among other things, owing to the distances of at least five times the rotor diameter to be anyway maintained from the wind turbine system of Site N-11.2, it is assumed that adjustment of the site layout implies no significant restriction for the actual development of Site N-13.1. The site is therefore changed in line with a consistent plan and equal treatment of sites compared to the designation of Site Development Plan 2023.

Site N-13.4

There are insights only on the occurrences of legally protected biotopes and for geological quality of the seabed with potential impacts on the

further development of sites for site N-13.4. Further information can be found in the environmental report.

Parts of the sites are designated as site under review, since there is an overlap with the conditional priority area EN13-North of the ROP 2021.

There is no time designated for this site in this revision procedure.

Area N-14

Area N-14 has a partial overlap with the reservation area hydrocarbon extraction KWN2 designated in ROP 2021, which is based on the exploration licence area NE3-0002-01. With the expiry of exploration licence NE3-0002-01 (Landesamt für Bergbau, Energie und Geologie, 2023) the direct reason for safeguarding the space of production of raw material by the reservation area KWN2 of ROP 2021 is not applicable. The construction of wind turbine systems is of overriding public interest and serves the public security. Use of Area N-14 by wind energy is in agreement with the requirements of maritime spatial planning.

Area N-19

Area N-19 is located completely within the “Doggerbank” sandbank identified by the Federal Agency for Nature Conservation (see Fig. 13 in Section 2.5.2 in North Sea Environmental Report) and thus completely within a legally protected biotope. Furthermore, there are primary indications of occurrence of coarse sediments, which should be possibly classified as legally protected biotope type gravel layer-, coarse sand layer and shell layers. Further information can be found in the environmental report.

Area under review N-20

The area under review N-20 spatially matches Area EN20, which is designated in ROP 2021 as reservation area of Offshore wind energy from 01.01.2027, unless the Federal Ministry responsible for fishery research proves to the Federal Ministry responsible for maritime spatial planning by 31.12.2026 that keeping the area free of development by wind turbines is indispensable for fishery research (see principle 2.2.2. (2) para. 3 of ROP 2021). In addition, parts of Area EN20 are also designated as reservation areas for scientific research (FoN3); fishery research should continue to be possible to that extent in the way it was done until now (see principle 2.2.2 (3) of ROP 2021).

Designation of Areas N-4 and N-5 for subsequent use

Since the first schedule of Site Development Plan in 2019, Areas N-4 and N-5 bear the status of “Area for subsequent use in review” for nature conservation and environmental precautions. Both the areas, N-4 and N-5, are located in important habitats of protected species/species groups. The requirement to review the areas with regard to any subsequent use arises from Section 8, para. 3 of the Offshore Wind Energy Act. The wind farms of Areas N-4 and N-5 are probably among the first that will go out of operation. Therefore, as a part of the current revision of the Site Development Plan, a subsequent use of Areas N-4 and N-5 is in consultation so as to create planning security for the future use of these areas.

Even against the background of increase in expansion targets for Offshore wind energy to a total of at least 70 GW in 2045, another review of subsequent use of Areas N-4 and N-5 appears necessary since a changed starting situation has arisen: In the evaluation until now, potential areas, which appeared preferable in the overall view compared to Areas N-4 and N-5, could be prioritised without the implementation of statutory expansion targets coming into question. In view of the constant installed capacity of a total of at least 70 GW, there are hardly any areas available, where competing uses of offshore wind energy are permitted and which are also

more suitable for nature conservation than N-4 or N-5.

Area N-4 is designated in the previous layout according to ROP 2021. An expected capacity to be installed of 2,000 MW is presently assumed for Area N-4 for subsequent use.

A changed layout is designated for Area N-5. The OWF Butendiek within the partial site II of nature conservation area Sylt Outer Reef and OWF Dan Tysk immediately adjacent to partial site II are not designated as area or site for subsequent use after the duration of permission elapses.

The following considerations underlie the area layout N-5:

- Shipping: The area is determined under consideration of a possible extension of shipping route SN7 (object of the research project “Traffic flows in the EEZ" currently planned by the BMDV (the Federal Ministry for Transport and Digital Infrastructure)). The area has a distance of 2.5 nautical miles from the priority area SN7 defined in the ROP 2021. At the same time, this would result in the closure of shipping route SN8.
- Capacity: In the interests of efficient use and utilisation of the grid connection in accordance with Section 5, para. 4, sentence 1 of the Offshore Wind Energy Act (see below for further explanation), the area is defined on the assumption that the size of the area should enable a capacity of a multiple of the standard transmission capacity of 2,000 MW. On this basis, it is assumed that the capacity to be installed in area N-5 will increase to an expected 4,000 MW in the course of subsequent utilisation.

From an environmental perspective, the following aspects must be taken into consideration for the subsequent utilisation of areas N-5 (new layout) and partially part N-4. These do not preclude the designation of an area and will be appropriately taken into consideration as part of the consultation on the draft Site Development Plan and, in particular, the specific area designation in a further revision process:

- Due to the location in the main concentration area harbour of harbour porpoises, there are restrictions with regard to the subsequent use of areas N-4 and N-5 in accordance with the reasoning for section 2.4 (4) of ROP 2021 in that special attention should be paid to the effectiveness of preventive and mitigation measures, particularly during the sensitive season, when erecting wind turbines at the approval level (see ROP 2021). The noise mitigation concept of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMU 2013) must be strictly used (see the planning principle 7.1.4). Low-noise, alternative foundation methods are to be favoured here.
- Consideration of the occurrence of very coarse sediments (superficial moraine clay) and local boulder fields as well as the legally protected biotopes reefs and species-rich gravel, coarse sand and shell layers in accordance with Section 30 of the Federal Nature Conservation Act and the FFH habitat type sublittoral sandbanks (1110) in area N-5 in the subsequent specific area layout and site selection for offshore wind turbines.
- Consideration of an appropriate distance to area II of the nature conservation area "Sylt Outer Reef - Eastern German Bight" in the east and the future sub-area III in the south (see the draft bill for the first ordinance to amend the ordinance on the designation of the nature conservation area "Sylt Outer Reef - Eastern German Bight")
- Presumably reduction deterrence on seabirds and resting birds in the main concentration area harbour of divers by closing the

shipping route SN8 and the newly included planning principle 7.1.8 (traffic logistics concept).

Size of areas

According to Section 2a, para. 2 of the Offshore Wind Energy Act, each area to be put out to tender should permit an installed capacity of 500 to 2,000 MW in principle. For this Site Development Plan, it is generally assumed that a capacity of 2,000 MW is likely to be installed in each area, unless the spatial conditions make it necessary to define smaller areas with a lower expected installed capacity, for example if areas do not allow a multiple of 2,000 MW to be defined. The reason for specifying large areas with the resulting reduction in individual areas and OWF projects is the associated expectation of increased efficiency for the various phases of an area or an OWF, from planning and preliminary site investigation to tendering, approval, realisation and operation through to deconstruction. In individual cases, these considerations lead to the definition of areas with two spatially separate sub-areas, as in the example of site N-14.3.

Regarding the distances between areas and other energy generation areas

Areas and other energy generation areas that are defined as of this Site Development Plan are planned within the areas at a distance of at least 1,000 m from neighbouring areas and areas for other energy generation. For the distances between wind turbines and other energy generation facilities and wind turbines and other energy generation facilities in neighbouring areas and areas for other energy generation, the provisions in section 7.10.5 apply.

Regarding expected capacity to be installed

The aim of determining the expected capacity to be installed is to ensure the synchronised development of offshore wind energy and offshore grid connection systems and to achieve the statutory expansion targets for offshore wind energy. Accordingly, the required capacity of the offshore grid connecting cable is determined and the grid connection of the sites is defined. The aim is to achieve an orderly and efficient use and utilisation of offshore grid connection cables.

By determining the expected installed capacity, the expected tender volume on the respective site is predetermined. The share of the respective area in the tendering volume is determined for centrally pre-investigated areas on the basis of the preliminary site investigation as part of the suitability assessment and determination of the respective area with the associated Ordinance on the Implementation of the Offshore Wind Energy Act (WindSeeV) in accordance with Section 12, para. 5 of the Offshore Wind Energy Act. Therefore, the installed capacity determined in the site investigation may deviate from the designations of the Site Development Plan. For the tender of sites that are not centrally pre-investigated, the determination of the expected installed capacity in the Site Development Plan is decisive.

The methodology for determining performance was consulted on extensively as part of the amendment and revision procedure for Site Development Plan 2020; please refer to Site Development Plan 2020 for further background information.

The determination of the expected capacity to be installed in the respective area as part of this amendment and revision of the Site Development Plan is carried out by taking the following competing objectives in consideration:

1. Achieving targets and efficient use of space:

In accordance with Section 1, para. 2 of the Offshore Wind Energy Act, the aim of the Offshore Wind Energy Act is to increase the installed capacity of offshore wind turbines in order to achieve the expansion targets. In view of the limited availability of space in the German EEZ, it must be taken into consideration when determining the expected installed capacity that the expansion targets must be achieved with the areas

available for wind energy utilisation. Ongoing coordination with the competent authorities in the Netherlands and Denmark on the management of international shipping routes has made it possible to significantly expand the areas available for wind energy utilisation compared to the specifications of the ROP 2021, which will make a considerable contribution to achieving the targets. Nevertheless, in order to achieve the target, it is still necessary to use rather high power densities in an international comparison when determining the expected capacity to be installed. In addition, the Site Development Plan makes stipulations in accordance with Section 4, para. 2, no. 2 of the Offshore Wind Energy Act with the aim, among other things, of expanding electricity generation from offshore wind turbines with efficient use of space. High power densities help in the efficient use of space by reducing the total area required to achieve the target.

2. Cost efficiency:

According to Section 1, para. 2, sentence 2 of the Offshore Wind Energy Act, the development of offshore wind energy should be cost-efficient. The expected full-load hours are considered to be an influencing factor influencing cost efficiency. These, in turn, are significantly influenced by the power density in addition to other influences. Other factors such as distance from the coast and installation technology also play a role in cost efficiency. With all other assumptions remaining the same, a lower power density leads to a reduction in losses due to wake effects within wind farms and in neighbouring wind farms and thus, within a certain range, to a reduction in the levelised cost of energy. In terms of cost efficiency, a lower power density is therefore advantageous within a certain range.

3. Efficiency of the grid connection

In accordance with Section 5, para. 4, sentence 1 of the Offshore Wind Energy Act, the aim of site designations in the Site Development Plan is also the efficient use and utilisation of the offshore grid connection cables. When determining the expected capacity to be installed, inefficiencies must therefore be avoided, such as residual capacities on grid connection systems or cross-area connections. This approach serves in particular to ensure coordinated and systematic overall planning so that the very limited space for the routing of grid connection cables in the territorial sea can be utilised efficiently. When determining the expected capacity to be installed in this Site Development Plan, this means that it is based on the standard capacity of the grid connection systems of 2,000 MW per connection system. For the extensions of areas N-9, N-12 and N-13 as well as for areas N-14 and N-16, the expected generation capacity for the first time in this Site Development Plan corresponds in each case to a multiple of the standard transmission capacity of the grid connection systems of 2,000 MW.

Plausibility check using the corrected power density

The base area is only of limited suitability as an initial value for the expected power of an area. In addition to the size of the site, the geometry of the site and the underlying systems technology are important aspects in determining the potential output of a site. For this reason, Site Development Plan 2020 introduced the corrected power density as a comparative value (cf Section 4.7 of Site Development Plan 2020). The expected generation capacity is based on a corrected base area, which supplements the defined area with a buffer strip half the width of a turbine spacing. This makes it possible to compare sites of different sizes and geometries.

When determining areas and the expected generation capacity, a similar level of the resulting corrected power density is generally aimed for. The specifications in this Site Development Plan are based on a target value for the corrected power density of 10 MW/km², taking into consideration the criteria of efficient use of space and

cost efficiency when determining the expected generation capacity. However, due to the individual spatial conditions and planning constraints, in particular the size of areas in conjunction with the efficiency of the standard grid connection, there are differences between the areas. The corrected power densities of the areas are shown in Table 10.

Table 10: Corrected power density

Designation of area	Designation of site	Corrected power density[a] [MW/km²]
N-3	N-3.7	7.5
	N-3.8	9.3
	N-3.5	8.8
	N-3.6	9.9
N-6	N-6.6	9.6
	N-6.7	5.7
	~~N-21.1~~ N-6.8	~~6.5~~ 6.6
N-7	N-7.2	9.3
N-9	N-9.1	10.7
	N-9.2	10.6
	N-9.3	11.2
	N-9.4	12.0
	N-9.5	11.6
N-10	N-10.1	10.6
	N-10.2	10.2
N-11	N-11.1	8.3
	N-11.2	7.8
N-12	N-12.1	8.7
	N-12.2	9.1
	N-12.3	9.4
	N-12.4	8.3
	N-12.5	8.1
N-13	N-13.1	~~7.5~~ 7.7
	N-13.2	8.6
	N-13.3	8.7
	N-13.4	8.4
N-14	N-14.1	9.0
	N-14.2	9.0
	N-14.3	10.0
N-16	N-16.1	10.1
	N-16.2	9.9
	N-16.3	10.0
	N-16.4	9.9
	N-16.5	9.8
	N-16.6	10.1
O-1	O-1.3	7.3
O-2	O-2.2	7.3

Colour coding:
Designations in a previous Site Development Plan | Designations in a previous Site Development Plan with changes | New designation

[a] For the areas defined for the first time in this Site Development Plan, a buffer distance of 500 m was assumed for the calculation of the corrected power density.

Estimation of the expected energy yield

In order to estimate the expected annual energy generation and to assess the influence of wake effects on the electricity yield, extensive modelling was carried out in various expansion scenarios as part of the scientific expert report commissioned by the Federal Maritime and Hydrographic Agency to accompany the revision procedure of the Site Development Plan. Current results are published on the website of the Federal Maritime and Hydrographic Agency (Vollmer & Dörenkämper, 2024a; Vollmer & Dörenkämper, 2024b), which also take into consideration updated assumptions for wind energy expansion in the Dutch EEZ and hypothetical assumptions for an expanded expansion in the Danish EEZ, which represent an unfavourable case for wind farms within the German EEZ.

The results serve to check the plausibility of the power calculation and as an indicator of the expected cost efficiency of electricity generation.

The assumption of an increasing expansion of offshore wind energy in the German EEZ and in neighbouring EEZs leads to an overall reduction in the expected full load hours for wind farms within the German EEZ of the North Sea. For the full expansion outlined in this Site Development Plan, the estimates result in full load hours averaging around 3,200 h/a for the North Sea (without taking into consideration the extended assumptions for expansion in the Danish EEZ) (Vollmer & Dörenkämper, 2024a) and around 3,300 h/a for the Baltic Sea (Dörenkämper, et al., 2023).

The expansion of areas N-9, N-12 and N-13 by additional areas creates very large contiguous wind energy areas with significant additional energy yields for these areas. At the same time, however, additional shading will result in lower average full load hours for these areas. The assumption of an extended expansion of wind farms within the Dutch EEZ also has an additional negative impact on the expected energy yields within the neighbouring areas in the German EEZ. Due to the gradual expansion of areas N-6, N-9 and N-12 as a result of international consultations, which took place over several revisions of the Site Development Plan, some areas within these areas are directly surrounded by other areas on all or several sides. As a rule, below-average full load hours are to be expected for OWFs in these areas.

When evaluating the results of the yield estimate, it should be noted that these were determined assuming full availability of wind turbines and grid connections and without taking electrical losses into account. On the other hand, the long-term average yields are expected to be slightly higher than for the reference year 2006 assumed in the scenarios (Vollmer, Dörenkämper, & Borowski, 2023) The yield estimates are dependent on assumptions and are subject to uncertainties.

On the expected installed capacity for sites N-9.4 and N-9.5

For the expansion of area N-9 to include sites N-9.4 and N-9.5, the determination of an additional expected installed capacity totalling 2,000 MW and alternatively a total of 4,000 MW was examined due to the additional area. Accordingly, one or two grid connection systems are required for the connection. A cross-area grid connection, e.g. with area N-12, was ruled out due to the large distance and the need to cross the main corridor for cables and pipelines in the direction of zones 4 and 5 (so-called North-western region of the German EEZ). The determination of the expected power to be installed for sites N-9.4 and N-9.5 will also have impacts on the expected energy yields of wind farms on neighbouring areas due to the expected shading losses. The sites N-9.1, N-9.2 and N-9.3 are affected in particular.

The Federal Maritime and Hydrographic Agency has had the expected energy yields for wind farms on sites N-9.4 and N-9.5 and neighbouring

sites estimated in two scenarios as part of an expert report. Updated assumptions on wind energy expansion in the Dutch EEZ were also taken into consideration, which are also expected to have impacts on the expected yields for neighbouring wind farms within the German EEZ. The results are summarised and published in a separate report (Vollmer & Dörenkämper, 2024a).

The determination of an expected total installed capacity of 4,000 MW for sites N-9.4 and N-9.5 is supported by the additional determination of 2,000 MW, which would otherwise have to be planned elsewhere, probably much further from the coast. Due to the higher total nominal capacity in area N-9, a higher total energy yield can be expected for this area. However, due to the simultaneous increase in shading losses, the relative increase in yield is lower than the increase in output. With a specification of 2,000 MW for each of the sites N-9.4 and N-9.5, there are smaller differences between the areas within the area N-9 in terms of the power densities and the expected full load hours. Compared to the other sites in the area N-9, higher full-load hours can be assumed for sites N-9.4 and N-9.5 due to their peripheral location despite their above-average power density. In addition, lower overall costs for the grid connection can be expected for area N-9 compared to areas further offshore due to the shorter lengths of submarine cable required. If a total of two grid connection systems are specified for sites N-9.4 and N-9.5, this results in a short spatial distance between the offshore converter platforms, which favours a connection between these converter platforms.

The alternative specification of an expected total installed capacity of 2,000 MW for sites N-9.4 and N-9.5 is supported by the higher expected full load hours, which result in particular for sites N-9.4 and N-9.5, but also for neighbouring sites. This has a favourable effect on cost efficiency. In addition, the lower resulting power densities in the case of an expected installed capacity of 1,000 MW each result in greater leeway in the choice of turbine locations for wind farms on these sites.

However, the latter considerations cannot outweigh the advantages of a higher specification; in particular, the limited availability of land in the German EEZ is the decisive factor here. As a result, an expected generation capacity of 2,000 MW each is envisaged for sites N-9.4 and N-9.5. The determination of the expected generation capacity at this level serves to achieve the ambitious expansion targets. This also realises the objective of efficient use of space, also see reasoning for 5.2.

2 Acceleration site

2.1 Designation of acceleration site by the Site Development Plan

The site designations as acceleration areas in accordance with Section 5, para. 2b Draft Offshore Wind Energy Act is especially based on the following legal provisions:

An area should be designated as an acceleration area if no significant impacts on the environment within the meaning of Section 5, para. 2b, sentence 3 of the Draft Offshore Wind Energy Act are to be expected as a result of the construction and operation of offshore wind turbines. No significant impacts on the environment within the meaning of Section 5, para. 2b, sentence 3 of the Draft Offshore Wind Energy Act are expected for the designated acceleration sites. No impacts are expected on the conservation objectives within the meaning of Section 7, para. 1, no. 9 of the Federal Nature Conservation Act or on the specially protected species pursuant to Section 7, para. 2, no. 13 of the Federal Nature Conservation Act. The designated areas are also not located in a particularly sensitive area within the meaning of Section 5, para. 2b, sentence 7, no. 1 of the Draft Offshore Wind Energy Act. None of the areas are located in a Natura 2000 area within the meaning of Section 7, para. 1, no. 8 of

the Federal Nature Conservation Act, Section 5, para. 2b, sentence 7, no. 2 of the Draft Offshore Wind Energy Act; in a marine area that is protected by a Protected Area Ordinance pursuant to Section 57 of the Federal Nature Conservation Act, Section 5, para. 2b, sentence 7, no. 3 of the Draft Offshore Wind Energy Act; in a bird corridor designated in the Annex to the Ordinance on Maritime Spatial Planning in the German exclusive economic zone in the North Sea and the Baltic Sea of 19 August 2021 (Federal Law Gazettel p. 3886), Section 5, para. 2b, sentence 7 no. 4 of the Draft Offshore Wind Energy Act; within an area eight kilometres wide starting from the outer boundary of the areas pursuant to Section 5, para. 2b, sentence 7, nos. 1 to 4 of the Draft Offshore Wind Energy Act, whereby the areas newly designated pursuant to no. 1 remain excluded, Section 5, para. 2b, sentence 7, no. 5 of the Draft Offshore Wind Energy Act; or in the Baltic Sea, Section 5, para. 2b, sentence 7, no. 6 of the Draft Offshore Wind Energy Act. This fulfils the requirements for the designation of acceleration sites.

It is true that these requirements are also met for certain other sites that have not been designated as acceleration sites (namely sites N-9.5, N-16.1, N-16.4 and N-16.5), and hence that acceleration sites could also be designated here in accordance with Section 5, para. 2b, sentence 3 of the Draft Offshore Wind Energy Act. In the context of the exercise of discretion in the review pursuant to Section 5, para. 2b, sentence 3 of the Draft Offshore Wind Energy Act, it has become apparent when considering the derivation of the technical basis for the exercise of discretion in the designation of acceleration areas within the meaning of Section 5 of the Draft Offshore Wind Energy Act (see Section 6 in the North Sea environmental report), it has emerged that some sites may fall into the atypical standard cases described by the legislator, which preclude designation. Taking the special features of the site into consideration, these include, for example, a significant occurrence of sensitive seabirds and resting birds or large-scale, sensitive biotope structures. Similar findings were seen at sites N-9.5, N-16.1, N-16.4 and N-16.5. Therefore, these sites are not designated as acceleration sites and are subject to a preliminary site investigation.

Derivation of the technical basis for the exercise of discretion in the designation of acceleration sites within the meaning of Section 5 of Draft Offshore Wind Energy Act (see section 6 in the North Sea environmental report), mitigation measures and rules for mitigation measures within the meaning of Section 5, para. 2c, sentences 1 and 2 of the Draft Offshore Wind Energy Act were taken into consideration on an environmental basis when examining the sites. The mitigation measures and rules for mitigation measures are determined on an area-specific basis, Section 5, para. 2c, sentences 1 and 2 of the
Draft Offshore Wind Energy Act. The mitigation measures can be found in the catalogue in Section 5 of the Appendix. Mitigation measures as well as concrete specification of rules are defined and implemented by the Federal Maritime and Hydrographic Agency in the approval procedure.

The Federal Maritime and Hydrographic Agency monitors the effectiveness of these measures and, in consultation with the Federal Agency for Nature Conservation, immediately takes suitable and proportionate measures if new mitigation measures prove to be ineffective, Section 5, para. 2c, sentence 3 of the Draft Offshore Wind Energy Act.

Even if the mitigation measures are complied with, the statutory requirements for the provisions of the Site Development Plan, including the planning principles, will be met.

2.2 Acceleration sites according to Section 8a of the Offshore Wind Energy Act shown for information

The declaration of existing sites as acceleration sites is based on the amendment to the Offshore Wind Energy Act by the "Act to amend the Renewable Energy Sources Act and other energy industry regulations to increase the expansion of photovoltaic energy generation" of 8 May 2024 (Federal Law Gazette I 2024 No. 151 of 15 May 2024). Article 10 of this law was added to Section 8a of the Offshore Wind Energy Act. This provision declares existing sites from the Site Development Plan 2023 as acceleration sites. Even if the designation is not carried out by the Site Development Plan, the affected sites (N-6.6, N-6.7, N-7.2, N-9.1, N-9.2, N-9.3, N-10.1, N-10.2, N-11.1, N-11.2, N-12.1, N-12.2, N-12.3, N-13.1, N-13.2, N-21.1 (henceforth N-6.8)) are shown for the sake of clarity.

In addition, mitigation measures and rules for mitigation measures pursuant to Section 5, para. 2c, sentence 1 of the Draft Offshore Wind Energy Act are also defined for these sites.

3 Cables

3.1 Gates to the territorial sea

The routes planned in the Site Development Plan must be able to be reasonably routed through the territorial sea to the GCP (cf planning principle 7.13.2). For coordination with the coastal states, the gates serve as locations where the grid connection cables cross the border between the EEZ and the territorial sea. In this way, the cable systems are to be concentrated at these points as far as possible and bundled for further routing towards the GCP. The routing in the territorial sea is not determined; this is the responsibility of other bodies in the procedures provided for this purpose. When the corridors were designated, no assessment of the further routing (e.g. with regard to nature conservation concerns in the territorial sea) was carried out. This is also the responsibility of the competent authorities in the procedures provided for this purpose.

The dimensioning of the gates at the transition to the territorial sea results from the distances between the cable systems and the number of required or possible systems as well as the respective space situation at the transition to the territorial sea.

With regard to the planned location of the gates, there are severe restrictions within the EEZ due to the already approved and existing OWF, so that the conflicts resulting from the existing lack of space cannot be easily resolved by definitions in this plan. In addition, existing structures (i.e. in particular cable systems and pipelines already in operation) must be taken into consideration, whereby the subsea cables planned must fit into the existing system. At the same time, planning in the territorial sea has not yet progressed to the point where a sufficient number of routes have been identified to achieve the expansion targets. The gates in this plan are therefore defined in close consultation with the coastal states. The Federal Maritime and Hydrographic Agency is in consultation with the responsible federal states, the Federal Network Agency and the TSOs to identify further gates and additional route capacities at existing gates. The aim of this coordination is to identify sufficient route corridors and gates to permanently achieve the statutory expansion target of at least 70 GW by 2045. Additional demand for route corridors and gates arises from the realisation of further international interconnection projects to cover the import demand for renewable electricity from abroad.

The gates are explicitly intended for power lines. No capacity is planned for pipelines here, and hence these must be routed outside the defined gates.

North Sea

No further systems can be planned for the gate N-I (Ems route) as part of the Site Development Plan, since this will already be fully utilised after 2025.

Gate N-II (Norderney route) will be fully occupied with the commissioning of NOR-6-4 (defined as NOR-21-1 in the Site Development Plan 2023).

OGCS via gate N-III should be routed via the two islands of Baltrum and Langeoog in the territorial sea in future - subject to further assessments. The total capacity of the N-III gate has not been finally determined. However, according to findings from the "Sea Routes 2030" project, a potential total of 13 OGCS could be derived via this corridor from a technical perspective using the currently available methods. Five of these OGCS would then be routed via the island of Baltrum and a further eight OGCS via the island of Langeoog. Only two OGCS via the island of Baltrum have been approved by the state planning authorities until now.

The route corridor via the island of Baltrum is available earlier than the route corridor via the island of Langeoog. The OGCS defined in the Site Development Plan 2023 up to and including 2031 with gates N-III NOR-9-2, NOR-9-3, NOR-12-1, NOR-11-2 and NOR-13-1 are spatially planned across the island of Baltrum owing to this reason.

After commissioning these five OGCS, the pipeline corridor via Baltrum will be exhausted and all further OGCS via the gate N-III will be routed via Langeoog.

The gate N-V to the North Sea territorial sea of Schleswig-Holstein is defined south-west of area N-4. Following an examination of the capacity via the so-called Büsum corridor in the territorial sea of Schleswig-Holstein as part of the revision procedure for the Site Development Plan 2023, it was determined that 12 systems can probably be routed via the corridor without laying them within the fairway. This corresponds to a capacity of eight OGCS for the gate N-V, while the remaining four systems will be routed via the already fully utilised gate N-IV.

Based on current knowledge, the described capacities at gates N-II, N-III and N-V are sufficient to route the OGCS specified in this plan through the territorial sea of the North Sea to land.

Baltic Sea

In the area of the gate O-I, two additional OGCS and two cross-border subsea cables are planned in addition to the existing systems as part of this plan (see section 3.3).

Gate O-II is not a corridor for grid connection of OWFs through the territorial sea to the GCP in the sense of this plan. This corridor serves exclusively for the grid connection of the OWF "ARCADIS East I" (area O-4), which has been authorised in the territorial sea.

Gate O-III is defined by the existing systems for the OWF "EnBW wind farm Baltic 2". Two cross-border subsea cables are planned for this corridor as part of the Site Development Plan (see section 3.3).

Gates O-IV, O-V, and O-XIII are also used exclusively for the routing of interconnectors within the framework of this plan (see Section 3.3).

3.2 Offshore grid connection systems

In contrast to the specifications in the Site Development Plan 2023, OGCS with the calendar year of commissioning from 2032 onwards are defined in this plan. The defined OGCS serve for the grid connection of the defined areas. OGCS are only defined for those areas for which a year or quarter of the tender and commissioning are also defined. Accordingly, OGCS are defined in this plan with the calendar year of commissioning up to and including 2037.

The NDP 2037/2045, which was confirmed by the Federal Network Agency on 01.03.2024, is the main basis for determining the OGCS in this plan. In the NDP, the OGCS are confirmed with the year of commissioning and the respective NVP. The responsibility of the TSOs for the respective OGCS is derived from the allocation of the NVP. Based on the location of the NVP, the confirmed OGCS are allocated to the gates in

the territorial sea. The known capacities of the gates corridors are taken into consideration. In the confirmation of the NDP 2037/2045 of 01.03.2024, the OGCS NOR-x-1 to NOR-x-8 were only confirmed from the NVP to the gate. The routing within the EEZ up to the site to be connected is the responsibility of the Site Development Plan. In Table 4, a corresponding allocation is made for the OGCS NOR-x-1 to NOR-x-8.

The allocation of areas to be connected to the OGCS or gates to be used takes the spatial location of the respective sites into consideration. Therefore, OGCS NOR-12-3, NOR-12-4, NOR-16-1 and NOR-16-2, which are located on the northern border of the EEZ or in the northern area of the EEZ, are routed to the gate N-V. Crossings with the OGCS located further south, which are routed to gate N-III, can thus be avoided. OGCS NOR-6-4 is routed to gate N-II, as site N-6.8 is located in the western part of the EEZ. According to current knowledge, NOR-6-4 is the last OGCS that can be routed N-II. All other OGCS defined in this plan are routed to Lower Saxony via gate N-III.

In Table 4, the grid connection NOR-10-1 was specified as “Designation in a previous Site Development Plan with amendment”. Spatial adjustments were made to the NOR-10-1 grid connection with regard to the route to the converter platform through site N-10.1 and at the north-western boundary of SEN-1. The grid connection NOR-10-1 now runs between sites N-10.1 and N-10.2 and, after bending in a north-easterly direction, along the north-western boundary to SEN-1.

The locations of the converter platforms in the sites to be connected were already the subject of consultation in previous plans. As a result and after consideration of all comments, the converter platforms are generally positioned in the centre of the site to be connected. This can minimise the overall length of the cabling within the wind farm.The increasing size of wind turbines is accompanied by greater absolute distances between them. This in turn creates further opportunities for the creation of flight corridors for the helicopter landing deck of the platform within the sites without significantly restricting the utilisation of the site.

Exceptions to the centred positioning of the converter platform are the OGCS NOR-9-4, NOR-9-5 and NOR-14-3. the locations are defined at the north-western edge of the sites as far as NOR-9-4 and NOR-9-5 are concerned. The locations on the edge of the respective area allow for greater flexibility in the subsequent WT layout, which is advantageous in these cases due to the comparatively high power density of sites N-9.4 and N-9.5. In addition, the converter platforms NOR-9-4 and NOR-9-5 should be connected with each other by a route. Due to the location of the converter platforms on the edge, the connection will also result in less adverse effect on the sites. The converter platform of OGCS NOR-14-3 is also determined at the edge of site N-14.3. On the one hand, the reasons for this positioning are the need to connect wind turbines from the northern sub-site N-14.3 to the converter platform and, on the other hand, the definition of a connecting line from the NOR-14-3 converter platform in a western direction to the Dutch EEZ via gate N-XIV.

For the specified locations of converter platforms, a small-scale shift of the location may be necessary in the course of detailed planning, for example due to the results of the site investigation or the positioning of the helicopter landing deck on the platform, even beyond the inaccuracy of the planning scale. As long as this does not result in any changes to the protection zone of 1,000 m defined in the planning principle 7.10.4 around the converter platform site defined in the Site Development Plan, wherein no wind turbines may be erected, it is assumed that this will generally not have any significant impacts on the OWF developer of the project in the respective site.

With regard to the spatial specifications, reference is made to the planning scale of 1:400,000 and the associated inaccuracies of the graphic specifications. The depiction of turning points of cable routes in the Site Development Plan is always (right-)angled. This does not correspond to the actual, technically required towing and laying radii of the construction ships and is dependent on the cable system to be laid. The exact representation of laying radii is given in respective approval procedures. Please refer to the planning principle (b). It is also pointed out that the resulting differences in the area of the turning points in the individual project approval procedure must not be regarded as a deviation from the Site Development Plan.

3.3 Interconnectors

The Site Development Plan is intended to spatially secure routes or route corridors for possible cross-border subsea cables in order to ensure that the existing and planned cross-border subsea cables can be spatially integrated into a coordinated overall system, i.e. in particular with regard to the OGCS for OWFs.

North Sea

As part of the Site Development Plan, eight additional cross-border subsea cables are defined in the North Sea EEZ.

In the course of the revision, two new gates for cross-border subsea cables to Denmark and the Netherlands were defined in the North Sea EEZ. The names of the gates still labelled N-VIII to N-XII in the preliminary draft have been consecutively adjusted by one number each in this draft by defining the first new gate. The first new gate N-VIII thus joins the counter-clockwise numbered gates along the border of the EEZ. Two options are defined for the gate N-VIII: N-VIIIa is located to the north of site N-16.3 and N-VIIIb is located to the north of site N-16.5. This changes the designation of the subsequent gate to the north-east between the sub-areas of site N-16.6 (earlier N-VIII) in N-IX. The subsequent gates (earlier N-IX to N-XII) thus change to N-X to N-XIII.

The names of the gates still labelled N-XIII to N-XV in the preliminary draft have been consecutively adjusted by two numbers each in this draft by defining the new gate. The second new gate N-XIV north of the southern sub-area N-14.3 thus joins the counter-clockwise numbered gates along the border of the EEZ. This changes the designation of the subsequent gate south of site N-14.1 (earlier N-XIII) to N-XV, the name designation of gate to the west of site N-9.5 (earlier N-XIV) to N-XVI and the gate to the north of "Borkum Riffgrund 3” (earlier N-XV) to N-XVII.

A connection is only defined up to a bundling point so that the question of landfall can be clarified at a later date. This means that a further route can initially be kept open for OGCS on the limited gates to the territorial sea. Starting from the bundling point, the subsea cables runs parallel to "Europipe 2" and shipping route SN4 to shipping route SN10 and from there along the border of areas N1-2 and N-13 to gate N-VI in the direction of the Danish EEZ.

The other interconnector landing in Germany is the approved NeuConnect system routed to the UK. It begins at gate N-III and runs parallel to "Europipe 2" in a northerly direction to the southern edge of shipping route SN2. From there, it continues north of areas N-1, N-2 and N-3 to the west to gate N-XVII. Although NeuConnect crosses gate N-III, it does not cross an island. For this reason, NeuConnect is not relevant for the limited capacity of 13 OGCS via gate N-III.

In addition, three further cross-border subsea cables are planned that can only cross the German EEZ and connect the Netherlands with Denmark or Norway. Two routes run north and one south along the SN10 shipping route and connect the gates N-VI and N-XVI as well as N-VII and N-XV. Further cross-border subsea cables

are provided for a connection from Denmark via the gate N-VI to Germany and runs south along the SN10 and north-west of area N-12 until it bends in a south-easterly direction at the western tip of site N-12.4 and runs to a bundling point to the west of "Europipe 2". Another system is planned parallel to “Viking Link” from gate N-IX to N-XIII .

For a connection between Germany and Denmark, cross-border subsea cables will run from the NOR-16-5 platform eastwards out of the site and northwards along the newly defined gate N-VIIIb between sites N-16.4 and N-16.5 to Denmark. In addition, a route for a connection between NOR-16-3 and Denmark will be spatially defined. This runs from the NOR-16-3 converter platform parallel to the connection with the NOR-16-2 converter platform in a north-easterly direction out of the site and then runs in a north-westerly direction between sites N-16.2 and N-16.3 to the newly defined gate N-VIIIa.

For a connection between Germany and the Netherlands, cross-border subsea cables will run from the NOR-14-3 platform westwards out of the southern sub-area N-14.3 along the newly defined gate N-XIV to the Netherlands.

Baltic Sea

In the Baltic Sea EEZ, ten routes or route corridors have been defined for cross-border subsea cables connecting the German territorial sea with the Danish and Swedish EEZs. One system each is planned in the area of the Fehmarnbelt crossing (O-V to O-VI) and parallel to "Kontek" (O-IV to O-VII). In the gate O-III, two systems begin in the direction of Sweden, which run parallel to the OWF "EnBW wind farm Baltic 2" to the gate O-IX. These are planned in the area of the OWF "EnBW wind farm Baltic 2" with a reduced distance of 350 m and 450 m to the OWF in order to minimise the impact on the overlapping submarine diving area. Two cross-border subsea cables are also planned from the O-I gate in the direction of Bornholm, running parallel to the existing OGCS to the gates O-X and O-XI. In its comment on the preliminary draft dated 01 September 2023, the TSO responsible for the grid connection of Bornholm Energy Island (BEI), 50Hertz, announced that it would examine the possible route alternatives between the gates O-XI and O-I as well as between the gates O-XII and O-XIII. Following this review process of the two alternative routes, it is planned to realise the cross-border subsea cables for the grid connection of "Bornholm Energy Island" via the route from gate O-XI to O-I. After entering the German EEZ, this runs via the gate O-XI between the OWF Wikinger and Arkona Basic South-East and crosses the shipping route SO2 parallel to OST-1-4. From the area O-2, it runs parallel to OST-1-4 and the cross-border subsea cables, which connects Germany and Denmark via the gates O-I and O-X, to the gate O-I in the direction of the territorial sea.

In order to enable a connection between OST-2-4 and Denmark, three routes for cross-border subsea cables with a voltage level of 220 kV to the gate O-X will be secured from the OST-2-4 converter platform. These run north of site O-2.2 parallel to OST-2-4. After OST-2-4 turns to the south, the routes continue to run along the southern edge of SO1 in an easterly direction and from the level of site O-1.3 parallel to the "Bornholm Subsea Cable" to the gate O-X. Shortly before reaching the gate with Denmark, the three systems cross the edge of a submarine diving area. With regard to the gate O-X, it is also pointed out that it is located on the edge of a submarine diving area and that, for reasons of national and alliance military defence, the route should always be routed outside this NATO training area in the Danish area as well.

Another system was planned in parallel between "NordStream 1" and "NordStream 2" in the Site Development Plan 2023 and connects the gates O-XII and O-XIII. Following consultation with the TSOs, this route will be supplemented by two

parallel routes to the north of "NordStream 2" in order to create further opportunities for international meshing. In addition, a further route for cross-border subsea cables has been defined in parallel. The relevant gates O-XII and O-XIII were extended by 600 metres to the north for this purpose. In the course of the revision of the Site Development Plan, further coordination between the Federal Maritime and Hydrographic Agency, the TSOs and the German Armed Forces will have to take place in this regard, since it still needs to be comprehensively examined whether there are any objections to the current planning from the point of view of national and alliance military defence and whether the new course of the routes north of "NordStream 1" and "NordStream 2" can be determined.

3.4 Cross connections of installations with each other

The spatial requirements for cross connections must be ensured for new grid connections, starting with the grid connection NOR-9-4. Please refer to section 5.11 of the Site Development Plan 2020 for the reasoning for dispensing with cross connections in zones 1 and 2. With a view to possible subsequent uses in these zones, cross connections to these platforms may also be resumed.

It is now assumed that cross connections will be realised with direct current technology in the future. Current platform concepts of the TSO provide for these possibilities; in addition, multi-terminal converters are to be increasingly used; these allow a connection to further converters. Because one route is sufficient for DC connections, the required route site for cross connections is reduced. When designating the route corridors for cross connections, the adverse effect on the sites should be as low as possible.

North Sea

Cross connections that were defined in previous revisions of the Site Development Plan will not be realised, since this would jeopardise the timely commissioning of the respective OGCS. In accordance with the national interconnection measure M273_new confirmed in the NDP 2037/2045, a connection between the OGCS NOR-9-4 and NOR-9-5 is defined in this plan.

The connection between the converter platforms NOR-16-2 and NOR-16-3 is also defined on the basis of the confirmed measure M272_new of the NEP 2037/2045. Alternatively, a connection between NOR-16-4 and NOR-16-5 is specified.

In order to realise the shortest possible route, a direct connection between the two converter platforms is defined that crosses sites N-16.2 and N-16.3. Please refer to planning principle (b).

Such a designation implies that the two sites to be connected will be affected. As described in the second draft of the Site Development Plan 2023, additional transfer areas are defined at the boundaries of the sites for such cross connections. In addition, the awarded bidder for a site is granted flexibility in the planning of the WT layout as long as the designations listed in II regarding the design of the cross connections with each other are complied with.

For illustration purposes, Figure 11 represents ellipses, half the circumference of which corresponds to the maximum possible route length (+20 percent).

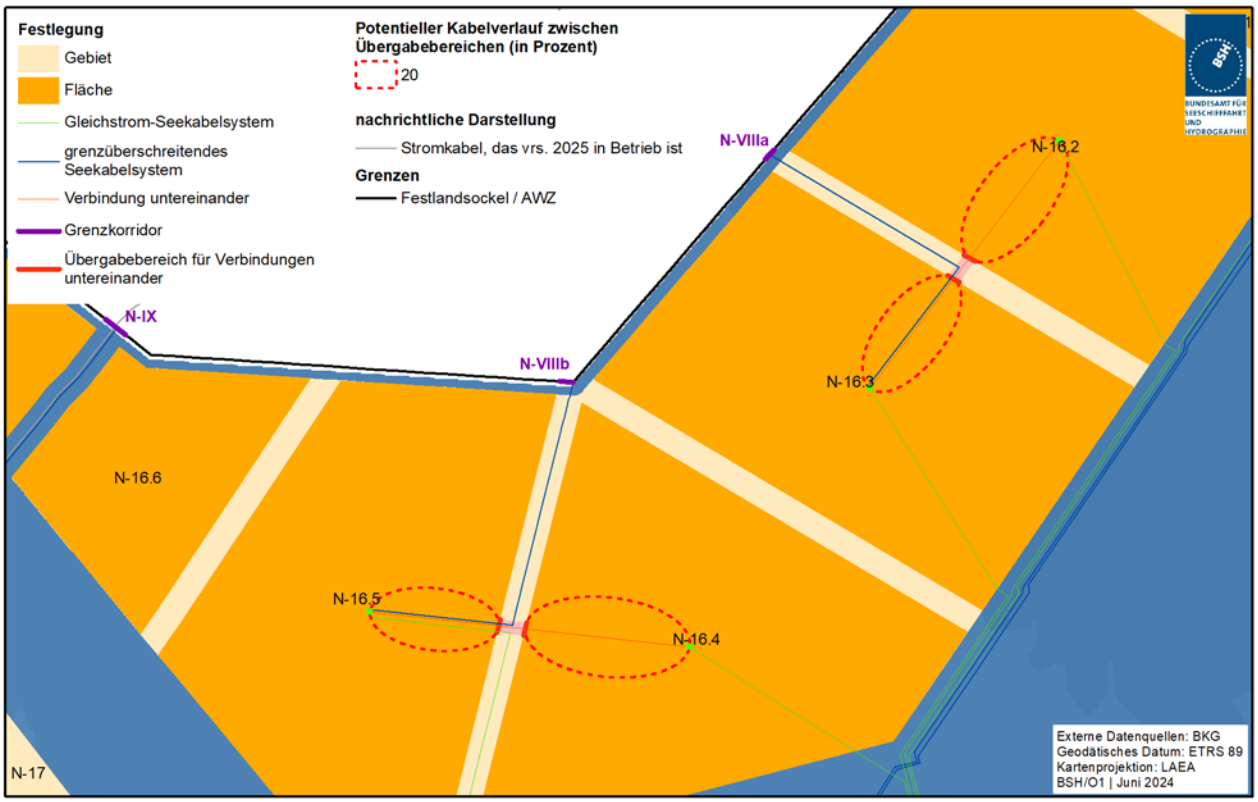

Figure 11: Designations for cross connections between installations: Illustration of possible path lengths for cross connections in the form of ellipses

4 Designations for the territorial sea

In accordance with Section 4, para. 1, sentence 2 of the Offshore Wind Energy Act, the Site Development Plan may also make sectoral planning designations for areas, sites, the chronological order in which the sites are put out to tender, the calendar years of commissioning, and the expected generation capacity as well as for testing grounds and other areas for other energy generation for the territorial sea. According to an administrative agreement[12] between the Federal Government, represented by the Federal Maritime and Hydrographic Agency, and the competent state, the individual designations for the territorial sea are determined in more detail.

Pursuant to Section 4, para. 1, sentence 4 of the Offshore Wind Energy Act, the federal state shall provide the Federal Maritime and Hydrographic Agency with the necessary information and documents, including those required for the strategic environmental assessment (SEA).

According to Administrative Agreement, designations for the territorial sea shall not include

[12] Available on the website of the Federal Maritime and Hydrographic Agency at: https://www.bsh.de/DE/THEMEN/Offshore/Meeresfachplanung/Flaechenentwicklungsplan/_Anlagen/Downloads/FEP/Flaechenentwicklungsplan_Verwaltungsvereinbarung_BSH_Mecklenburg_Vorpommern.html?nn=1653366

- the locations for converter platforms, collector platforms and transformer stations
- Routes or route corridors for offshore grid connection cables, for cross-border subsea cables or for possible cross connections between installations, routes and route corridors, and
- the definition of locations where the offshore grid connection cables cross the boundary between the EEZ and the territorial sea, and
- standardised technical principles and planning principles in accordance with Section 5, para. 1, no. 6 to 11 of the Offshore Wind Energy Act.

The corresponding technical and spatial requirements are the subject of the planning and individual project approval procedures within the jurisdiction of the Land.

An administrative agreement was already concluded between the federal government, represented by the Federal Maritime and Hydrographic Agency, and the state of Mecklenburg–Western Pomerania as part of the process of preparing Site Development Plan 2019.

No such administrative agreement has been concluded with the federal states of Lower Saxony and Schleswig-Holstein. Therefore, no designations are made in the territorial sea of these federal states.

Areas and sites for the construction and operation of offshore wind turbines

The reasoning for "Areas and sites for the construction and operation of offshore wind turbines" corresponds to the content of the Site Development Plan 2023.

Testing ground and testing ground grid connection

The content of the reasoning "Testing ground and testing ground grid connection" in the Site Development Plan 2023 remains valid in principle. However, an adjustment is made with regard to the specification of a testing ground grid connection to be realised by the TSOs with a capacity of 300 MW and commissioning in the calendar year 2032. The aforementioned testing ground grid connection is not determined. This is due to the fact that the state of Mecklenburg-Western Pomerania did not announce the need for such a testing ground grid connection by 30.06.2023.

5 Central site investigation and calendar years of tender and commissioning

Section 5, para. 4 of the Offshore Wind Energy Act specifies the criteria to be applied for site designation in the Site Development Plan as well as the chronological order in which they are to be put out to tender. The overriding objective of the specifications is to ensure that the development of offshore wind energy and the associated OGCS on these sites takes place in parallel and that the existing OGCS are used efficiently and utilised to capacity. This ensures that all offshore wind turbines are connected in good time and vacancies on the OGCS are avoided. In this way, the development of the use of wind energy will be carried out as cost-efficiently as possible. When applying the criteria specified in Section 5, para. 4, sentence 2 of the Offshore Wind Energy Act, this objective and the general objective of the Act is to ensure that a steady and cost-efficient expansion of the use of offshore wind energy must always be taken into account. The list in Section 5, para. 4, sentence 2 of the Offshore Wind Energy Act is not exhaustive.

For a detailed description of the criteria and their application, please refer to section 4.8 of the Site Development Plan 2020.

There must be at least enough months between the calendar year of the tender for a site and the calendar year of the commissioning of the

awarded WT on this site to ensure that the realisation deadlines pursuant to Section 81 of the Offshore Wind Energy Act can be met.

The basis for determining the chronological order of the sites and OGCS is initially the achievement of the expansion targets in accordance with Section 1, para. 2, sentence 1 of the Offshore Wind Energy Act. In addition, Section 2a, para. 1 of the Offshore Wind Energy Act specifies the magnitude of the tendering volume in the individual calendar years.

In accordance with Section 5, para. 1, no. 3 of the Offshore Wind Energy Act, the Site Development Plan must also determine whether the respective area should be centrally pre-investigated and put out to tender in accordance with Part 3, Section 4 of the Offshore Wind Energy Act or whether a tender for the non-centrally pre-investigated sites should be issued in accordance with Part 3, Section 5 of the Offshore Wind Energy Act. Section 5, para. 4, sentence 2 of the Offshore Wind Energy Act sets out criteria for the determination of sites and the chronological order of their tendering.

5.1 Central site investigation

In accordance with Section 2a, para. 2 of the Offshore Wind Energy Act, the tender volume starting with the year 2027 is basically divided in half to centrally pre-investigated and non-pre-investigated sites. The central site investigation is carried out in accordance with Section 9, para. 1, sentence 1 of the Draft Offshore Wind Energy Act outside the acceleration sites.

In order to fulfil Section 2a, para. 2 of the Offshore Wind Energy Act and Section 9, para. 1, sentence 1 of the Draft Offshore Wind Energy Act , it is stipulated that all sites that are not designated as acceleration sites will be centrally pre-investigated.

Sites N-13.3, N-13.4 and N-16.6 are not intended for commissioning up to and including 2037. They are therefore not currently prioritised; sites N-13.3 and N-13.4 are designated for centralised site investigation.

5.2 Calendar years of tender and commissioning

In accordance with Section 5, para. 1, no. 4 of the Offshore Wind Energy Act, the Site Development Plan specifies the calendar years, including the quarter in the respective calendar year, in which the wind turbines awarded on the specified sites and the corresponding OGCS are to be put into operation, as well as the quarters in the respective calendar year in which the cables for the internal cabling of the awarded wind turbines are to be connected to the converters or the transformer platform. In addition, the Site Development Plan can specify key intermediate steps for the joint realisation schedule in accordance with Section 17d, para. 2 of the Energy Industry Act.

As part of the consultation for the Site Development Plan 2020, the interaction between the commissioning of the OGCS and the commissioning of the wind turbines was consulted on. Against this background, the first or second quarter is generally determined for the connection of two areas sites an OGCS. If only one site is connected to the converter platform, the period for cable installation is generally designated as the first and second quarter of the respective calendar year.

In accordance with Section 5, para. 1, no. 4 of the Offshore Wind Energy Act, the Site Development Plan determines the respective quarter of the calendar year for sites and OGCS in addition to the calendar year of commissioning. The question of which quarter of the respective calendar year the OGCS can be commissioned as early as possible was discussed extensively during the consultation on the draft of Site Development Plan 2020. Against this background, the third quarter of the respective calendar year is generally set for the commissioning of the

OGCS. In accordance with Section 17d, para. 2, sentence 1 of the Energy Industry Act, the TSO with a connection obligation commissions the OGCS in good time so that the completion dates are in the calendar years specified for this purpose in the Site Development Plan, including the quarter in the respective calendar year.

The calendar years for tendering and commissioning mentioned in Table 7 and Table 8 are based, among other things, on the NVP available for connecting the sites to the grid. The availability of the NPPs is proposed by the TSOs as part of the NDP process and reviewed by the Federal Network Agency. For the measures confirmed in the NDP 2037/2045 with a year of commissioning up to and including 2037, for which specifications are made, there is a distribution of NPPs in the control areas of the responsible TSOs. To prevent crossings in the EEZ as well as in the territorial sea, sites must therefore be identified that can reasonably be routed via the gates N-III to Lower Saxony or N-V to Schleswig-Holstein in the year specified for the NVP in the NDP. As a result, neighbouring areas may not be put out to tender or put into operation in the same or consecutive years, but may be delayed due to the availability of the NVP.

In addition to the availability of the NVP, the determination of areas for carrying out a centralised site investigation is also an important factor, as the tendering volume of the calendar years should generally be divided equally in accordance with Section 2a, para. 2 of the Offshore Wind Energy Act. The different lead times for centrally pre-investigated and non-centrally pre-investigated sites are taken into consideration when determining the calendar years for the tender and commissioning.

As part of the consultation on the preliminary draft of 01.09.2023, it was proposed that sites N-9.4 and N-9.5 should be defined spatially, but that development should not be planned until later. This was justified in particular by the expected impacts of the development of the two sites on the neighbouring sites N-9.1, N-9.2 and N-9.3 to the south-east, which will be put out to tender in 2024. The proposal was examined during the preparation of the draft, but was not pursued as a result. If N-9.4 and N-9.5 cannot go into operation in 2032 and 2033 respectively as now specified, other sites, in any case further away from the coast, would have to be specified for these years of commissioning. As compensation for the later development of the sites N-9.4 and N-9.5 called for in the consultation, there are no alternative sites available that make sense from a planning perspective.

Compared to the specifications of the Site Development Plan 2023, there have been delays in the realisation of the measures for some grid connection systems. This results in deviations for the relevant grid connection systems from the specifications for the calendar year and quarter of commissioning of the Site Development Plan 2023. The draft of the Site Development Plan only presents these deviations for those grid connection systems for which a corresponding delay has already been announced by the TSOs as part of the publication of the expected completion dates in accordance with Section 17, para. 2, sentence 3 of the Energy Industry Act. This concerns the grid connection systems NOR-9-2 and NOR-11-2. In deviation from this, the TSO Amprion has notified the Federal Maritime and Hydrographic Agency in writing about the deviating dates for the commissioning and installation of the wind farm-internal cabling for NOR-9-1. Due to the relevance for the imminent tendering of the site N-9.1 to be connected at this time, the delay was included in the statement regarding the expected specifications of the site development plan to the Federal Network Agency for the Electricity Grid Development Plan 2037/2045 and the tenders for offshore wind energy 2024 of 26.01.2024 on the basis of the aforementioned letter, although the expected completion date in accordance with Section 17d, para. 2, sentence 3 of the Energy Industry Act

has not yet been published by the TSO. The expected completion date for NOR-9-1 has not yet been announced by the TSO.

The current estimated completion dates for NOR-9-2 and NOR-11-1 have been announced by the responsible TSO TenneT as follows:

Table 11: Estimated completion dates for NOR-9-2 and NOR-11-2 announced by TenneT.[13]

Projekt	*Maßnahme*	*Voraussichtlicher Fertigstellungstermin*
NOR-9-2	Anschluss OWP Fläche N-9.2	31.12.2031
NOR-11-2	Anschluss OWP Flächen N-11.2 und N-13.1	31.12.2031

The delays described result in the changes to the sites to be connected shown in Table 7 and Table 8 compared to the specifications of the Site Development Plan 2023. For the sites N-9.1, N-9.2 and N-11.2 to be put out to tender in 2024 and the site N-13.1 to be put out to tender in 2026, the specifications regarding the calendar year and quarter of commissioning as well as the time at which the wind farm-internal cabling moves into the converter platform, which deviate from the Site Development Plan 2023, therefore apply.

There are no temporal designations for sites N-13.3, N-13.4 and N-16.6 in this Site Development Plan. The specification of calendar years for the tendering and commissioning of these sites is not necessary to fulfil the statutory expansion path until 2037. Compared to sites N-13.3 and N-13.4, other sites appear more suitable in terms of nature conservation. The designation of parts of site N-13.4 is also under review, since there is an overlap with the conditional priority area EN13-North of the ROP 2021. Site N-16.6 is the furthest from the coast of the areas defined in this Site Development Plan. Specifications for the temporal realisation of sites N-13.3, N-13.4 and N-16.6 are planned for a subsequent revision.

6 Standard technical principles

Compared to the specifications in the Site Development Plan 2023, there are only isolated changes to the technical principles. The voltage level for the grid connection concept in accordance with the standard technical principles 6.9 is increased from 66 kV to 132 kV. In the interests of land-efficient use of the EEZ, a provision for the bundled laying of cross-border subsea cables with fibre optic cables is included. For reasons of clarity and congruence with the planning principles, the possibilities for deviations are moved to a separate section (6.13) and supplemented by foreseeable technical innovations. Please refer to section III.5 of the Site Development Plan 2023 for further reasoning of the standard technical principles that have already been defined.

7 Planning principles

7.1 No threat to the marine environment

The environmental and nature conservation planning principles ensure that the marine environment is not endangered, Section 5, para. 3, sentence 2, no. 2 of the Offshore Wind Energy Act and environmental and nature conservation concerns are specified in concrete terms and

[13] Source: https://netztransparenz.tennet.eu/de/strommarkt/transparenz/transparenz-deutschland/offshore-netzanschluesse/

safeguarded. They therefore fundamentally represent prevention and mitigation measures within the meaning of Section 40, para. 2, sentence 1, no. 6 of the Act on the Assessment of Environmental Impacts.

7.1.1 Observance of environmental and nature conservation framework conditions

This planning principle specifies the applicable environmental and nature conservation provisions in concrete terms. These include the following aspects in particular - The list is not exhaustive.

Significant adverse effect of legally protected biotopes within the meaning of Section 30, para. 2, sentence 1 of the Federal Nature Conservation Act should be avoided as far as possible in accordance with Section 72, para. 2 of the Offshore Wind Energy Act when constructing facilities in accordance with the Offshore Wind Energy Act.

Areas, sites, and areas for other energy generation must be compatible with the purpose of protection of a Protected Area Ordinance issued according to Section 57 of the Federal Nature Conservation Act; designations are permissible if, according to Section 34, para. 2 of the Federal Nature Conservation Act, they cannot lead to significant adverse effects on the components of the area relevant to the conservation objective of the respective Protected Area Ordinance, or if they meet the requirements of Section 34, para. 3 to 5 of the Federal Nature Conservation Act.

Section 45a of the Act on Managing Water Resources[14] (WHG) is referred to. Best environmental practice in accordance with the Helsinki and OSPAR Conventions and the respective technological advancements must be taken into consideration and further specified in the individual procedure.

In accordance with Section 2, para. 2, no. 6 of the ROG, the area is to be developed, safeguarded or, where necessary, possible, and appropriate, restored in terms of its importance for the functional capacity of soils, the water balance, fauna and flora, and the climate, including the respective interactions. The significance of the area for the functionality of the soils, the water balance, the fauna and flora, and the climate, including the respective interactions with the requirements of the biotope network system, must be preserved. This should ensure that the dispersal processes and long-range ecological interactions of species and their habitats are taken into consideration.

When laying subsea cables, possible adverse effects on the marine environment should be minimised. To this end, the subsea cables should be laid outside nature conservation areas wherever possible.

Known occurrences of legally protected biotopes in accordance with Section 30 of the Federal Nature Conservation Act must therefore also be avoided as far as possible when laying subsea cables in accordance with Section 72, para. 2 of the Offshore Wind Energy Act.

Prevention and mitigation measures may be required for specific sites and projects when planning and constructing wind turbines and other energy generation facilities at sea in close proximity to nature conservation areas in order to ensure compliance with site protection provisions. These must be concretised at the approval level,

[14] Act on Managing Water Resources of 31 July 2009 (Federal Law GazetteI, page 2585), last amended by Art. 2 G on the implementation of provisions of Directive (EU) 2018/2001 for approval procedures under the Federal Immission Control Act, the Federal Water Act and the Federal Waterways Act of 18.8.2021 (Federal Law Gazette I p. 3901)

taking into consideration the specific plans of the project developers. For acceleration sites, such mitigation measures must be ordered as part of the catalogue of mitigation measures or rules for mitigation measures in accordance with Section 5, para. 2c of the Draft Offshore Wind Energy Act (see Appendix 5.2) for acceleration sites and, if necessary, also in individual project approval procedures if the requirements of Section 70a, para. 4 of the Draft Offshore Wind Energy Act are met.

Depending on the location and foundation design of the wind turbines and other energy generation facilities as well as the conservation purpose of the nature conservation area, additional or specific protective measures may be required in individual cases.

If occurrences of structures listed in Section 30 of the Federal Nature Conservation Act are found during detailed investigations in the specific individual procedure, these must be analysed and taken into consideration in the decision-making process.

The laying of subsea cables as well as their operation, maintenance and possible retention after abandonment of operation or deconstruction can lead to adverse effects on sensitive habitats. In order to limit potential negative impacts on sensitive habitats and to safeguard the purposes of protection of nature conservation areas, subsea cables within the EEZ should primarily be routed outside of nature conservation areas. If this is not possible, impacts on the protection and conservation objectives of the nature conservation areas must be assessed as part of the mitigation measures in accordance with Section 5, para. 2c of Draft the Offshore Wind Energy Actand in the individual project approval procedure.

In the ROP 2021, main bird migration routes were identified as bird migration corridors on the basis of extensive data source. During migration events, a significantly increased collision risk for birds is to be expected within these areas compared to other areas of the EEZ. The operation of wind turbines should, within reasonable limits, be as environmentally compatible as possible. Insofar as birds within the bird migration corridors of the ROP 2021 cannot be protected from a significantly increased collision risk with wind turbines, the requirement for preventive and mitigation measures - this could be, for example, the shutdown of installations during mass migration events - ensures targeted protection of migratory birds. This is necessary to protect the marine environment by preventing a proven significantly increased risk of birds colliding with wind turbines that cannot be mitigated in any other way. Please refer to Planning Principle 6.1.6.

7.1.2 Overall temporal coordination of the construction and installation work and maintenance and repairs works

The designation corresponds to the provisions for overall temporal coordination in principle 2.2.3 (8) of the ROP 2021.

In this way, the number of interventions can be reduced, and possible cumulative impacts avoided or mitigated.

7.1.3 Prevention and reduction of emissions

The prevention and reduction requirement ensures that the construction and operation of offshore installations does not lead to "pollution of the marine environment" within the meaning of Article 1, para. 1, no. 4 of the Convention on the Law of the Sea and a threat to the marine environment pursuant to sections 5, para. 3, sentence 2, no. 2 and 69, para. 3, sentence 1, no. 1 of the Offshore Wind Energy Act. In addition, the provisions of the Ordinance on Environmentally

Sound Practices in Maritime Shipping[15] must be complied with.

In this context, “emissions” are substances or energy directly or indirectly added to the marine environment (e.g. heat, sound, vibration, light, electrical, or electromagnetic radiation).

In order to prevent pollution and threats to the marine environment, no substances may be discharged into the sea during the construction, operation, maintenance and deconstruction of installations. If the discharge of such turbine-specific emissions into the marine environment is unavoidable for technical reasons, e.g. due to safety-relevant provisions of shipping or air traffic, this shall be presented and justified to the approval agency within the framework of the approval procedure, together with an environmental assessment. Installation-specific examination of reasonable alternatives (EIA Directive) must be performed and documented.

The minimisation requirement for material discharges applies.

Light emissions

The attraction effect of artificial light on birds that migrate at night has long been known and documented (summarised in (Ballasus, Hill, & Hüppop, 2009); (Dierschke, et al., 2021); (Brayley, How, & Wakefield, 2022). Especially in poor weather conditions and low visibility, songbirds are attracted by light on lighthouses, vessels, research platforms and oil rigs. On the one hand, this increases the collision risk (with illuminated and unlit parts of the structures), and on the other hand, artificial light can lead to disorientation of the birds, which can be associated with energy losses (Ballasus, Hill, & Hüppop, 2009); (Dierschke, et al., 2021).

Investigations have shown that the light intensity, the colour of the light and the flashing frequency can affect the attraction of migratory birds (Burt, et al., 2023). Current research results show that, if it is not possible to switch them off completely, red flashing lights, in contrast to other colours and continuous lighting, have the lowest attraction effect on migrating birds at night (Evans, Akashi, Altman, & Manville, 2007); (Rebke, et al., 2019); (Zhao, Zhang, Che, & Zou, 2020). Long dark phases with short light phases and synchronisation of the flashing regime of all wind turbines of an OWF are recommended (Ballasus, Hill, & Hüppop, 2009); (Dierschke, et al., 2021).

Measures to reduce light emissions are only possible if the requirements of safe shipping and air traffic are taken into consideration.

The exterior coating shall be as glare-free as possible without prejudice to the regulation on air and navigation marking.

Emissions study

The preparation of an emissions study to survey the emissions arising from the respective design and equipment variant or their prevention is mandatory. When preparing the emission study, the minimum requirements of the guidelines published by the Federal Maritime and Hydrographic Agency “Vision and guiding principles for the emission study for offshore platforms in the German EEZ" and "Guideline for the emission study for offshore wind turbines in the German EEZ", as amended, must be taken into consideration. Due to the early design phase, it is generally not yet possible to fully fulfil the requirements for an emissions study in the approval procedure. For this reason, an emissions concept must first be submitted as part of the application documents. In the concept, the project developer

[15] Marine Environmental Behaviour Ordinance dated 13 August 2014 (Federal Law Gazette I, page 1371), last amended by Article 3 of the Ordinance dated 13 December 2019 (Federal Law Gazette I, page 2739).

must deal with emissions that are as specific and project-related as possible, the possible and applied preventive and mitigation measures and the cumulative effects of the installation(s). The emissions study to be submitted in the enforcement procedure forms the basis for the waste and operating materials concept to be prepared as part of the protection and safety concept. When preparing the waste and fuel concept, the minimum requirements of the "Waste and fuel framework concept for OWFs and their grid connection systems in the German EEZ"[16] published by the Federal Maritime and Hydrographic Agency, as amended, must be taken into consideration. Emergency plans shall be drawn up, inter alia, for accidents involving substances hazardous to water during the construction and operation phases and other unexpected events giving rise to concerns about pollution of the marine environment.

Operating materials

The minimisation requirement also includes that environmentally compatible operating materials (e.g. oils, greases) are to be used as far as possible for the operation of the installation and that biodegradable operating materials are to be preferred, if available. The environmental compatibility of the operating materials used in the installations must be ensured by examination of reasonable alternatives (EIA Directive).

Fluorinated greenhouse gases in switchgear, cooling and air-conditioning systems and fire protection systems

The operating materials used must be assessed for their climate impact. In particular, sulphur hexafluoride (SF_6)is a highly climate-impacting gas. Its use should therefore be avoided for reasons of climate protection. It must be assessed whether SF6 can be replaced by a less non-climate-impacting alternative according to the latest technological advancements. The substitution test and its result shall be presented and justified in the procedures.

If fluorinated greenhouse gases are used, reference is made to the following provisions of Ordinance (EU) 2024/573 of the European Parliament and of the Council of 7 February 2024 on fluorinated greenhouse gases: The deadlines for the bans on the commissioning of electrical switchgear that uses fluorinated greenhouse gases as insulating or switching media must be complied with in accordance with Article 13 of the aforementioned ordinance. Furthermore, the requirements for the prevention of emissions in accordance with Article 4 and the provisions regarding leakage checks of technical installations and, if applicable, leakage detection systems in accordance with Articles 5 and 6 must be observed and implemented by the operator. The use of new SF_6 should be avoided and, if technically possible, reconditioned or recycled SF_6 should be used. After decommissioning the equipment, used SF_6 should be recycled, reconditioned or destroyed.

Constructional and operational precautions and safety measures

Possible structural safety systems and measures for the prevention and monitoring of pollutant accidents and environmental discharges include enclosures, double walls, space/door siphons, drip pans, drainage systems, collection tanks or leakage and remote monitoring. This applies in particular to installations that contain or carry larger quantities of operating materials and/or substances hazardous to water (e.g. diesel tanks, pipelines, transformers). False activations of the fire protection systems on helicopter landing decks must be avoided at all costs.

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[16] The framework concept is available at https://www.bsh.de/DE/THEMEN/Offshore/Offshore-Vorhaben/Windparks/_Anlagen/Downloads/Rahmenkonzept-Abfall-Betriebsstoffe.html?nn=1653404

Because there is an increased hazard potential in the offshore area from changes of operating materials and refuelling measures, special organisational and technical precautionary measures must be taken for these activities (e.g. preparation of method statements, precautionary measures during crane work, self-sealing breakaway couplings (emergency breakaway couplings), dry couplings, drip pans, overfill protections, and spill kits) in order to prevent pollution accidents and environmental discharges.

Waste

Waste must be taken ashore and disposed of there according to the applicable waste disposal regulations. Regulations of this planning principle Exceptions can include the discharge of properly treated sewage water or the discharge of drainage water with a maximum oil content of 5 mg per litre remain unaffected.

Corrosion protection

If the use of galvanic anodes (sacrificial anodes), typically consisting of aluminium-zinc-indium alloys, is unavoidable, this is only permissible in combination with a suitable coating of the foundation structures (cf Federal Maritime and Hydrographic Agency standard construction). The content of minor components of the anode alloys, in particular zinc, cadmium, lead, copper and mercury, shall be reduced as far as possible. The zinc content required for the functionality of the anodes must also be limited to a technically necessary minimum.

The cathodic corrosion protection system must be dimensioned such that the use of galvanic anodes is limited to a technically necessary minimum. The use of zinc anodes (in the sense of zinc being the main component of the anodes) is prohibited. Where necessary, external current systems should be used as a cathodic corrosion protection system in the internal areas of the foundation structures.

The minimum requirements for the corrosion protection in the construction standard must be observed. The use of biocides such as tributyltin (TBT) or other anti-fouling agents to protect the technical surfaces from the undesired settlement of organisms is prohibited.

System cooling

Seawater cooling systems with discharges during regular operation are only permissible in justified exceptional cases (e.g. if the required cooling capacity cannot be demonstrably achieved with closed systems or system variants and no suitable alternative systems are available).

Antifouling agents and biocides are reactive substances and, depending on the concentration, have detrimental impacts on the aquatic environment. In order to counteract pollution of the marine environment, the use of antifouling agents or biocides in seawater cooling systems should be minimised by means of a needs-based treatment strategy. The possibility of seasonally switching off the addition of antifouling agents or biocides, taking into account the expected strength of marine growth, is to be examined. If processes involving chlorination are planned, the concentration at the outlet, i.e. when discharged into the marine environment, must be monitored and a maximum discharge concentration of 0.2 ppm TRO (Total Residual Oxidant) must always be observed. Consideration should be given to monitoring the level of fouling. The use of antifouling agents or biocides requires a comprehensive environmental assessment in advance.

Sewage water

Sewage water treatment plants on platforms are generally not permitted and the sewage water specified in the planning principle must not be released into the marine environment. Because the discharge of treated sewage water is still associated with material discharges to a certain extent, the sewage water must always be collected professionally, transported to land and disposed of there in accordance with the applicable waste management regulations.

On platforms that are not continuously manned, solutions must be found that do not lead to a discharge, for example by providing sufficiently dimensioned collection tanks for the professional collection of sewage water in order to bring the limited quantities of sewage water ashore, or other solutions must be used (such as "incinerating toilets").

Exceptions may be permitted in individual cases and are determined in particular by the manning level of a platform.

On permanently manned platforms, a sewage water treatment plant is permitted by way of exception, in particular if the negative impacts on the marine environment associated with bringing the sewage water ashore - for example due to the required number of ship transports - exceeds the impact associated with discharging the treated sewage water.

The sewage water treatment plant must correspond to the latest technological advancements. This implies, among other things, that only that sewage water treatment plant is permitted which reduces nitrogen and phosphorus compounds at least in accordance with the provisions of MARPOL Resolution MEPC.227(64) “2012 Guidelines on Implementation of Effluent Standards and Performance Tests for Sewage Treatment Plants” Annex 22, para. no. 2.7 (MARPOL, 2012).

If sewage water treatment plants are permissible in individual cases, they shall treat all sewage water arising on the platform.

Chlorination of sewage water is not permitted because chlorination processes produce halogenated secondary compounds that are harmful to the environment. Other techniques must be used that are demonstrably more environmentally friendly (e.g. UV systems and ultrafiltration). Retained solids must be disposed of on land.

To ensure proper operation and to check the purification performance and the discharge values in the operating phase, the sewage water must be sampled and analysed regularly. At sewage water treatment plants, suitable sampling points shall be provided at the inlet and outlet for this purpose. This is to enable sampling and subsequent analysis of the sewage water.

On platforms manned only during maintenance work, sewage water is generated only for a limited period of time. However, sewage water treatment plants are effective only to a limited extent in discontinuous operation so that inadequately treated sewage water can lead to emissions into the marine environment that exceed avoidable levels. On such platforms, it is therefore either necessary to seek solutions that do not lead to a discharge (see above) or permanently maintain the functionality of the sewage water treatment plants (e.g. by adding nutrient solutions). Otherwise, the above provisions for the operation of sewage water treatment plants apply accordingly. A reasoning for the necessity of a sewage water treatment plant must be provided for the respective application as part of the approval procedure.

Oil content of the drainage water

If an oil separator is used instead of a closed system for collecting the drainage water and subsequent disposal on land, the oil content must not exceed 5 milligrams per litre during discharge in order to reduce the discharge of oil contained in the drainage water into the marine environment. The designation of the maximum oil content at 5 milligrams per litre is based on the current state of implementation in the existing OWFs and the technical availability of these systems (e.g. DIN EN 858-1).

In order to monitor compliance with the maximum oil content when discharging into the marine environment, the oil content in the drainage water shall be continuously monitored by means of sensors after passing the oil separator in the discharge.

Use of chemicals, especially in extinguishing foams on helicopter landing decks

Due to the close proximity of the installed installations to the marine environment, the use of chemicals that are potentially hazardous to people and the environment must be minimised as far as possible. The provisions of Ordinances (EC) 1907/2006 concerning the Registration, Evaluation, Approval and Restriction of Chemicals (REACH) and (EU) 2019/1021 on persistent organic pollutants, including the amendments to the Appendices of the aforementioned ordinances, must therefore be complied with. Perfluorinated and polyfluorinated chemicals (PFAS) in particular, e.g. in fire-fighting foams, are substances of particular ecotoxicological concern, have proven negative impacts on the marine environment and accumulate everywhere as extremely persistent substances. Against the background of ongoing European and international procedures to restrict further PFAS in fire-fighting foams, the use of fire-fighting foams containing PFAS should be avoided with foresight.

Reference is made to the principle that emissions should be avoided or, if they are unavoidable, reduced. Therefore, fire-fighting exercises must only be performed using water.

Diesel generators

This provision for platforms ensures that the adequate level of protection is guaranteed whilst a choice can be made between different suitable certifications.

For wind turbines, the use of diesel generators for emergency power supply is to be avoided. The use of diesel generators leads to air emissions. In addition, the operation of diesel generators requires extensive refuelling and fuel storage, which can result in risks of environmental hazards from oil spills. Therefore, alternative systems are to be used for the temporary supply of the wind turbine, if possible, within the framework of ensuring general operational safety.

In order to reduce sulphur dioxide emissions to a minimum, the lowest possible sulphur fuel must be used (such as low-sulphur heating oil according to DIN 51603-1 or diesel according to DIN EN 590 (land diesel)), taking into consideration the storage capacity of the respective product. This applies to temporary generators during installation work on WT and platforms as well as to permanent diesel generators (grid backup systems) on platforms. When selecting the appropriate diesel generators, ensure suitability for the respective fuel type in good time.

Grouting method and grouting material

The specification on grouting procedures serves to minimise the discharge of grouting material during the construction phase and the release of pollutants from the grouting material into the marine environment.

7.1.4 Noise protection in the foundations and operation of installations

This provision ensures prevention of hazards to the marine environment from noise emissions. In particular to ensure compliance with the ban on killing and injuring in accordance with Section 44, para. 1, no. 1 and the prohibition of disturbance in accordance with Section 44, para. 1, no. 2 of the Federal Nature Conservation Act with regard to the protected species of harbour porpoise, appropriate measures must be taken to avoid noise emissions as far as possible and to prevent damage.

The planning principle also corresponds to the assessment of requirement 2.2.2 (6) of ROP 2021.

The further development of low-noise installation methods is to be encouraged. The noise protection measures are further specified in concrete terms on a project-specific basis as part of the approval procedure.

The best available method or a combination of the best available methods according to the latest technological developments in science and technology for reducing the input of underwater

noise in order to comply with applicable noise emission values during the installation of foundation pillars must be used; these possible methods include, in particular, large bubble curtains, cladding pipes, hydro-silencers, limitation of pile-driving energy or optimised pile-driving methods with real-time monitoring. When designing suitable noise mitigation systems, the respective subsoil conditions must be taken into account.

In addition to the actual noise mitigation system, the use of further extensive sound protection measures and monitoring measures, in particular through the survey of underwater noise input as well as the activity of the harbour porpoise during the installation of foundations, is required.

Reference is made to the explanations under 7.2 of the BMU's concept for the protection of harbour porpoises from noise pollution during the construction of OWFs in the German North Sea from 2013.

The SEA (strategic environmental assessment) concludes that, based on current knowledge, only compliance with the applicable noise emission values and implementation of the noise mitigation concept of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection in the North Sea EEZ (BMU, 2013) can ensure with the necessary certainty that the provisions for species protection are met and that nature conservation areas are not significantly impaired in terms of their conservation objectives or protection purpose.

Deterrence

In order to prevent fauna that could be harmed by pile driving noise from being present in the vicinity of planned pile driving work from the outset, deterrence measures must be carried out before pile driving work begins. According to the current status, the danger zone is at least a radius of 750 m around the pile-driving site (see the noise mitigation concept of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMU, 2013).

The provisions under (c) serves for the prevention of a violation of the ban on killing and injuring species under species protection law in accordance with Section 44, para. 1, no. 1 of the Federal Nature Conservation Act. The harbour porpoise is the species that needs to be prioritised for protection. Representatives of other species can also be protected.

At the time of publication of the draft Site Development Plan, configurable state-of-the-art deterrence systems include FaunaGuard or APD (Acoustic Porpoise Deterrent).

The planned measures to prevent damage to the marine environment must be presented in the noise mitigation concept. As part of the approval procedure, it is also regularly stipulated that a concept for reviewing the efficiency of the deterrence and noise-reducing measures must be submitted.

Duration of the pile driving operation

Limiting the duration of individual pile driving operations is intended to minimise the impact and serves to prevent a violation of the prohibition of disturbance under species protection law, Section 44, para. 1, no. 2 of the Federal Nature Conservation Act.

According to current knowledge, the disturbance effect on marine mammals is determined not only by the absolute volume but also by the duration of the noise emissions. The spatial extent of the disturbance of fauna and the duration of the disturbance until presence rates comparable to the situation prior to the impulse sound input are restored depend on the duration of the pile driving work, including deterrence: The longer the duration of the noise-intensive work, the longer it takes to restore presence rates in the vicinity of the construction site. The temporary loss of habitat due to avoidance behaviour can have a considerable impact as a result of prolonged noise emissions, even if the noise level is

reduced. This should be prevented by limiting the duration, whereby the effectiveness can be monitored.

For the various foundation types (e.g. monopile, jacket) and dimensions, there are maximum pile-driving periods that must be specified specifically for each project based on the subsoil found and the foundation used. At the time of publication of the preliminary draft of the Site Development Plan, the guideline values for maximum pile driving duration are 180 minutes for monopiles and 140 minutes for jacket piles. In order to effectively prevent any threat to the marine environment, further specifications will be made by the Federal Maritime and Hydrographic Agency in the approval procedure on the basis of these provisions.

As far as the chronological order is concerned, the deterrence is followed by the provision that indicates that in case of noise-intensive pile driving, the highest possible sound input already at the beginning of the pile driving is to be avoided. The purpose of this stipulation is to give fauna that continue or return to the vicinity of pile driving work the opportunity to move away from the sound source before they are exposed to the full intensity of the sound. At present, a common procedure for ensuring this provision is the so-called soft-start procedure.

Draft noise mitigation concept

In order to ensure that the threshold values for noise protection are complied with during pile driving work, a noise mitigation concept must be drafted and submitted to the Federal Maritime and Hydrographic Agency.

The draft noise mitigation concept must describe:

- the site conditions,
- the planned foundation structure
- the planned construction process,
- the planned working method,
- the planned measures to minimise noise and prevent damage to the marine environment
- the noise forecast (including the expected frequency spectrum of the hammer) and
- the suitability of the noise mitigation systems for reducing the emitted noise according to the latest advancements in science and technology.

The draft must be submitted to the Federal Maritime and Hydrographic Agency in good time so that the plans can be checked and, if necessary, adjusted before the noise-intensive work and the noise mitigation system are commissioned. It is strongly recommended that the noise mitigation concept is submitted before concluding the corresponding contracts. It should also be ensured that noise protection is included in the design and that the planned noise protection measures are coordinated with the planned supporting structure. In particular, lifting vessels and crane capacities must be designed so that additional noise minimisation measures can be incorporated if necessary.

The selection of the planned procedures and the noise forecast must be justified.

As part of the description of the planned working method, the properties of the hammer and the options for controlling the pile-driving process must be described.

Measures to reduce noise are noise-minimising measures that already affect the sound input (e.g. high frequency low energy, HiLo process) and noise-reducing accompanying measures individually or in combination, in each case according to the latest advancements in science and technology. Accompanying noise-reducing measures are measures away from the piles (bubble curtain systems) and, if necessary, noise mitigation systems close to the piles. Measures to prevent damage include, in particu-

lar, deterrence. A concept for this must be submitted as part of the draft noise mitigation concept.

When designing the preventive and mitigation measures, the current state of knowledge from other procedures as well as results from investigations conducted as part of the government's accompanying ecological research and the monitoring of nature conservation areas must be taken into consideration. The noise forecast must take all relevant parameters into consideration.

The final noise mitigation concept must also take into consideration the specific site and plant characteristics (basic design).

As part of the approval procedure, an implementation plan is regularly ordered to be drawn up at least 6 months before the start of construction, which specifies the valid noise mitigation concept and sets out the processes and components in detail.

Testing

The provision to test the noise protection measures and damage prevention measures under offshore conditions should ensure that the noise mitigation predicted in the noise mitigation concept can be achieved. In particular, an offshore test must be carried out when using a system that has not yet been used under comparable conditions. If the test shows that the selected system cannot achieve the required noise mitigation, it may also be necessary to change the noise protection system - if no milder, equally suitable means are available - in order to ensure that no prohibitions under species protection law are realised. As part of the approval procedure, it is regularly stipulated that a concept for reviewing the efficiency of the noise-reducing measures must be submitted.

Coordination of time of pile driving work

The order for overall coordination of the pile driving work in terms of time and space as part of the subordinate approval procedure can be applied on the basis of the species protection law and site protection law requirements if coordination between the project developers is not sufficient.

The noise mitigation concept of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMU, 2013) states that, according to current knowledge, noise-related disturbances of harbour porpoises in the form of flight and avoidance behaviour may occur even if the noise emission values are complied with.

Section 7.3.1 of the noise mitigation concept of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection states that: "In order to rule out significant population-relevant disturbances in the German North Sea now and in the future, sufficient areas not affected by pile-driving noise must be available for harbour porpoises." The protection concept assumes that this is always the case if, firstly, no more than 10 per cent of the area of the EEZ of the German North Sea lies within the disturbance radii of the OWFs currently under construction and, secondly, the threshold value for impulsive noise from the ban on killing and injuring is complied with (ibid.).

Most environmentally compatible working method

Based on the environmental conditions, the developer of the project must select the quietest or otherwise most environmentally compatible construction process according to the circumstances found. The same applies to the working method. This provision will be further specified within the framework of the approval procedure.

During the pile driving work for the foundations of wind turbines, platforms and other energy generation facilities, effective technical noise mitigation systems must be used in order to comply with species and site protection concerns.

In order to prevent the killing and injury of harbour porpoises (Section 44, para. 1, no. 1 of the

Federal Nature Conservation Act, substantiated by the noise mitigation concept of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection), individual project approval procedures regularly stipulate that a suitable noise protection concept must ensure that noise emissions at a distance of 750 m do not exceed the value of 160 decibels for the broadband sound exposure level SEL05[17] and the value of 190 decibels for the peak sound pressure level[18]. Noise protection measures, which include technical noise mitigation, optimised pile driving, deterrence and monitoring of effectiveness, are further specified on a site-specific basis and in relation to the foundation construction used in individual cases. A restriction of the bid within the framework of the invitation to tender for the respective site with regard to the type of foundation shall thus not take place. The established working method according to the latest technological advancements (which is as quiet as possible under the circumstances) shall be used.

For the prevention of the harbour porpoise as a protected species within the meaning of Section 44, para. 1, no. 2 of the Federal Nature Conservation Act in conjunction with the noise mitigation concept of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMU, 2013), suitable overall coordination may be required so that no more than 10 percent of the area of the EEZ is exposed to disturbance-inducing impulse noise at any time. In order to fulfil the species protection requirements under Section 44 of the Federal Nature Conservation Act, it is necessary to ensure that sufficient alternative habitats are permanently available for harbour porpoises in the German North Sea EEZ and that significant disturbance of the local population can be ruled out with the necessary certainty. Through suitable spatial and temporal coordination of parallel construction sites, significant disturbance can also be avoided in the years with the highest expansion rates, 2029 to 2030 (see explanations in section 4.12.3 Environmental report North Sea, Site Development Plan 2023).

In order to comply with the requirements under site protection law within the meaning of Section 34 of the Federal Nature Conservation Act in conjunction with the noise mitigation concept of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMU, 2013), suitable overall coordination may be necessary so that no more than 10 per cent of the area of a nature conservation area is affected by impulse noise that causes disturbance at any time. According to the noise mitigation concept, stricter requirements apply in the period from 1 May to 31 August when implementing projects in sites bordering on Area I of the nature conservation area "Sylt Outer Reef - Eastern German Bight" or in or near the main concentration area harbour of the harbour porpoise. For the particularly sensitive period of the harbour porpoise (May to August), the noise mitigation concept also requires that the Natura 2000 area "Sylt Outer Reef" (corresponds to Area I of the nature conservation area "Sylt Outer Reef - Eastern German Bight") and the main concentration area harbour of the harbour porpoise be kept free of noise-intensive construction measures during this period, where cumulatively more than 1 percent of the area is located within the disturbance radius of 8 km. This is intended to fulfil the requirements of site protection law in accordance with Section 34 of the Federal Nature Conservation Act by ensuring

[17] Sound exposure level in dB re 1 µPa² s; dB = decibel; re = in reference to; 1 µPa = 1 microPascal; 1 µPa² s = 1 microPascal squared * second; the reference level for water is 1 µPa.

[18] Peak sound pressure level in dB re 1 µPa; dB = decibel; re = in reference to; 1 µPa = 1 microPascal; 1 µPa² s = 1 microPascal squared * second; the reference level for water is 1 µPa.

that sufficient alternative habitats are permanently available for harbour porpoises and that any adverse effects of the conservation objectives and the purpose of protection of the nature conservation area can be ruled out with the necessary certainty.

If compliance with the aforementioned 1 percent criterion (protection in the sensitive phase in the Natura 2000 area "Sylt Outer Reef" and in the main concentration area harbour of the harbour porpoise) or the 10 percent criterion (species protection) cannot be technically ensured in the individual procedures, a spatial and temporal coordination of parallel construction sites could be considered - as already implemented in the years 2013 to 2018. This means that at the downstream approval level, it may be possible to issue orders regarding the permitted period for pile-driving work for individual OWF projects whose pile driving work overlaps with that of other projects. For individual projects, it may not be possible for sound-intensive work to take place at certain times.

Blasting

Blasting is generally not permitted because of harmful impacts on the marine environment, in particular harmful sound pressures. If blasting for the removal of ammunition that cannot be transported in the project site or on the routes of grid connection line should be unavoidable, a noise mitigation concept must be submitted to the approval agency in good time beforehand. The provision of a noise mitigation concept is necessary in order to avoid endangering the marine environment through the use of suitable protective measures, such as scaring and the use of bubble curtains, even in the exceptional case of blasting of non-transportable munitions regulated here.

Operational noise

In order to protect the marine environment from significant sound input during the operation of the installations, it is necessary to always ensure that the turbines are as low-noise as possible in accordance with the latest technological advancements. According to current knowledge, the wind turbines that have been used so far are very quiet, so that the noise emission does not stand out from the usual ambient noise even at a very short distance from the installation (final report FuE OWF (offshore wind farms) Noise, 2023). This applies to all types of installations since 2009 (alpha ventus) until today in the German EEZ of the North Sea and Baltic Sea regardless of manufacturer, capacity, size, foundation type, and location.

7.1.5 Minimisation of scour and cable protection measures

In certain areas, measures to prevent scour are necessary to ensure the long-term stability and positional safety of structures on the seabed.

For any scour and cable protection measures, the placement of hard substrate must be limited to the minimum necessary to provide protection in order to minimise the impact on the marine environment.

For technical reasons, the use of natural stone is necessary for the construction of scour protection.

If the use of natural stone or other inert and natural materials is not technically possible when constructing the surface layer of crossing structures, there are no fundamental technical reasons for excluding the use of other inert materials (e.g. plastic-free and pollutant-free concrete mats) to a limited extent, provided that material emissions and the abrasion of plastic particles into the water column can be ruled out.

Even in the case of other cable protection measures, such as those required in the area where cables are fed into wind turbines or the platform, there are no fundamental technical reasons for excluding the use of other inert materials (e.g. plastic and pollutant-free concrete mats)

to a limited extent, provided that material emissions and abrasion of plastic particles into the water column can be ruled out.

7.1.6 Bird collision monitoring

Section 77, para. 1, sentence 1, no. 1 of the Offshore Wind Energy Act obliges the persons responsible pursuant to Section 78 of the Offshore Wind Energy Act to ensure that the facility does not pose a risk to the marine environment during construction, operation and after cessation of operation. This also includes ensuring that there is no proven significantly increased risk of birds colliding with wind turbines that cannot be mitigated by protective measures, Section 69, para. 3, sentence 1, no. 1b of the Offshore Wind Energy Act in conjunction with Section 44 of the Federal Nature Conservation Act. This provision also applies outside the bird migration corridors. In addition, Section 77, para. 3, no. 1 of the Offshore Wind Energy Act stipulates that the responsible persons must carry out monitoring of the construction- and operation-related impacts of the installations on the marine environment during the construction phase and during the first ten years of operation of the turbines and must immediately transmit the data obtained to the Federal Maritime and Hydrographic Agency and the Federal Agency for Nature Conservation. As part of the environmental precautionary principle for the protection of migratory birds, bird collision monitoring should always be carried out with regard to possible collisions between birds and wind turbines. Bird collision monitoring is to be planned for a period of ten years as part of operational monitoring. Reference is made to the options under Section 79, para. 1 to 3 in conjunction with Section 69, para. 3, sentence 1, no. 1b of the Offshore Wind Energy Act.

In order to ensure that professionally coordinated bird collision monitoring is carried out, it is necessary to submit a monitoring concept at an early stage. The concept must be drawn up by technical experts and agreed with the Federal Maritime and Hydrographic Agency.

The objective of the survey is that the location-specific collision risk in relation to the location-related migration intensity and evaluate it with respect to the impacts of weather conditions and operating status of wind turbine or correlate them. High migration rates are not necessarily associated with a high collision risk (relative proportion of collisions in relation to the total number of migrating birds in the investigated site). Some birds can avoid the rotors on a small scale (micro-avoidance). In contrast, collisions can occur even with low migration rates, e.g. in poor weather conditions.

In order to record the number of birds colliding with the wind turbines operated on the sites, collision monitoring is required using measuring systems suitable for the marine environment that can record the full range of species composition to be expected (including small songbirds). According to the latest technological developments, this requires a combination of radar systems to survey migration phenology and intensity, camera systems (including infrared cameras) to record individuals in the rotor area and weather sensors. With regard to the survey of weather conditions, the parameters precipitation, fog/visibility, wind speed and wind direction must be recorded. The operating status of the wind turbine (standstill, spinning, revolutions per minute and alignment of the rotor blades to the direction of migration) must also be recorded as additional accompanying data. If technical systems are available that can quantitatively and reliably record direct bird collisions with wind turbines (e.g. vibration sensors), these should be used in consultation with the Federal Maritime and Hydrographic Agency in order to reliably measure actual collisions in real time. The direct survey of collisions in addition to camera recordings is likely to provide a more precise measurement of collision mortality than the sole camera-based recording of birds in the vicinity of the rotor

blades. The latter is a conservative method that potentially overestimates the number of collisions and is dependent on visibility conditions.

During the migration periods in autumn and spring, the majority of migratory birds cross the German North Sea and Baltic Sea EEZs. For this reason, continuous surveys are required during the main migration periods from 1 March to 31 May and from 15 July to 30 November. To ensure this, in the event of a failure of one or more systems, replacement devices must be kept ready to resume the survey immediately. The Federal Maritime and Hydrographic Agency must be informed immediately of any failures in recording and of any measures taken to resume the survey.

The number and locations of the wind turbines equipped with survey recording systems must be suitable for collecting representative data for the respective site or other energy generation area. As part of a current wind farm procedure in the Baltic Sea, for example, there are plans to use systems for the survey on the transformer platform and on five WTs. The number of sites with survey recording systems must be determined in each case depending on the wind farm layout, the location in the context of other OWFs and the respective site conditions and may also deviate from this number. Data are representative if they allow reliable extrapolations of collision events to the entire area of investigation. A clear assignment of the individuals affected by collisions is required at least up to the species group. It must therefore be ensured that no collisions are missed ("false negatives") and that detected collisions ("true positives") can be correctly classified and quantified. The survey recording systems used must be technically capable and positioned in such a way that the generally expected species composition of bird migration (including very small and light songbirds, for example) is detected at all times (even in poor weather conditions and when the wind turbines are in and out of operation) and across the entire rotor area (i.e. 100 percent coverage of the danger zone). The species composition to be expected can be taken from annual reports on the standard surveys for the protected asset of migratory birds or from specialist literature on bird migration over the German EEZ. If several measuring systems (of the same or a different type) are used to cover the entire rotor area, it must be ensured that there are no multiple counts or that these can be clearly recognised and taken into consideration in the analysis.

The calibration of the systems used is a prerequisite for the interpretation of the measurement data and must be described in detail in the investigation concept of bird collision monitoring. It must be completed and approved by the Federal Maritime and Hydrographic Agency before operation begins. The documentation of the calibration is part of the reporting to the Federal Maritime and Hydrographic Agency.

In order to set the collision risk in relation to the site-specific migration intensity, the overall migration activity must be recorded using bird radars. In addition to the continuous survey of bird migration, specialised bird radar systems allow insects to be reliably distinguished from bird signals and species groups to be differentiated from one another. This is necessary for analysing the risk of collision and is not possible with conventional ship radars, which were not developed for bird detection.

7.1.7 Increase of sediment temperature

The definition of increase of sediment temperature is based on the reasoning of principle 2.2.3 (6) of the ROP 2021 and Section 17d, para. 1b of the Energy Industry Act.

During operation of subsea cables, the surrounding sediment heats up radially around the cable systems. The heat emission results from the thermal losses of the cable during energy transmission. The conductor temperature can be

a maximum of 70 °C for DC conductors and 90 °C for AC conductors.

The so-called "2 K criterion", i.e. a maximum temperature increase of 2 degrees (Kelvin) 20 cm below the seabed surface, has become established as a precautionary value for nature conservation in current official approval practice for all subsea cables laid in the EEZ. The 2 K criterion represents a precautionary value which, according to the assessment of the Federal Agency for Nature Conservation based on the current state of knowledge, ensures with sufficient probability that significant negative impacts of cable warming on the marine environment and the benthic biocoenosis are avoided. A stronger warming of the uppermost sediment layer of the seabed can lead to a change in the benthic communities in the area of the submarine cable route. In the process, cold-stenothermal species, which are bound to a low temperature range and are sensitive to temperature fluctuations, can be displaced from the area of the cable routes, especially in lower areas. In addition, there is the possibility that new, non-native species could become established as a result of increase of sediment temperature. Furthermore, an increase in soil temperature could change the physico-chemical properties of the sediment, which in turn could result in a change in oxygen or nutrient profiles.

In addition to the ambient temperature in the area of the subsea cables and the thermal resistance of the sediment, the cable type and the transmission capacity have a significant influence on the extent of increase of sediment temperature. Compliance with the 2 K criterion should therefore be ensured when dimensioning the cable systems, taking into consideration Section 17d, para. 1b of the Energy Industry Act.

It must be taken into consideration that in the area of crossing structures, it may not be possible to fulfil the required covering over for compliance with the 2 K criterion.

For the temperature development in the near-surface sediment layer, the depth position or covering over of the cable systems is also decisive.

For further reasoning and discussion of this planning principle during the revision procedure for Site Development Plan 2020, please refer to the explanations in Section 4.4.4.8 of Site Development Plan 2020.

7.1.8 Traffic logistics concept

The purpose of this new regulation included in this Site Development Plan is to minimise the impact of service traffic on seabirds and resting birds as far as possible. This regulation is explicitly applicable only the service traffic that crosses the main concentration area harbour of divers or the partial area II and the future partial area III of nature conservation area “Sylt Outer Reef and Eastern German Bight” and can be restricted to sensitive periods, such as the main resting periods. The traffic logistics concept aims to reduce the number of journeys through the above-mentioned areas during sensitive periods by minimising the number of journeys and keeping them as short as possible. Additional regulations on maximum speeds can reduce the deterrence effects on seabirds and resting birds.

7.2 No adverse effect on the safety and efficiency of shipping traffic

This stipulation is derived from principle 2.2.1 (3) of the ROP 2021, according to which economic uses should affect the safety and efficiency of traffic as little as possible.

A common safety zone is regularly constructed around WT and platforms. The effect of this safety zone is that commercial shipping does not take place in these areas and that proper shipping operated in accordance with the rules of good seamanship continues to be generally possible without danger. Please refer to the respon-

sibility of the GDWS in this respect for the construction of safety zones as well as for the preparation of any navigation regulation for OWF.

In the case of cable systems, the specified depth (cf 7.13.6) and the crossing angles (cf 7.13.3) are not expected have an adverse effect on shipping.

Please refer to Planning principles 7.8 and 7.10.

According to the current state of knowledge, the provision of additional towing capacity of presumably at least one additional tug in the traffic area of Shipping route SN10 of ROP 2021 is a necessary prerequisite in order to minimise the risks to the safety and efficiency of shipping caused by the further development of sites in Zone 3 as well as in the area of Shipping route SN10. This is the conclusion of the risk analysis developed on the occasion of the revision of the Site Development Plan in the expert opinion "Verkehrlich-schifffahrtspolizeiliche Risikoanalyse der im Rahmen der Fortschreibung des FEP der deutschen AWZ der Nordsee festzulegenden Gebiete" (Traffic and shipping police risk analysis of the areas to be defined as part of the revision of the Site Development Plan of the German North Sea EEZ) (DNV GL, 2021) of April 2021, taking into consideration the parameters, criteria and acceptance thresholds specified by the working group of the Federal Ministry for Transport and Digital Infrastructure" guideline values relevant to approval" in connection with the risk analysis and assessment of OWFs. Current findings of a currently ongoing shipping expertise for the future design of the SN10 also support the assumption of the need for additional towing capacity in the above-mentioned traffic area using a different methodology. The obligation to provide additional towing capacities is initially applicable to the developer of the project for the OWF to the east of SN10 in areas N-9, N-10, N-11, N-12 and N-13 individually as well as in cooperation. It is left to the OWF Project Developers to develop a collaborative model for operation. Based on the available shipping reports, in particular (DNV GL, 2021), it is to be expected that the need for additional towing capacity will arise from the time of the first development of the sites in areas N-11 or N-12.

The positioning of the additional towing capacity will have to be finally determined in the course of further proceedings.

Towing capacity requirements must be appropriate to the conditions of the traffic area concerned. The WSV traffic centres should have the authority to issue instructions regarding the towing capacities. In addition, a right of access of the Central Command for Maritime Emergencies is required in case of need. Other solutions for the provision and operation of towing capacities, which are developed in consultation with all authorities involved, are not excluded by the above planning principle.

A vehicle is suitable for emergency towing operations if it is able to fulfil the tasks of emergency towing. This is assumed to be the case if it complies with the standards and guideline values for the type, dimensions and number of towing equipment components to be carried on board from the concept for towing equipment for multipurpose vessels of the Central Command for Maritime Emergencies for the respective sea area to be covered. Emergency towing essentially comprises the establishment of a towing connection and the subsequent holding at sea or towing ("controlled drifting") of the drifting damaged ship. These measures are carried out until the manoeuvrability of the damaged ship is restored, commercial emergency tugs can safely take over the damaged ship or the danger has been eliminated in some other way. This stipulation of additional towing capacity in the catchment area of shipping route SN10 does not affect any requirements for the provision of additional towing capacity in other traffic areas, in particular on the Baltic Sea or in the region of areas N-1 to N-8. The need for any additional towing capacity

will have to be assessed depending on further development and traffic development in the relevant traffic area or other relevant framework conditions and cannot be ruled out at present.

7.3 No adverse effect on the safety and efficiency of air traffic

The planning principles ensure that the safety and efficiency of traffic, in this case air traffic, is not impaired, Section 5, para. 3, sentence 1, no. 3 of the Offshore Wind Energy Act.

There is an airspace structure above the German EEZ that includes, in particular, danger areas and helicopter route networks. The aviation provisions and regulations to be observed in this context are specified in the relevant aviation manual. For example, for the Dutch helicopter route network in the German North Sea EEZ, the lowest IFR flight altitude is currently 600 m (2,000 ft) AMSL, whereby a minimum vertical distance of 300 m (1,000 ft) between aircraft and obstacles (on the seabed/on the water surface) must be guaranteed by air traffic control when using this route network. To adapt the helicopter route network to developments in the expansion of offshore wind energy in the German North Sea EEZ, the Federal Ministry for Transport and Digital Infrastructure has initiated a procedure with the responsible Dutch Ministry of Transport.

Offshore structures, parts thereof, or associated activities may pose a risk to air traffic (collision risk). In order to minimise the potential danger, such structures and temporary obstacles caused by construction, maintenance or dismantling must therefore be marked as obstacles to aviation if the relevant requirements are met. As the regulations applicable to the identification of aviation obstacles on national territory do not extend to the German EEZ, the Federal Ministry for Transport and Digital Infrastructure has created a corresponding regulation for the EEZ with the SOLF, which must be complied with in its current version.

Section 9, para. 8 of the EEG specifies the sites in the German EEZ whose night-time labelling must be demand-driven.

Provisions for the installation and operation of aviation infrastructure (helicopter landing decks, helicopter hoist platform on wind turbines and platforms) are set out in the SOLF.

Sufficient permanent obstacle clearance is an essential criterion for safe flight operations at an offshore aerodrome (currently only helicopter landing decks in the EEZ). The dimensions and orientation of the approach and departure areas (in particular flight corridors) to be provided and kept clear for this purpose are also determined by the SOLF in its current version.

By taking a holistic view, i.e. a view of the obstacle landscape that encompasses the entire area, it should be ensured that the air traffic interests of third parties in the area concerned or regularly also in neighbouring areas are sufficiently taken into consideration in addition to the operator's own interests, e.g. if a helicopter landing deck of a third party is to be set up and operated in a site, as is regularly the case with platforms of the TSO. In this case, the third party must be able to comply with or implement all necessary regulations for the required obstacle clearance (flight corridors) in accordance with Part 3 of the SOLF. Only in this way can it be ensured that the obstacle protection requirements of all helicopter landing decks to be set up are adequately taken into consideration. The primary objective is that the erection of obstacles, such as wind turbines, must not result in one of the helicopter landing decks located in the relevant vicinity becoming unusable or one planned there not being able to be erected. It is also important to note that changes to the obstacle backdrop may also make it necessary to adapt the obstacle limitation areas and sectors. For example, if larger installations than previously expected are erected adjacent to an existing obstacle backdrop and an existing flight corridor, the required flight corridor

may become longer, which must be taken into consideration when selecting turbine locations.

The spatial proximity of the OWF in an area on the one hand and the manoeuvring requirements of a helicopter on the other regularly require an area-wide consideration in addition to a cross-area consideration. It cannot be ruled out that obstacle limitation areas and sectors may extend into other sites or areas for other energy generation or be located entirely within them. If the helicopter landing decks of third parties are located on converter or transformer platforms already defined by the Site Development Plan or shown therein for information purposes, or if the helicopter landing deck has already been defined or approved in the planning documents of an approval procedure at the time of the local announcement of the plan design, the installation of these helicopter landing decks, including the associated obstacle limitation areas and sectors, must be made possible. The parties involved must coordinate with each other during the planning process, taking into account the relevant regulations in the SOLF. If helicopter landing decks with obstacle limitation areas and sectors already exist or are authorised, their obstacle clearance must be ensured.

This may impose restrictions on layout planning within sites or other energy generation areas. The obstacle limitation areas and sectors should therefore be planned in such a way that sites or areas for other energy generation of third parties are impaired as little as possible within the framework of the SOLF provisions, for example by planning the obstacle limitation areas and sectors as far as possible outside areas and energy generation or by using areas that are to be kept free of development anyway, such as cable corridors, for the installation of the air traffic areas.

Obstacle limitation areas and sectors of helicopter landing decks may not be created beyond the boundaries of the German EEZ in order to prevent them from being restricted in their use or rendered unusable outside the German EEZ. Outside the German EEZ boundaries, there is no influence on any uses planned there, so that reliable planning and the necessary freedom from obstruction in accordance with the planning principle (b) cannot be ensured for these areas. Therefore, a deviation is only possible if the developer of the project submits express consent from the neighbouring state whose EEZ is affected.

A tower beacon along the affected flight corridors is intended to ensure the safe use of helicopter landing decks at night, as it increases the visibility of these obstacles and makes it easier for helicopter crews to orientate themselves, thus giving them a spatial impression of their surroundings. In this way, the approach to obstacles can be better assessed, as the lateral limits of the approach and departure paths are marked. If third-party flight corridors extend into sites or areas for other energy generation and tower radiation is required along these corridors in accordance with the SOLF, a tower beacon must be permitted in order to avoid hazards to air traffic. In these cases, in order to ensure proper operation of the tower beacon, the third-party operating the tower beacon must be given access to the installations of the project sponsor in order to carry out necessary maintenance or repairs.

7.4 No adverse effect on the safety of the military

The stipulations comply with Section 5, para. 3, sentence 2, no. 4 of the Offshore Wind Energy Act as well as objective 2.2.2 (5.1) and principle 2.2.2 (5.2) of the ROP 2021.

The designation of areas, sites, platforms and other energy generation facilities within reservation areas for defence must be avoided. Insofar as the specific military requirements are not restricted by the designation, designation in these areas is not ruled out in individual cases. The aim should be to route subsea cables outside the military training areas for floating units.

Stipulations (c) and (e) comply with objective 2.2.2. (5.1) as well as principle 2.2.2 (5.2) of the ROP 2021 and serve to ensure effective military defence. For further reasoning, please refer to ROP 2021.

7.5 Removal of devices

According to Section 80, para. 1, sentence 1 of the Offshore Wind Energy Act, the facilities must be removed if the planning approval procedure or the planning permission becomes invalid, with the aim of ensuring the complete subsequent use and restoration of the performance and functional reliability of the site. Objective 2.2.1 (2) of the ROP 2021 stipulates that fixed installations must be dismantled at the end of their use.

The Federal Maritime and Hydrographic Agency will decide at the time of the dismantling procedure to what extent the facilities (in particular the foundations) are to be removed in order to achieve the objective in Section 80, para. 1, sentence 1 of the Offshore Wind Energy Act. The interests and standards specified in Section 80, para. 1 of the Offshore Wind Energy Act must be taken into consideration. However, the maritime spatial plan specifies the complete deconstruction of fixed installations as an objective, so that any deviation from this will at least require the examination of an objective deviation procedure.

The developer of the project should complete the removal within twelve months of the fulfilment of the removal obligation at the latest, Section 80, para. 2 of the Offshore Wind Energy Act. In order to ensure the fulfilment of the removal obligation, the Federal Maritime and Hydrographic Agency can order the provision of suitable security in the planning approval or in the planning permission in accordance with Section 80, para. 3 of the Offshore Wind Energy Act.

Section 80, para. 1a of the Draft Offshore Wind Energy Act is additionally applicable for installations under the Directive on Industrial Emissions.

7.6 Investigation and consideration of objects

A subsoil investigation and route investigation according to the latest prevailing version of Federal Maritime and Hydrographic Agency standard subsoil investigation should be conducted and evaluated as a basis for the planning and execution of the installations. In the case of centrally pre-investigated sites, the results of the subsoil investigation can be used.

In this context, existing objects, in particular cables, lines, wrecks, cultural assets and material goods as well as stones and blocks on surfaces, routes, platforms or other energy generation areas must be identified.

Locations of the aforementioned objects should be taken into consideration when planning sites and routes. The developer of the project is responsible for the resulting necessary measures (e.g., adaptation of farm layout, protective measures or recovery and removal).

With regard to any munitions found, in 2011, a federal–state working group published a basic report on the munition contamination of German marine waters, which is updated annually. According to current knowledge, the explosive ordnance load in the German Baltic Sea is estimated at up to 0.3 million tonnes and in the German North Sea at up to 1.3 million tonnes. The overall data availability is insufficient. It can thus be assumed that explosive ordnance deposits are also to be expected in the area of the German EEZ (e.g. remnants of mine barriers and combat operations). The location of the known ammunition dump area can be found on the official nautical charts and in the said report from 2011 (which also includes suspected areas for

ammunition-contaminated areas). (Böttcher, et al., 2011)[19]

Developers of projects are recommended to carry out detailed historical research into the possible presence of munitions as part of the concrete planning of a project.

According to DIN 4020, the developer is responsible for ensuring that the site is free of explosive ordnance. This task remains with the developer of the project as a duty to avert danger as part of the general duty to ensure public safety. The latter shall take measures to protect its employees.

The respective project developer is responsible for the identification and exploration of explosive ordnance as well as for all resulting protective measures. Within this framework, the project developer is also responsible for any necessary rescue or removal. The responsibility of the project sponsor also includes its obligation to bear the costs of identification, exploration, resulting protective measures and the recovery or removal of found munitions.

If unexploded ordinance is found, proceed according to the instructions of the Federal Maritime and Hydrographic Agency “UXO Survey and Procedure in finding unexploded ammunition in the area of German EEZ of the North Sea and Baltic Sea” (available on the website of the Federal Maritime and Hydrographic Agency). In particular, the reporting obligations must be followed and measures should be taken.

If there are no instructions of specific relevance, the Quality Guide for Offshore Ordnance Disposal of the University of Leipzig can be referred to.

Blasting of found munitions is generally not permitted, also see planning principle 7.1.4.

Transportable munitions found may not be dumped again after recovery but rather must be disposed of properly on land in consultation with the responsible explosive ordinance disposal team of the States.

The relevant details of any protective measures that may become necessary are regulated in the individual procedure.

The Federal Agency for Nature Conservation is currently in charge of drafting the guideline "Nature conservation law and technical requirements for the clearance/disposal of old munitions in the North Sea and Baltic Sea". It is the responsibility of the responsible persons to keep themselves informed about the entry into force of the guideline and to ensure compliance with the provisions of the guideline once it has come into force.

7.7 Consideration of cultural assets

This stipulation is in line with the values of principle 2.2.1 (3) of the ROP 2021, according to which adverse effects to the cultural heritage through economic use should be minimised.

The seabed may contain cultural assets of archaeological value such as soil monuments, settlement remains, or historic shipwrecks. According to Article 303 of the United Nations Convention on the Law of the Sea (UNCLOS), states have a duty to protect objects of an archaeological or historical nature found in the sea and to cooperate to this end.

A large number of shipwrecks are known and recorded in the German Underwater Obstacle Information System of the Federal Maritime and Hydrographic Agency. The information available at the competent authorities should be taken into consideration when selecting sites for the construction of wind turbines and platforms or the

[19] The reports of the Federal-State Working Group are available at www.munition-im-meer.de.

specific routing of subsea cables. For consideration in spatial planning, all known wrecks located within these reservation areas were forwarded to the state monument authorities with a request for examination and assessment of the required distances when the reserved areas for pipelines were defined in the ROP 2021. These assessments of the case-by-case assessment are used for the spatial planning in the Site Development Plan. In the immediate vicinity of the designated converter sites, there are no known wrecks that are relevant for monument protection. However, it cannot be ruled out that previously unknown cultural assets will be found during the closer investigation of planned sites or a suitable route or during construction. The authorities responsible for the preservation of monuments and archaeology should be involved at an early stage in the case of discoveries. In order to avoid damaging these, exclusion zones are to be defined around the sites of historic shipwrecks, provided that this does not jeopardise the targeted development of offshore wind energy. This provision is based on Section 5, para. 3, sentence 2, no. 2 in conjunction with Section 69, para. 3, sentence 1, no. 1, Section 8 of the Offshore Wind Energy Act and Article 303 of the United Nations Convention on the Law of the Sea. The size of the exclusion zone may vary depending on the size of the shipwreck. The restriction to shipwrecks is based on the assessment that such cultural assets can be easily detected and demarcated. In addition, suitable safeguarding measures can be implemented in the approval procedure with the involvement of the monument protection and monument authorities of the federal states of Lower Saxony, Schleswig-Holstein and Mecklenburg-Western Pomerania and in compliance with the overriding public interest in the development of offshore wind energy in the context of balancing decisions.

7.8 Official standards, provisions or concepts

This planning principle stipulates that official standards, provisions and concepts in their respective currently applicable version should be followed while following the overriding public interest of construction of wind turbine and OGCS for the planning, construction and operation of the wind turbines, platforms, subsea cables and other forms of energy generation in the context of balancing decisions. This serves to ensure a speedy approval procedure as well as the safe and proper construction and operation of the installations. Particular attention should be paid to

- The “Standard - investigation of impacts of offshore wind turbine systems on the marine environment (StUK)” of the Federal Maritime and Hydrographic Agency
- The "Standard for subsoil exploration - Minimum requirements for subsoil exploration and investigation for offshore wind turbines, offshore stations and power cables” of the Federal Maritime and Hydrographic Agency
- The “Standard construction – minimum requirements for design of offshore structures in the EEZ” of the Federal Maritime and Hydrographic Agency,
- The “SOLF - Standard offshore aviation for the German EEZ” of the Federal Ministry for Transport and Digital Infrastructure,
- The “WSV framework provisions for the identification of offshore installations” of the Directorate General of Waterways and Shipping (GDWS),
- The execution directive “maritime surveillance of offshore wind farms” of the Federal Ministry for Transport and Digital Infrastructure,
- The “Directive for offshore installations to ensure the safety and efficiency of shipping traffic” of the GDWS,
- recommendations R0139 (Marking of man-made Offshore-Structures) and R0126 (Use

of the AIS in Marine AtoN Services) as well as Guideline G1162 (Marking of Offshore man-made Structures) of the International Association of Marine Aids to Navigation and Lighthouse Authorities

- The “Offshore wind energy - safety framework concept” of the Federal Ministry for Transport and Digital Infrastructure,
- The "Framework concept for waste and operating materials for OWFs and their grid connection systems in the German EEZ” of the Federal Maritime and Hydrographic Agency
- The “Vision and guiding principles for the emission study for offshore platforms in the German EEZ” of the Federal Maritime and Hydrographic Agency,
- The “Vision and guiding principles for the emission study for offshore wind turbine systems in the German EEZ” of the Federal Maritime and Hydrographic Agency,
- The instructions “UXO Survey and Procedure in finding unexploded ammunition in the area of German EEZ of the North Sea and Baltic Sea” of the Federal Maritime and Hydrographic Agency
- The German regulations on safety and health at work,
- The “Concept for the protection of harbour porpoises from noise pollution during the construction of offshore wind farms in the German North Sea (noise mitigation concept)” of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection. (BMU, 2013)
- The mapping guidelines of the Federal Agency for Nature Conservation for the German EEZ "species-rich gravel, coarse sand and shell layers in marine and coastal areas - definition and mapping guidelines for gravel, coarse sand and shell layers".

It should be noted that the planning, construction, operation and deconstruction of wind turbines, platforms, submarine cable systems and other energy generation facilities must take into account the health and safety, rescue and medical care needs of people working in the area of offshore facilities in the vicinity of these installations.

7.9 COMMUNICATION AND MONITORING

As a result of the bundling of traffic in the EEZ because of the existing and emerging offshore installations, it is necessary to collect data and voice radio capabilities for the WSV and transfer them to shore. The interface required for this is to fulfil all technical requirements for communication with the Maritime Traffic Technology (SMV) system. A grid connection of the data to the SMV is made via the safety zone of the transfer service.

The construction of all installations (offshore to the onshore interface) and their operation are the responsibility of the Project Developer of the OWF. The application for and obtaining of frequency allocation certificates is the responsibility of the OWF Project Developer. The latest technological advancements according to the current the latest technological advancements: For the mobile maritime radio service, installations must be provided for three radio channels of the VHF maritime radio service with the frequencies of channel 16 (156.800 MHz), channel 70 (156.525 MHz, Digital Selective Calling (DSC)) and a radio channel to be determined by the WSV to cover the requirements of the traffic centres of the WSV in the frequency range of the mobile maritime radio service. To ensure the AIS service, the frequencies of the channels (161.975 MHz, AIS 1) and (162.025 MHz, AIS 2) are to be received.

The transfer/acceptance of data into the SMV takes place via IP addresses. The transmission path is the responsibility of the OWF developer

of the project. The data must be encrypted in accordance with the WSV provisions and provided or retrieved via a virtual private network tunnel.

To ensure the availability requirements of 99.9 percent at the transfer point, a suitable system structure and transmission path must be taken into consideration.

The mobile network serves the safety of the installations and traffic. It forms a second communication channel alongside digital radio systems. The purpose of designating this principle is to achieve universal mobile phone coverage. A specific mobile radio standard should not be specified; rather, the mobile radio network should correspond to the latest technological advancements. It must also be possible for the public to use the mobile network with commercially available end devices.

A mobile radio network also enables communication in areas far from the coast; this is of considerable safety-relevant importance there in particular. For example, telemedical care could also be ensured in case of need when other communication channels are not available. In addition, occasional traffic of smaller vessels, especially recreational sailors, can also be assumed in more distant farms. Here, experience shows that accessibility via mobile radio can lead to a significant increase in safety. Furthermore, access to a mobile network opens up the otherwise non-existent or limited possibility of transmitting more comprehensive sensor data for environmental monitoring on land. Because of the existing grid connection of the installations by high-performance fibre optic cables, the laying of additional cables does not appear to be necessary. This reduces the effort required to set up a mobile network.

If it is advantageous and technically feasible from a technical or economic point of view, the OWF developer of the project should also be able to install mobile radio technology on the transmission system operator's platforms in consultation with the responsible transmission system operator. The costs for the installation and operation of the mobile radio technology shall be borne by the OWF developer of the project.

7.10 Consideration of all existing, approved, and designated uses

This planning principle also corresponds to the evaluations in ROP 2021, including in requirements 2.2.1 (3), 2.2.2 (3), 2.2.2 (4), 2.2.2 (5.1), and 2.2.2 (5.2).

7.10.1 General information

In order to minimise conflicts, the interests of shipping (see planning principle 7.2), national defence and alliance obligations (see planning principle 7.4) as well as existing and approved uses, rights of use (including OWF) and other concerns worthy of protection should be taken into consideration as early as possible when selecting sites for wind turbines, platforms, other forms of energy generation and the routing of subsea cables. A route outside these areas should be sought if the laying of the subsea cables is expected to have a negative impact on the aforementioned uses and concerns.

Due to the close proximity between the OWF project and the OGCS, including the platforms of the TSO, there is a high need for coordination between the OWF developer of the project and the TSO. Accordingly, it is imperative that close coordination between the TSO and the OWF project developer takes place at an early stage of the project. For the OWF developer of the project and the TSO, there is an unrestricted need for cooperation on both sides. This applies, in particular, to the exchange of information on project deadlines, to the mutual transfer of necessary information and details on the planning, construction, commissioning, and operation of the platform and subsea cables, to any repair and maintenance work, and during the deconstruction. In particular, the construction is to be

coordinated and optimised in good neighbourly cooperation at an early stage. The permanent activation of the automatic identification system (AIS) is ordered for fishery vessels equipped with such a system when passing through OWFs in order to reduce risk factors with regard to sabotage, marine accidents or damage to the installations.

The concerns of fishery should also be taken into consideration at an early stage. Where possible, aquaculture facilities should be constructed in close proximity to or in combination with other installations that are already in existence or under construction. The construction, maintenance and operation of installations should be impaired as little as possible by the construction and operation of aquaculture facilities. Please refer to Principle 2.2.5, para. 2 in the ROP 2021. Fishing across subsea cables outside the safety zones is generally made possible by ensuring sufficient depth of the cables and corresponding conditions in the individual procedures; reference is made to the provisions of principle 7.13.6 Covering over. Regulations within OWF areas according to principles 2.2.2 (4) and 2.2.5 (2) of ROP 2021 are to be clarified on a case-by-case basis.

In the reservation areas of scientific research designated in the ROP 2021, sovereign research activities are carried out regularly as part of the EU Common Fisheries Policy and in accordance with standardised methods, which contribute to the annual international assessment of the status of fishery resources. Scientific fisheries research should continue to be made possible in the areas of multiple use in the same way and to the same extent as before. A self-responsible exchange of the users concerned is imperative. For this purpose, the concerns of the research institutions should be taken into consideration as early as possible in the conceptualisation of the OWF project or grid connection and in the downstream planning and decision-making levels once the sites concerned have been awarded. For the overlapping area of affected utilisation areas in the North Sea EEZ, the navigability of research vessels is therefore defined in two corridors to be kept free of wind turbines. The corridors should each have a length of 5 nm and a width of 1.025 nm and be as perpendicular with each other as possible (e.g. one in a north-south direction and another in an east-west direction). The dimensions of the corridors result from a safety distance of 800 metres on both sides of the trawl tracks and an additional safety distance to the pylons of 150 metres on both sides. Turning areas are already included in the above-mentioned dimensions of the corridors. It should be noted that the above requirements only apply to offshore wind turbines which are firmly anchored on the seabed.

Specifications regarding the type of fishing gear used (mobile, bottom-contacting, pelagic) are made on an area-specific basis. Please refer to Section II.1. Measures to implement and ensure navigability are to be developed and implemented by the affected users on their own responsibility after the award of affected sites.

Research activities outside the reservation areas for scientific research designated in the ROP 2021 should be made possible for the Thünen Institute - insofar as this is compatible with the interests of offshore wind energy. Information on the geographical location of the research activities can be found in the Thünen Institute's comments dated 17.11.2023[20].

[20] Available on the Federal Maritime and Hydrographic Agency website at: https://bsh-preview.service.res.bund.de/DE/THEMEN/Offshore/Meeresfachplanung/Laufende_Fortschreibung_Flaechenentwicklungsplan/Anlagen/Downloads_Entwurf_FEP/Stellungnahmen_Vorentwurf_FEP.html

7.10.2 Pipelines

In order to reduce the risk of damage to existing pipelines and to avoid impairing repair options, impacts on the seabed within a protection zone of 500 metres on either side of pipelines should be avoided as a matter of principle. The respective subsoil conditions may also require greater distances in individual cases. The centre line of the pipeline is decisive for determining the protection zone.

Exceptions are permitted, for example, if compliance with this principle demonstrably jeopardises or significantly impedes the commissioning or grid connection of an OWF. In addition, planning that leads to an impact within the 500 m protection zone of pipelines requires close coordination with the respective operator.

7.10.3 Subsea cables

In accordance with the planning scale of 1:400,000, the Site Development Plan does not define the actual submarine cable routes, but only corridors. The exact planning of the submarine cable route (“fine routing”) is reserved for the respective approval or enforcement procedure. In the routing and associated arrangement of the cable systems, it must be taken into consideration as early as possible that the planning principles are implemented. This can minimise the space required and the environmental impact of laying and deconstruction.

The distance of 500 metres between subsea cables and wind turbines is necessary so that work can be carried out on the subsea cables while the OWF is in operation. Sufficient space must also be available for the construction vessel of the wind turbines and the cable-laying vessel in the event that work is carried out on the cable systems and the OWF at the same time. The centre line of the submarine cable system is decisive for determining the required distance.

Existing subsea cables must also be taken into consideration during planning and laying. In accordance with the provisions of the principle, a distance of 100 m or 200 m must be provided alternately between submarine cables. This also applies to distances from data cables and existing interconnectors. With this distance, a smaller distance is designated for the shallower water depths of up to 45 m in the planned area compared with corresponding internationally agreed industry guidelines, which apply for water depths of up to 75 m. In order to ensure that (bundled) subsea cables are laid in an area-efficient manner, deviations from the routes in Site Development Plan must be kept to the minimum necessary in terms of construction technology. This applies in particular to routes that run parallel to other existing, authorised and planned cable routes (see planning principle 7.13.1 on the bundling of cable systems). Particularly at turning points, major deviations from the routes in the Site Development Plan have impacts on neighbouring cable systems, so that either the applicable distances can no longer be maintained or the total area required for the bundled systems is increased. For this reason, the installation radii should be kept as small as technically possible and should not exceed a radius of 250 metres.

Please refer to the reasoning of planning principle 6.4.2 in the Site Development Plan 2023 for the reasons for the specified distances to submarine cables.

The planning principle also applies to subsea cables of the interarray cabling of sites and areas for other forms of energy generation provided that they are located outside areas, sites, or areas for other forms of energy generation.

If cross connections between installations cross areas and do not run parallel to grid connection systems, this is likely to have an adverse effect on the planning of the site. In order to minimise this, the Site Development Plan can firstly define so-called transfer areas between sites. As a re-

sult, possible routes can be taken into consideration early when planning the site even if a route has not yet been selected. Secondly, the OWF developer of the project must enable the guideway for a route for the cross connections of installations with each other on the corresponding site starting from the converter platform through the site up to the transfer area. However, the bidder is granted flexibility in the layout planning of the wind turbine to the extent that the possible connection may be a maximum of 20 percent longer than the direct route from the converter platform to the site boundary. After consultation between the responsible TSO and the OWF developer of the project, it is possible to deviate from the specified distances between the wind turbine and the connecting line. Crossings between multiple interconnecting lines as well as between connecting cable and interarray cabling should be avoided wherever possible.

7.10.4 Platforms

In order to reduce the risk of damage during the construction and operation phases of the platforms and in order not to affect the possibilities of the necessary maintenance and servicing work, due consideration must be given to existing and approved structures in the case of platforms planned for the future. The distance to be maintained depends, among other things, on the position of the platform in space in relation to building structures on site, the subsoil conditions, and the water depth.

In the area of the converter platform, it must be ensured that sufficient space is available for routing the TSO's DC and AC subsea cables due to the large number of cable systems being fed in. Therefore, a distance of at least 1,000 metres must be maintained between the platform and the nearest wind turbines in the area where the subsea cables are routed to the converter platform. The centre of the platform is decisive for the distance.

In addition, interference-free operation of existing installations (e.g. radio or radar installations) must be ensured.

7.10.5 Wind turbines and other forms of energy generation

The planning principle serves to limit wake effects and turbine loads caused by turbulence between wind turbines in neighbouring areas and areas for other energy generation.

The minimum distance of five times the rotor diameter of the new installations to be constructed from the wind turbines of the neighbouring OWF project in accordance with section 7.10.5 (a) is measured between the centres of the installations. The larger rotor diameter is to be used as a basis. The legal provisions for minimum distances only apply to installations of neighbouring OWFs. This paragraph does not apply to the distances between wind turbines within a site. The same also applies in the case of the same developer of the project or if the respective developers of the project have agreed on a different arrangement. In order to ensure coordinated planning of adjacent OWFs that are being planned during the same period, a proof of coordination with the respective developer of the project must be submitted as part of the project approval procedure. Existing installations or installations that have already been specified or authorised in the planning documents of an approval procedure at the time of the customary announcement of the plan design must be taken into account. With regard to two adjacent areas on which the planning by the respective developer of the project takes place at the same time, close coordination between the developers of the project is required at an early stage in good neighbourly cooperation with regard to the turbine locations and distances, taking into account the rotor diameters. Therefore, the submission of proof of coordination is designated as a prerequisite for the respective individual project approval procedure.

The distance of at least two and a half times the rotor diameter according to section 7.10.5 (b) is measured from the respective centre point of the installation. The geographical position of the centre line is provided by the Federal Maritime and Hydrographic Agency via the GeoSeaPortal. The centre lines are not defined by the Site Development Plan, but are provided for information purposes. This requirement is intended to harmonise the possibility of utilising neighbouring sites or other energy generation areas for different planning periods and commissioning years. The distance of five times the rotor diameter according to para. (a) continues to apply regardless of the distance to the centre line. This paragraph shall not apply in the case of neighbouring sites with the same developer of the project or in the case of a deviating agreement between the developers of the project.

The distance of at least five times the rotor diameter in accordance with section 7.10.5 (c) shall be measured between the centres of the installations. In the case of simultaneous planning of neighbouring wind farms, close coordination between the project developers regarding the installation locations and distances should take place at an early stage in good neighbourly cooperation, taking into consideration the rotor diameters.

As a logical consequence of the distance of at least five times the rotor diameter between wind turbines in neighbouring sites or areas for other energy generation and the designations of sites in close proximity with each other by the Site Development Plan, OWF and their wind turbines must be designed in such a way that wind turbines can be erected at a corresponding distance on neighbouring sites or neighbouring energy generation areas without adverse effects on the stability of their own wind turbines. This is clarified in the new section 7.10.5 (d) included in this Site Development Plan.

The centre point of the wind turbine is the decisive factor for the location of a WEC within an area in accordance with section 7.10.5 (e). In the case of other energy generation systems, all installation components should be located entirely within the other energy generation area.

7.11 Specific planning principles for sites and offshore wind turbines and areas for other energy generation and installations

Planning principles for sites, primarily for the construction and operation of wind turbines and areas for other energy generation areas and installations, are listed below. Reference is made to section (b), which sets out planning principles for platforms as well as for transformer and accommodation platforms. Planning principle 7.11.1 is not applicable to areas for other energy generation.

7.11.1 Deviation of the actually installed capacity from the allocated grid connection capacity

According to the explanatory memorandum to Section 24, para. 1, no. 2 of the Offshore Wind Energy Act, the OWF project developer has the option of installing additional wind turbines in excess of the bid quantity if this is permitted by the planning approval decision. Furthermore, additional capacity can be allocated in accordance with Section 14a of the Offshore Wind Energy Act, Section 14a, para. 2 Draft Offshore Wind Energy Act. However, an excess feed-in over the allocated grid connection capacity is not permitted at any time.

As part of the application, the OWF project developer must state whether and to what extent additional installations should be installed over and above the allocated grid connection capacity.

The increase in installed capacity beyond the allocated grid connection capacity serves to offset

electrical losses and the unavailability of individual wind turbines. When demonstrating compliance with the 2 K criterion by the responsible TSO, the non-availability of individual wind turbines, the OGCS or feed-in management measures as well as the electrical losses of the internal farm cabling are generally not taken into consideration. Due to the conservative approach of the verification procedure, measures to increase the installed capacity beyond the allocated grid connection capacity are thus covered within a certain framework.

Proof of compliance with the 2 K criterion for the interarray cabling by the OWF project developer is comparable to the proof for the OGCS without taking into consideration the aforementioned power-reducing restrictions. As a result of the conservative approach of the verification procedure, subsequent measures to increase the installed capacity beyond the originally permitted nominal capacity are covered within a certain framework.

If the increase in installed capacity exceeds a share of ten percent of the allocated grid connection capacity, the approval of the responsible TSO is required with regard to compliance with the maximum temperatures of the operating resources.

Compliance with the 2 K criterion during operation of the grid connection system should be checked by the TSO using modelling procedures (e.g. TCM II), especially if the actual installed capacity exceeds the allocated grid connection capacity.

7.12 Specific planning principles for platforms

7.12.1 Planning and public display of platforms

During planning, construction, operation and deconstruction of the platform, particular attention shall be paid to structural safety, supply and disposal, including the provision of drinking water, sewage water treatment and occupational health and safety concerns, including escape routes and means of rescue. Reference is made to the requirements of the planning principle 7.8 regarding official standards, provisions and concepts and the planning principle 7.1.3 (emission minimisation) with regard to supply and disposal as well as sewage water treatment.

The implementation of the planning principle must be demonstrated in the project approval procedure for the various areas mentioned.

Major challenges are regularly associated with the subsequent installation of residential units to accommodate personnel. These should therefore be avoided and, where necessary, accommodation should be provided when planning the platform.

Depending on the escape and rescue concept, at least two regular access points should be provided. Each installation should be equipped with a facility (e.g. boat landing) that enables rescue workers who dock at the installation with a vessel without wave-compensated access systems and persons who have fallen overboard to ascend in an emergency. On platforms, another access system (e.g. helicopter landing deck, landing point for wave-compensated access systems) is regularly set up in addition to access by boat landing. It should be possible to use two different transport systems so that if access by crew transfer vessel is restricted because of weather conditions, the helicopter landing deck or the landing point for wave-compensated access systems is available as an alternative access option. On a platform, the establishment of a helicopter hoist platform can be taken into consideration only as a rescue area for emergencies. Use of the helicopter hoist platform on a platform beyond emergencies is permissible by way of exception if, in the event of a technical incident, the hazard potential must be reduced within a short period of time in order to prevent the occurrence

of an emergency, intervention from shore is not possible or countermeasures initiated have remained unsuccessful and no more suitable means of access to the platform are temporarily available.

The dimensions of the rescue and emergency response equipment must be calculated in such a way as to ensure that the arrival times (e.g. rescue operation) can be bridged and that all conceivable hazards (e.g. fire-fighting operation) can be completely averted. If necessary, especially at greater distances from the coast, suitable landing and refuelling facilities for airborne rescue equipment must be provided. In this context, the case of a complex damage situation or complex rescue situation may not be disregarded.

7.13 Specific planning principles for subsea cables

The reasoning for planning principles for subsea cables are listed below, meaning power cable systems in line with this plan, such as OGCS, interconnectors, cross connections of installations with each other and subsea cables for other forms of energy generation. For subsea cables of the interarray cabling also of other energy generation areas, the following planning principles apply with the exception of 7.13.2 and 7.13.3.

7.13.1 Bundling

This designation implements principle 2.2.3 (5) of ROP 2021.

The bundling principle is intended to minimise impacts on other uses and the need for coordination with each other and with other uses. In addition, it should create as few constraints as possible for future uses. Bundling in the sense of parallel routing also reduces undesirable fragmentation effects.

The planning principle also applies to subsea cables of the interarray cabling of sites and areas for other forms of energy generation provided that they are located outside areas, sites, or areas for other forms of energy generation.

7.13.2 Routing through gates

This designation ensures that subsea cables are routed through specified gates. This concentrates the subsea cables and pipelines at these points as far as possible and bundles them for further discharge towards land. This designation implements Objective 2.2.3 (3) and Principle 2.2.3 (4) of ROP 2021 with modifications. The designation was made in close consultation with the coastal federal states.

Gates were designated at the external borders of the EEZ with neighbouring states; from these, a route within the German EEZ appears possible. In some cases, these make use of existing infrastructures such as already laid subsea cables or pipelines. The designation was made in consultation with the neighbouring countries.

Because of the limited number of available routes in the territorial sea, interconnectors that do not land in Germany should not be routed through gates N-I to N-V.

7.13.3 Crossing of shipping lanes

This designation corresponds to the requirements of principle 2.2.3 (5) of ROP 2021.

In order to minimise mutual adverse effect between shipping and network infrastructure, it is necessary for the cable routes to cross the traffic separation zones, their continuations and the Kiel-Baltic Sea Route by the shortest possible route, insofar as parallel routing to existing structures and built installations is not possible. Because of the many cable systems to be expected, this applies in particular to the subsea cables for grid connection of OWFs as well as all other subsea cables. By routing them parallel to existing structures, the use of marine space and – to the benefit of shipping – the devaluation of the manoeuvring site as an anchorage ground

can be reduced. In addition, conflicts can be minimised by laying the subsea cables sufficiently deep. Please refer to planning principle 7.13.6.

7.13.4 Crossings

The designation also corresponds to the values of principle 2.2.3 (5) of ROP 2021.

The purpose of the legal provision is to avoid damage to third-party subsea cables and pipelines as well as other third-party devices that have already been laid, designated, or approved by the Site Development Plan. In addition, crossings of subsea cables are to be avoided wherever possible to prevent interference with the marine environment through the introduction of hard substrate. Recommendations for the construction of crossing structures are defined, for example, in the recommendations of the European Subsea Cables Association (ESCA) and the International Cable Protection Committee (ICPC).

The two crossing cable systems must usually be mechanically separated from each other. If both cables are newly laid, a crossing without structures should be aimed for when planning them, provided the local geological conditions permit this. The crossing cable systems can be separated, for example, by laying the first system to be crossed sufficiently deep. If a crossing without structures is not possible, separation is usually achieved by constructing a crossing structure. When building crossings, a technical structure is usually constructed on the seabed using hard substrate.

By laying the cables without crossing constructions, it is not necessary to cover the upper cable system with a covering over or stone packing. This minimises the interference, especially in the case of expected large crossing constructions.

A structure-free crossing should be implemented in particular if several cables cross each other and the overall impacts on the marine environment are likely to be lower.

If crossing constructions cannot be avoided, the crossing should be designed as right-angled as possible according to the respective the latest technological advancements. This determination is intended to minimise the size of the crossing structure and thus the amount of soil sealing. In justified cases, the crossing angle can be reduced to up to 45° if this leads to a lower overall use of marine space and is technically feasible. This applies, in particular, to the crossing of several cables in parallel with existing cables, which can lead to significant additional cable lengths. In principle, the crossing angle may not be less than 45°. Within the crossing construction, the two crossing subsea cables are usually separated from each other by concrete mats. These extend approx. 30 m on each side beyond the subsea cables to be crossed. The narrower the crossing angle, the longer the required crossing construction. Within the crossing construction, it is not possible to repair the lower cable system because of these structural measures. If there are faults in the lower cable system, a new crossing construction may be required.

In order to prevent potential danger spots with regard to fishing activities with ground-contacting equipment, unavoidable crossing structures should be designed as far as possible in such a way that a fishery can carry out fishing in this area. When planning a crossing construction, the subsoil conditions must be taken into account. It is to be expected that the upper cable system will have to be additionally covered over a length of at least 100 metres.

In addition, the laying radii of the submarine cable must be taken into consideration, particularly in the case of crossings. When crossing existing cables, it must be ensured that the laying radii of the newly crossing subsea cables are not in the area of the crossing structure so as not to enlarge it.

The routes for the subsea cables of the TSO shall be provided without any crossings within

the sites, and the interarray cabling of the OWF shall be designed accordingly.

If the cutting of decommissioned cables (out-of-service cables) becomes necessary, these cables shall be laid down and their cable ends fixed in the seabed in such a way that any adverse effects on shipping and fishery is permanently ruled out. Sealing of the seabed must be limited to what is absolutely necessary. The fixed cable ends shall be measured exactly for the aforementioned purpose, and the coordinates shall be documented to the Federal Maritime and Hydrographic Agency. The cables removed from the seabed shall be properly disposed of on land.

Questions for consultation

Crossing between subsea cables and pipelines

Until now, subsea cables and existing pipelines have crossed at right angles over a total length of 500 metres on either side of the pipeline. This procedure leads to a significant use of marine space when many cables cross a pipeline in parallel. In the current draft, the procedure has been adapted so that the cable is brought significantly closer to the pipeline and a right-angled crossing is implemented in an area of 30 metres to the left and right of the pipeline. The exact implementation must be closely coordinated between the responsible project developer and the pipeline operator. Figure 12 shows the space savings of the current planning (in green) compared to the previous planning (in grey).

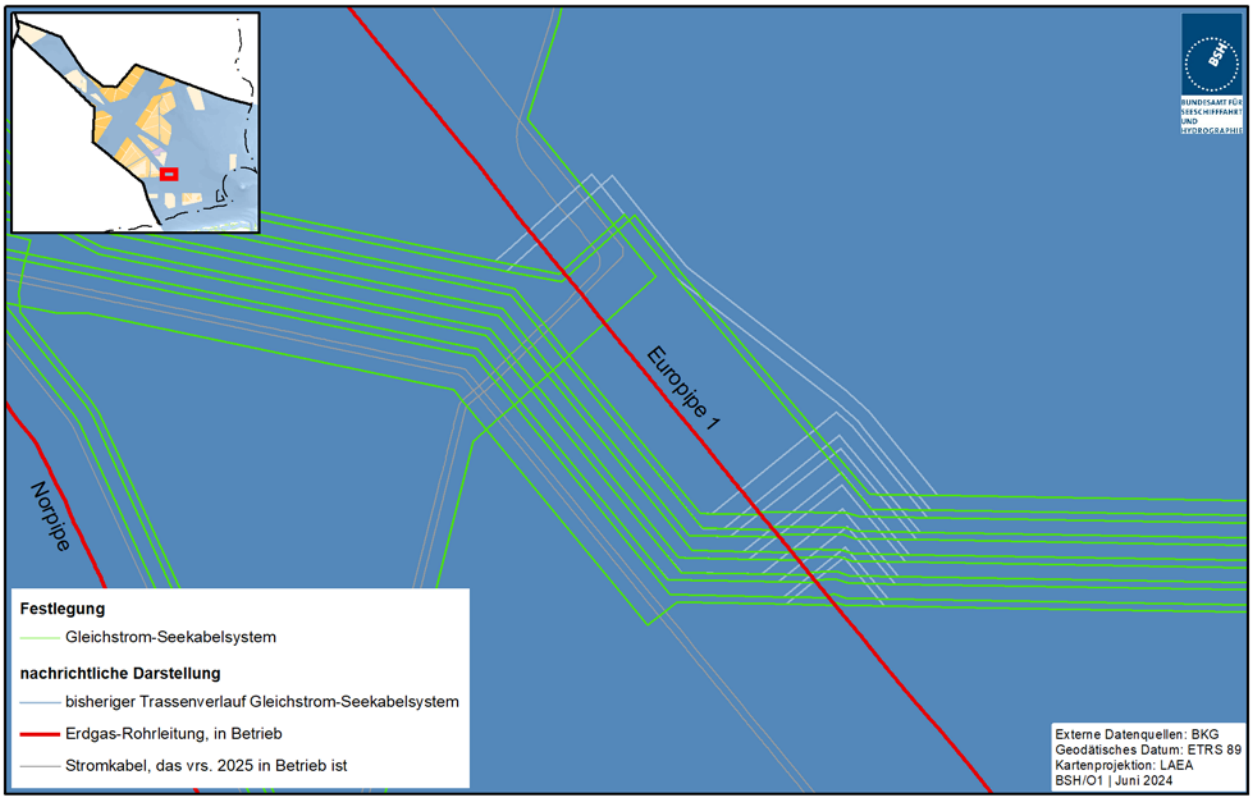

Figure 12: Example of adaptation of the crossings in the area of the Europipe 1 pipeline.

F10. Are there any aspects that speak against the planned approach?

F11. What requirements must such a crossing fulfil?

F12. Is the considered distance of 30 metres on both sides of the pipeline sufficient for the right-angled crossing?

7.13.5 Minimally disruptive cable laying procedure

The designation corresponds to the values of principle 2.2.3 (6) of ROP 2021.

In order to minimise possible negative impacts on the marine environment through the laying of subsea cables, a cable laying procedure should be selected in the individual procedure, in particular depending on the geological conditions, which has the least interference and impact on the marine environment, but at the same time can be expected to safely achieve the specified covering over. The use of the cable laying procedure should cause as few adverse effects as possible to the safety and efficiency of shipping.

7.13.6 Covering over

This planning principle is also found in and clarifies principle 2.2.3 (5) of ROP 2021. According to the spatial offshore grid plan for Offshore North Sea (BFO-N) 16/17, a continuous covering over of at least 1.5 metres must be ensured for the cable system in the North Sea during laying. Please refer to the reasoning for this in planning principle 5.3.2.7 of BFO-N 16/17. Within the areas defined in the Site Development Plan, the requirements of the planning principle of increase of sediment temperature must be taken into consideration with regard to the required covering over.

Different regulations may apply in areas where designated areas overlap with reservation areas for other uses in the ROP 2021 and multiple use is intended. These are weighed up and specified in the respective project approval procedures. For the corridors for research vessels in the overlapping areas of areas for wind energy with reservation areas for scientific research, a covering over of at least 1.5 m is required for all subsea cables, including inner-farm cabling, in order to be able to implement multiple use.

The covering over to be created in the Baltic Sea was designated on the basis of Planning principle 5.4.2.7 of the Federal Sectoral Plan for the Baltic Sea (BFO-O) 16/17 in the project approval procedure and/or in the enforcement procedure on the basis of a comprehensive study.

7.14 Deviation possibilities

The specific decision regarding the possibility of a deviation is made on a case-by-case basis when weighing up the conflicting interests on the basis of the relevant planning principle and the associated technical regulations.

8 Pilot offshore wind turbines

In accordance with Section 5, para. 2, no. 2 of the Offshore Wind Energy Act, the Site Development Plan can designate available grid connection capacities for areas in the EEZ and in the territorial sea on existing offshore connection lines or offshore grid connection cables to be completed in the coming years, which can be allocated to pilot offshore wind turbines in accordance with Section 95, para. 2 of the Offshore Wind Energy Act. In this context, the Site Development Plan identifies those grid connection capacities which are not sufficient for the efficient, economic operation of a larger number of WT at sea in the spatial context and which are therefore not to be included in the tenders, but which are sufficient for the grid connection of pilot offshore wind turbines at sea. This is intended to increase the efficient use and utilisation of offshore grid connection cables.

The Site Development Plan can define spatial provisions for the construction of pilot offshore wind turbines in areas and specify the technical conditions of the offshore grid connection line and the resulting technical requirements for the grid connection of offshore pilot wind turbines. A preliminary investigation of sites for pilot offshore wind turbines does not take place.

It should be noted that by identifying available grid connection capacities, the Site Development Plan makes no statement as to whether there are free sites in an area for the construction and operation of pilot wind turbines at sea. Furthermore, the Site Development Plan makes no statement as to whether pilot offshore wind turbines can be connected to the offshore grid connection cable on which grid connection capacity is available. Whether and where exactly the construction and operation of pilot offshore wind turbines at sea are permissible will be decided solely by the approval procedure for pilot offshore wind turbines at sea to be carried out later.

With the second Law on Amendments to the Offshore Wind Energy Act (WindSeeG) and other regulations of 20.07.2022 (Federal Law Gazette I, page 1325), the legislator introduced regulations on supplementary capacity allocation from 01.01.2023 in Section 14a of the Offshore Wind Energy Act. Since the announcement of the Site Development Plan 2023, the Federal Network Agency has allocated corresponding additional capacities to the grid connection systems NOR-2-2, NOR-2-3 and NOR-6-2. This means that no more grid connection capacities for pilot offshore wind turbines are available for the grid connection cables NOR-2-3 and NOR-6-2. The available capacity for the grid connection line NOR-2-2 has thus been reduced to 38.44 MW.

No additional capacity was allocated for the grid connection line NOR-4-2. This is no longer listed as available grid connection capacity for pilot energy plants, as it is only available for a limited period until the grid connection system NOR-7-2 is fully commissioned in QIV 2027.

9 Areas for other energy generation

In accordance with Section 5, para. 2a of the Offshore Wind Energy Act, the Site Development Plan may designate areas for other energy generation outside the areas.

The Site Development Plan can set spatial and technical provisions for areas for other energy generation for wind turbines and other forms of energy generation facilities, for lines or cables that discharge energy or energy sources from these and for their ancillary facilities (Section 5, para. 2a, sentence 1 of the Offshore Wind Energy Act).

The provision stating that the lines or cables for the grid connection of SEN-1 should be routed within the reservation areas for lines as far as possible is based on principle 2.2.3 (2) of the ROP 2021.

Pursuant to Section 5, para. 2a, sentence 2 of the Offshore Wind Energy Act, the designation of lines or cables for the grid connection of other energy generation areas in routes or route corridors for offshore grid connection cables is not permitted. For this reason, the routing of subsea cables and pipelines or cables for grid connection to SEN-1 via the gates N-I to N-V designated in the Site Development Plan is excluded.

A grid connection of the SEN-1 area to the existing Europipe 1 pipeline is not ruled out. The open questions regarding third-party access options to existing and planned pipelines are to be clarified exclusively by the respective project managers.

The definition of a hydrogen pipeline for the grid connection of SEN-1 is being consulted.

The Ordinance on the allocation of other energy generation areas in the Exclusive Economic Zone (SoEnergieV) is currently being revised. The tender of other energy generation areas can take place in several sub-areas. Reference is made to the BMWK's consultation on the "Sectionalisation of areas for other energy generation SEN-1"[21].

IV. Conformity of the designations with private and public concerns

The examination of the compliance of the specifications with private and public concerns will be carried out after the consultation. In anticipation of the examination of the compatibility of the provisions of the Site Development Plan with the ROP 2021, the areas in which the draft Site Development Plan deviates from the objectives of the ROP 2021 are presented below. A detailed description of the resulting necessary deviation procedures will also be provided after the consultation.

Deviations from the ROP 2021

Determinations that do not comply with the maritime spatial planning requirements pursuant to Section 17, para. 1 of the ROG are not permitted pursuant to Section 5, para. 3, sentence 2, no. 1 of the Offshore Wind Energy Act. Requirements of spatial planning are objectives of maritime spatial planning, principles of maritime spatial planning and other requirements of spatial planning (Section 3, para. 1, no. 1 of the ROG). While deviations from principles and other requirements of maritime spatial planning have already been implemented as part of the consideration of the preliminary draft and the draft Site Development Plan and are recorded in the specifications and the reasoning, a deviation procedure must be carried out for deviations of the Site Development Plan from the objectives of ROP 2021. Deviations from priority areas of the ROP 2021 and deviations from border gates of the ROP 2021 to the territorial sea must therefore be presented. Priority areas are areas that are designated for certain spatially significant functions or uses and

[21] Available at: https://www.bmwk.de/Redaktion/DE/Artikel/Energie/marktkonsultation-Zuschnitt-Teilbereiche-SEN-1.html

[22] Sound exposure level in dB re 1 µPa² s; dB = decibel; re = in reference to; 1 µPa = 1 microPascal; 1 µPa² s = 1 microPascal squared * second; the reference level for water is 1 µPa.

exclude other spatially significant functions or uses in this area if these are not compatible with the priority functions and uses (Section 7, para. 3, no. 1 of the ROG). Priority areas have the character of objectives of the ROP 2021 (see preliminary remarks under 2. Designations of the ROP 2021). Objectives of maritime spatial planning are binding provisions in the form of spatially and objectively definable textual or graphic specifications in maritime spatial plans for the development, organisation and safeguarding of space that have been finally weighed up by the spatial planning authority (Section 3, para. 1, no. 2 of the ROG). It is clear from the above definitions that the objectives of maritime spatial planning are not open to consideration and that there is therefore no possibility at the downstream level of the Site Development Plan (unlike in the case of reservation areas, for example) to weigh up the priority uses against uses planned in the draft Site Development Plan that deviate from them. Rather, if no exceptions are provided for the deviating specifications of the Site Development Plan in the ROP 2021, a deviation procedure pursuant to Section 19, sentence 1, alt.1 in conjunction with Section 6, para. 2 of the ROG, which can be carried out as part of the Site Development Plan revision procedure (Section 19, sentence 2, alt.1 of the ROG).

Expected deviations from the ROP 2021 with regard to the areas and sites in the Site Development Plan

Area N-17

Area N-17 in the draft Site Development Plan has a layout that deviates from the reservation area for wind energy EN17 in the ROP 2021 in the following places:

Area N-17 deviates in a north-easterly direction from part of the reservation area for wind energy EN17 - in this respect, area N-17 also overlaps the priority area for shipping SN16 of the ROP 2021 over almost the entire width of the shipping route and the length of the reservation area EN17. In this respect, a deviation procedure is therefore required. The reason for this aforementioned change to area N-17 is that the course of shipping route SN16 has been shifted to the north-east. This contributes significantly to increasing the safety of shipping traffic in the see area. For this reason, the part of the reservation area for wind energy EN17 is not planned as a site in the draft Site Development Plan with a site that is currently located north-east of the shipping route SN16. Furthermore, area N-17 of the draft Site Development Plan does not extend all the way to the south-western tip of the south-western section of the reservation area for wind energy EN17. The reason for this is the international coordination with Denmark and the Netherlands as part of an external expert report. In these investigations, an optimal route was agreed in principle with the neighbouring countries.

Sites N-16.1 to N-16-5

Sites N-16.1, N-16.2, N-16.3, N-16.4 and N-16.5 of the draft Site Development Plan deviate from the zoning of the reservation area for wind energy EN16 of the ROP 2021. In particular, the sites now defined by the Site Development Plan in this area will be extended to the south-east and overlap the temporary priority area for shipping SN10 (over a width of up to around 12 km), which means that a deviation procedure is also required here. The time limit for the priority area for shipping SN10 in the ROP has been set until 31.12.2035 (see item 2.1, para. 2 of the ROP 2021), meaning that the priority area for shipping SN10 must still be observed as such when the planned Site Development Plan comes into force.
Sites N-16.4 and N-16.5 are also partially located in the priority area for shipping SN17 of the ROP. This amended planning is a consequence of the current interim status of the ongoing international coordination between Denmark, the Netherlands and Germany to close the shipping route SN17.

As part of the joint Formal Safety Assessment (FSA), various investigations were carried out in 2023 and up to April 2024. In this context, no concerns regarding the safety and efficiency of shipping could be identified at this time for the route preferred by Germany. For this reason, this draft of the Site Development Plan takes this preferred variant as the basis for planning and thus puts it for international consultation.

Sites N-14.1 to N-14.3

Sites N-14.1, N-14.2 and N-14.3 are each partially located in priority areas for shipping in the ROP 2021. The south-western part of site N-14.1 overlaps a strip 4 to 6 km wide with the priority area SN10 of the ROP 2021. Sites N-14.2 and N-14.3 also overlap with the priority area for shipping SN17 of the ROP 2021. A deviation procedure is also required for all of the aforementioned changes.

Sites N-13.1 to N-13.4

The area of the priority area for wind energy EN13 of the ROP 2021, which is planned by sites N-13.1, N-13.2 and N-13.3 of the Site Development Plan, is also largely the seasonally limited reservation area for harbour porpoises, so that the protection of the harbour porpoise must be given special weight in consideration against the use for wind energy (defined as a priority in the ROP 2021) - in this respect, however, there is no deviation from the objective.
Site N-13.4 is also partially located in the priority area for shipping SN10 of the ROP. EN13-North is designated in the ROP as a priority area for wind energy from 01.01.2030, unless the Federal Ministry responsible for shipping provides evidence to the Federal Ministry responsible for maritime spatial planning by 31.12.2025 that this area is required for shipping for compelling reasons of safety and ease of navigation. A deviation procedure must be carried out for the area where N-13.4 protrudes into the priority area for shipping SN10.

The southern sub-section of site N-13.4 is also overplanned in the priority area for shipping SN15. The course of the SN15 shipping route was slightly adjusted in consultation with Denmark and the Netherlands. This new course of SN15 takes into consideration areas for the extraction of hydrocarbons in the Dutch EEZ. This deviation from the uses envisaged in the ROP in the priority area for shipping SN15 therefore also requires a deviation procedure.

Sites in extended areas N-9 and N-12

Some sites of the draft Site Development Plan are located in the south-western area of the temporary priority area for shipping SN10 of the ROP: N-12.5 (partially) as well as N-12.4, N-9.4, N-9.5 (each completely overlapping with the priority area for shipping). As described above, the current interim status for the planning of parts of the shipping route SN10 has been identified as a preferable solution from the point of view of Federal Maritime and Hydrographic Agency, which has enabled these new area expansions and area definitions. A deviation procedure is also required in this respect.

Area for subsequent utilisation N-5

In addition, the layout of the area for subsequent use N-5 has changed; details on this are described in the reasoning to the section on areas and sites for area N-5. The newly defined area now overlaps in parts with the priority area for divers. According to the new layout, N-5 will also overlap the SN8 shipping route along its entire length in an easterly direction. Such a closure of shipping route SN8 has not yet been finalised. A deviation procedure is required for both the aforementioned changes.

Deviations from the ROP with regard to gates to the territorial sea

In addition to deviations from the ROP with regard to areas and sites, the Site Development Plan will also define deviations with regard to gates. The gates to the territorial sea defined in

the ROP are defined as objectives of the ROP; conflicting uses are excluded in these areas (item 2.2.3 (3) of the ROP).

In the Baltic Sea, the gate O-XIII of the Site Development Plan, which lies on the border with the territorial sea, will be extended by 600 metres to the north. As a result, it now also extends 100 metres northwards beyond the gate GO5 of the ROP, resulting in a deviation from the objective. The reason for this is that two interconnectors north of NordStream 2 should now also run through this gate.

A description of the requirements for the individual deviations from the objectives mentioned above, together with the associated assessment and reasoning, will be provided after the consultation on this draft Site Development Plan.

V. Transitional regulation

The current version of the Site Development Plan, which was last published at the time of the award of the contract for the site, shall be applicable for the approval procedures for offshore wind turbines. The current version of the Site Development Plan published at the time of the application pursuant to Section 66 of the Offshore Wind Energy Act shall be applicable for the approval procedures for offshore grid connection cables.

Deviating from this, the current version of the Site Development Plan published in each case must be applied in the following cases:

(a) For planning principles of the respective published Site Development Plan in the current version with reference to the latest technological advancements in science and technology,

(b) For planning principles of the respective published Site Development Plan in the current version, which serve to implement numbers 1 to 5 of Section 5, para. 3, sentence 2 of the Offshore Wind Energy Act, and

(c) For procedures for significant changes and the removal of already authorised offshore structures and their ancillary facilities.

The possibility of permitting deviations from standardised technical principles and planning principles remains unaffected by this.

VI. Summarised environmental statement and monitoring measures

[To be implemented after consultation]

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Appendix

1 Map section

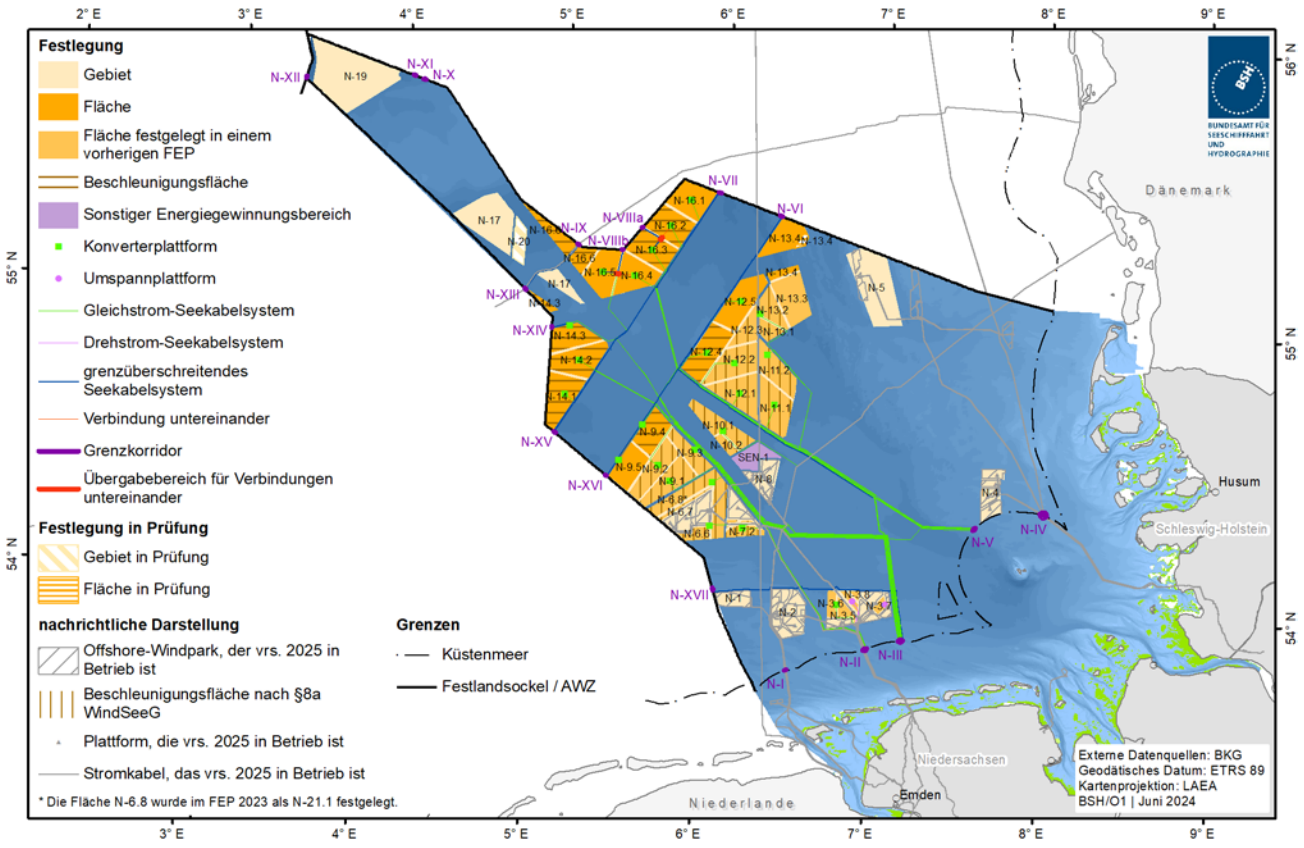


Figure 13: Designations for North Sea

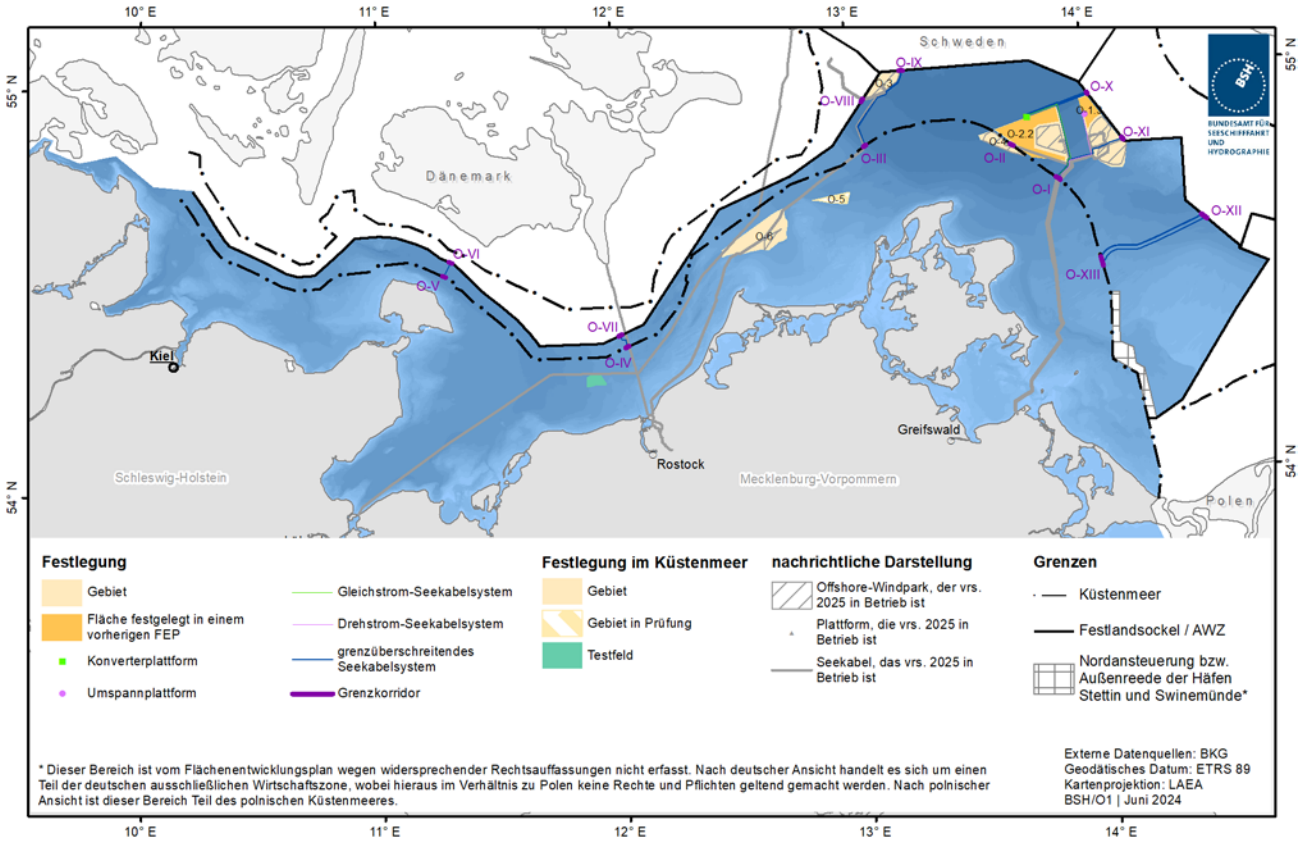


Figure 14: Designations for Baltic Sea

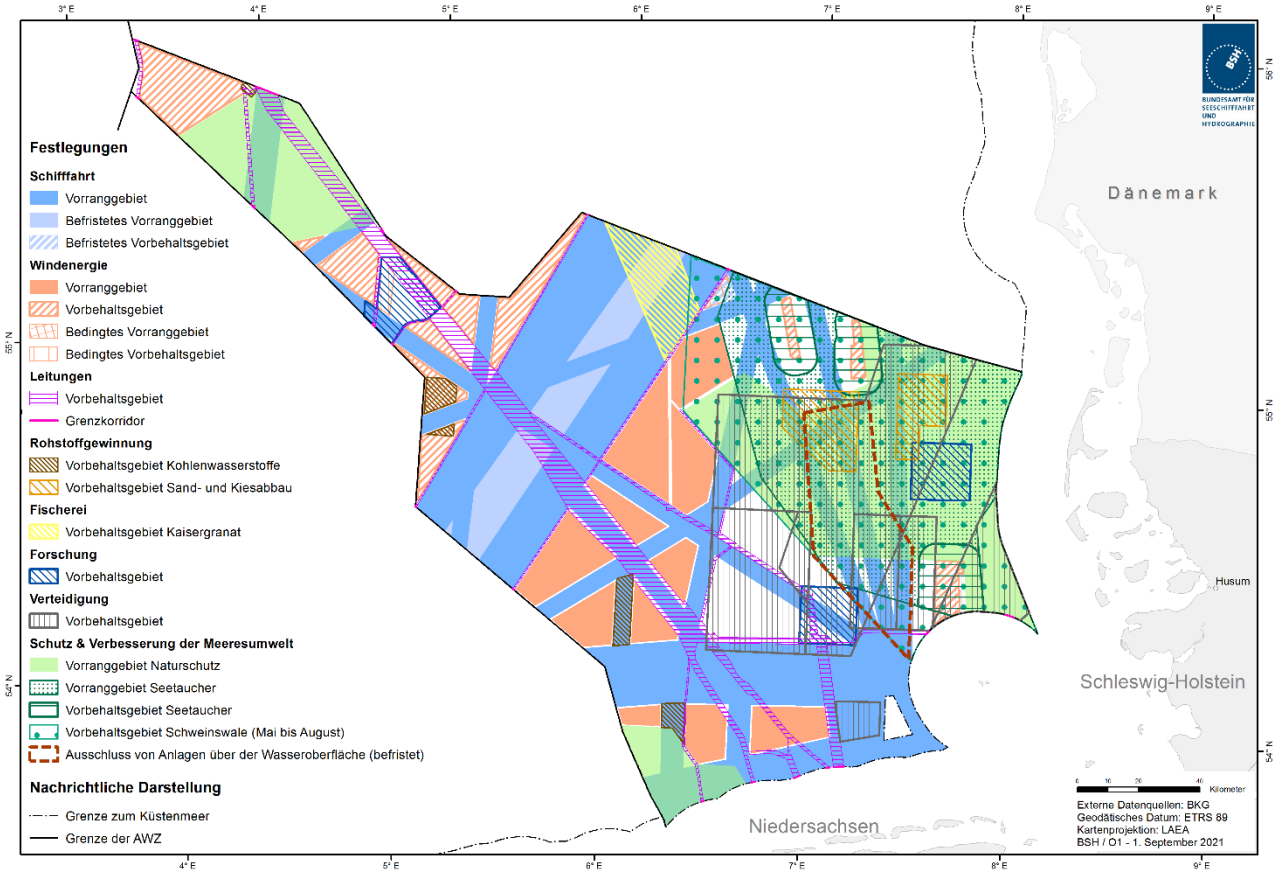


Figure 15: Maritime spatial plan for the German exclusive economic zone in the North Sea and the Baltic Sea – map section North Sea

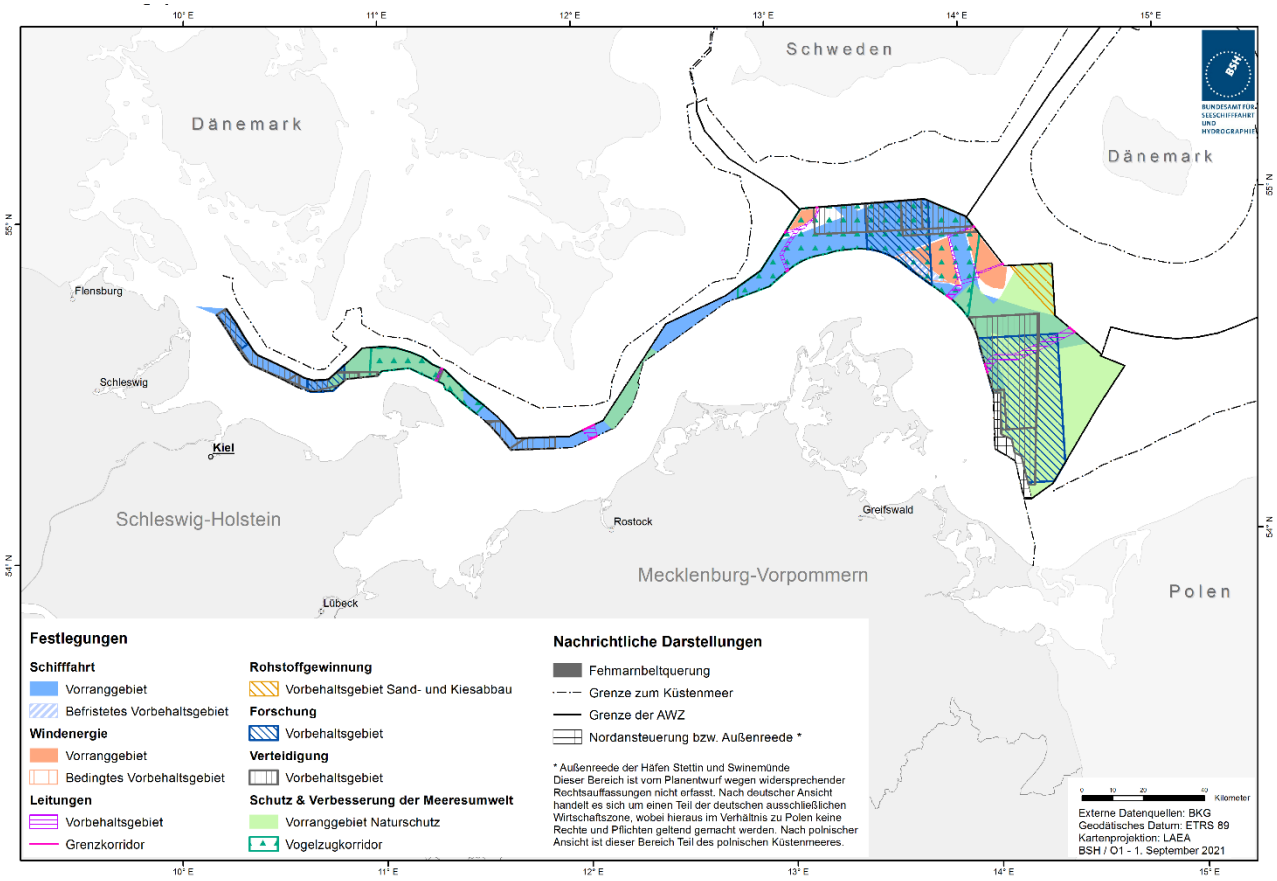


Figure 16: Maritime spatial plan for the German Exclusive Economic Zone in the North Sea and in the Baltic Sea – Baltic Sea map section

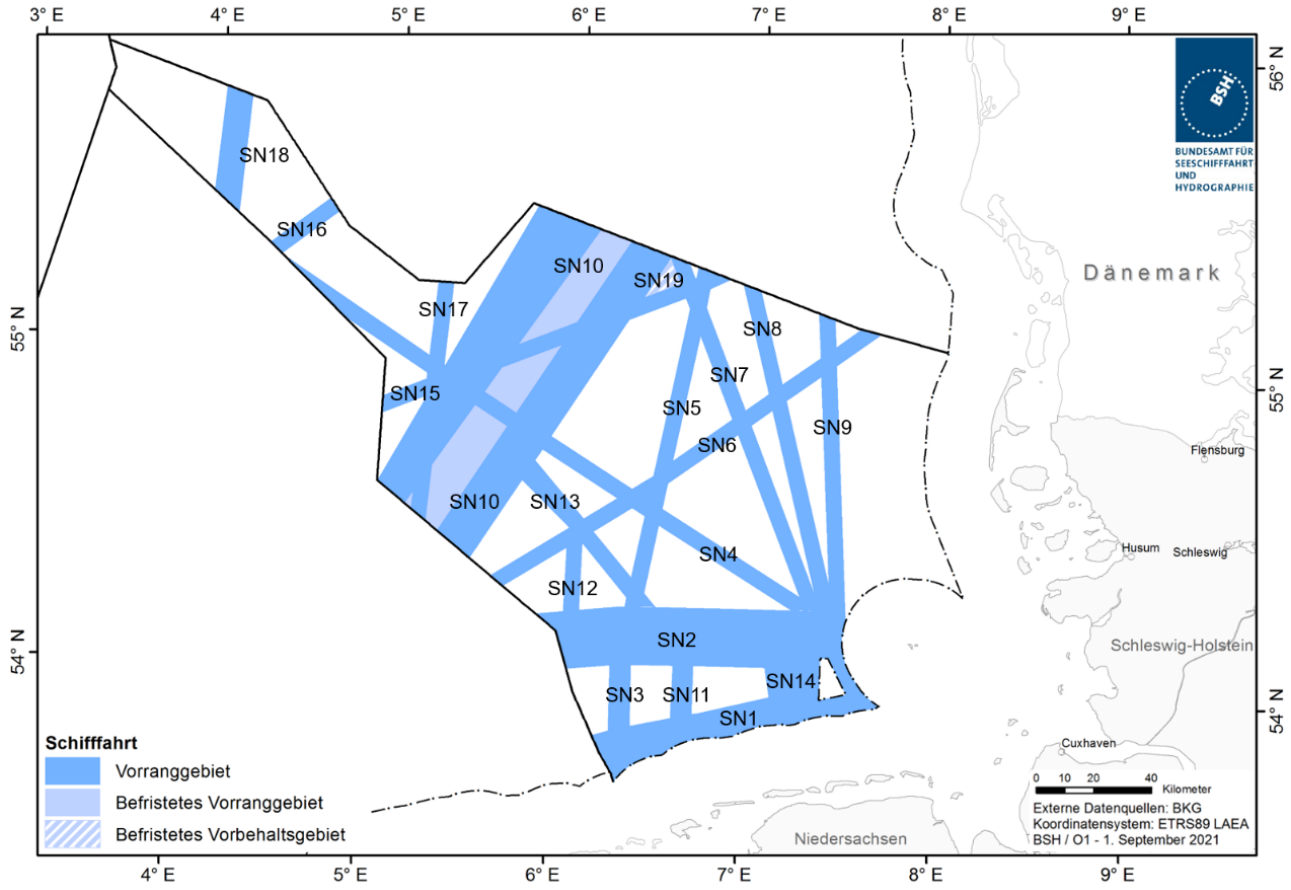


Figure 17: Maritime spatial plan for the German exclusive economic zone in the North Sea and the Baltic Sea – priority and reservation areas for shipping in the North Sea.

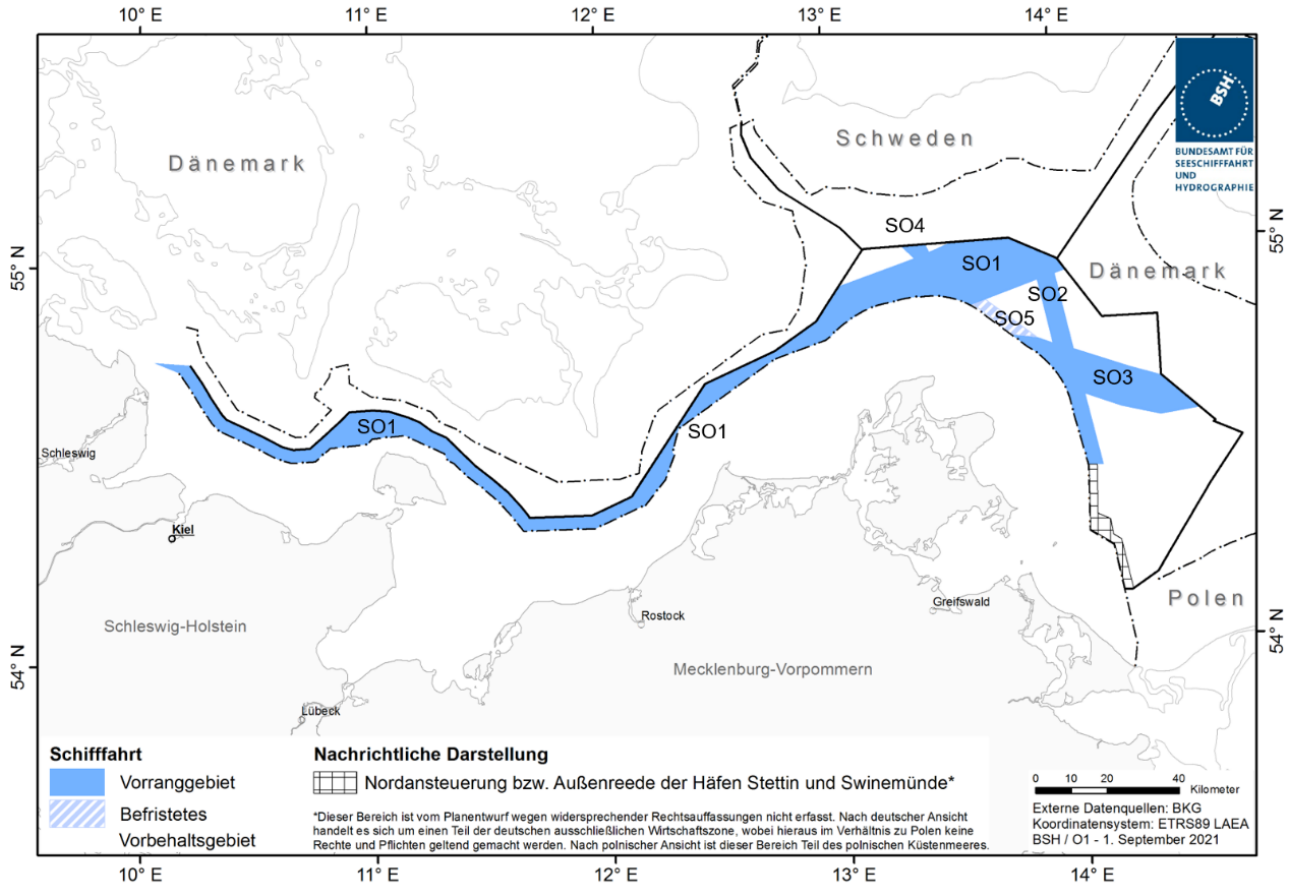


Figure 18: Maritime spatial plan for the German exclusive economic zone in the North Sea and the Baltic Sea – priority and reservation areas for shipping in the Baltic Sea

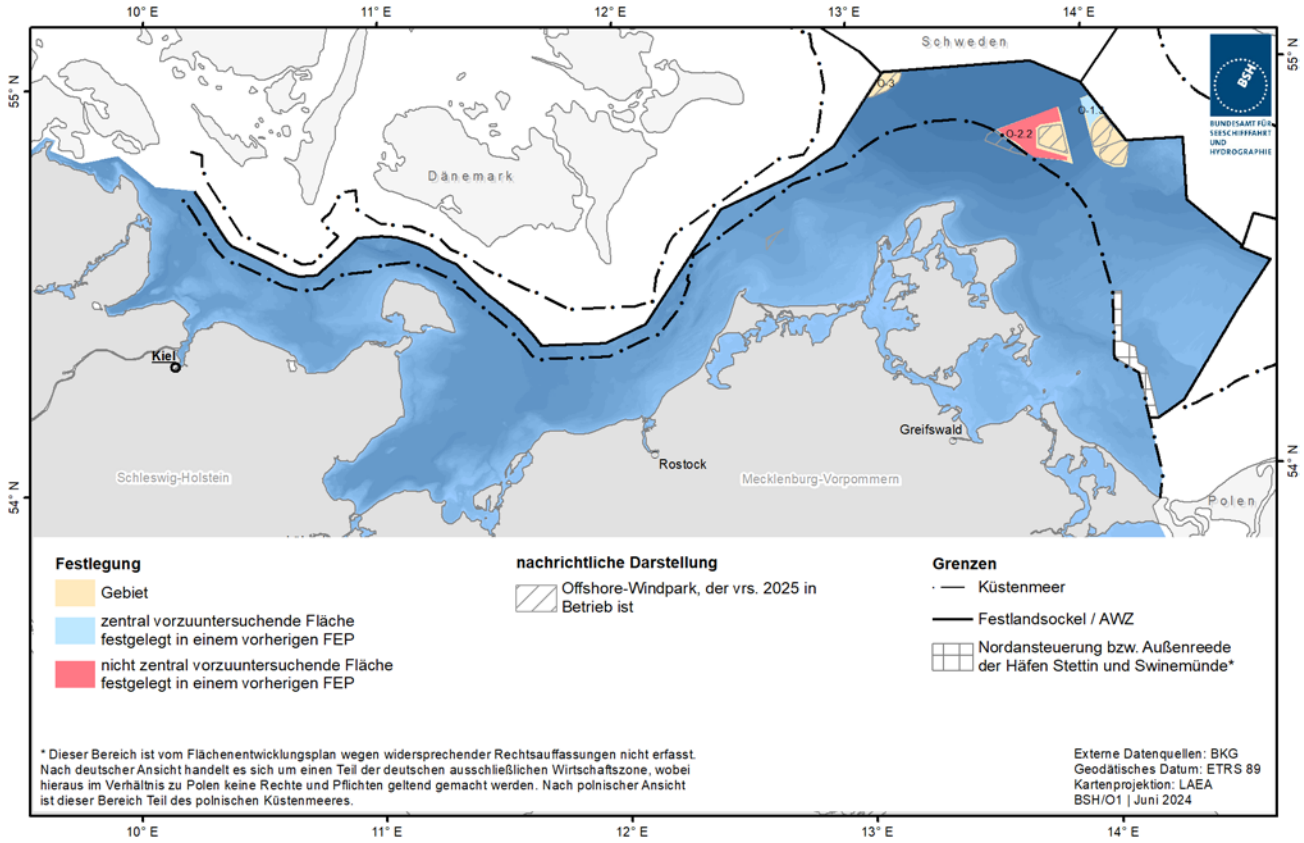


Figure 19: Differentiation of the designated areas with regard to the type of site investigation in the EEZ of the Baltic Sea (a corresponding figure for the North Sea is included in section 5)

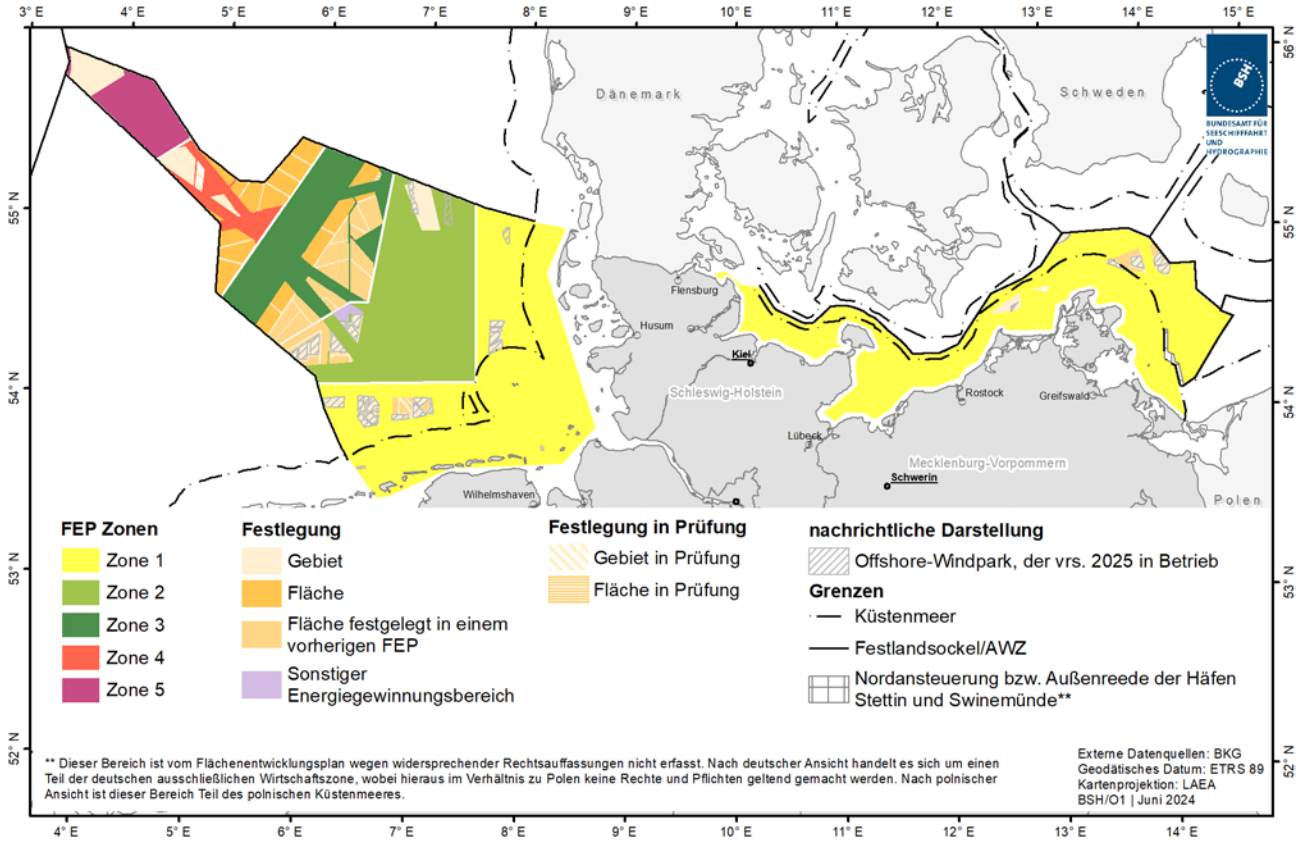


Figure 20: Site Development Plan zones (new layout)

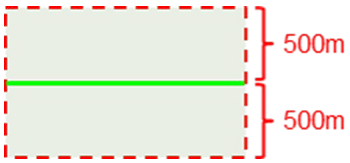
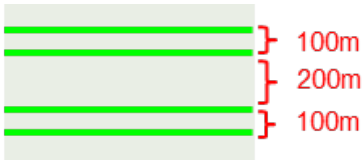
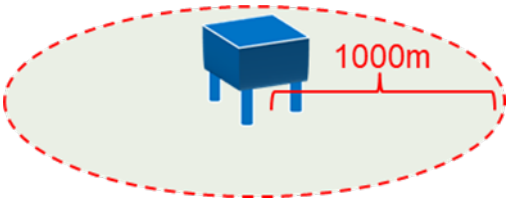
2 Overview table for planning principle 7.10 Consideration of all existing, approved, and designated uses

Table 12: Overview table for planning principle 7.10 Consideration of all existing, approved, and designated uses

Usage / Installation	Distance to be main-tained (m)	Explanation of distance	Requirement / Reference	Planning principle
Pipeline	500	Both sides	Centre line of the pipeline	7.10.2
Subsea cables, third-party	500	Both sides	Centre line of the route	7.10.3
Subsea cables, parallel	100-200-100	Alternating	Centre line of the route	7.10.3
Platform, converter	1000	Radius	Centre of the location	7.10.4
Wind turbine to wind turbine of neighbouring areas or areas for other energy generation	At least 5 x Ø rotor	Diameter	The larger rotor of the neighbouring wind turbines is relevant; the distance refers to the centres of the neighbouring installation locations	7.10.5
Wind turbines to the centre line between sites and/or other energy generation areas	At least 2.5 x Ø rotor	Diameter	The rotor of the respective wind turbines is relevant, the distance refers to the centre point of the installation location	7.10.5

Table 13: Figures to explain the distances to be maintained.

Please refer to the planning principle 7.10 Consideration of all existing, approved, and designated uses.

All dimensions in metres (m)		
7.10.2 Pipelines 	7.10.3 (a) Subsea cables 	7.10.3 (b) Subsea cables 
7.10.4 0 Platforms 		

3 Overview table

Table 14: Overview table for designations for sites and OGCS

Commissioning calendar year	Site name	Tender calendar year	Calendar year/quarter of commissioning	Expected to be installed Capacity [MW]	Commissioning per calendar year [MW]	Designation of grid connection system	Calendar year/quarter Commissioning	Transmission capacity [MW]	Gate to the territorial sea
2026	N-3.7	2021	2026 (QIII)	225	958	NOR-3-3	n/a	900	N-II
	N-3.8	2021	2026 (QIII)	433					
	O-1.3	2021	2026 (QIII)	300		OST-1-4	2026 (QIII)	300	O-I
2027	N-7.2	2022	2027 (QIV)	980	980	NOR-7-2	2027 (QIV)	980	N-V
2028	N-3.5	2023	2028 (QIII)	420	1800	NOR-3-2	2028 (QIII)	900	N-II
	N-3.6	2023	2028 (QIII)	480					
	N-6.6	2023	2028 (QIV)	630		NOR-6-3	2028 (QIV)	900	N-II
	N-6.7	2023	2028 (QIV)	270					
2029	N-9.1	2024	~~2029 (QIII)~~ 2030 (QIII)	2000	5500	NOR-9-1	~~2029 (QIII)~~ 2030 (QIII)	2000	N-II
	N-9.2	2024	~~2029 (QIII)~~ 2031 (QIV)	2000		NOR-9-2	~~2029 (QIII)~~ 2031 (QIV)	2000	N-III
	N-9.3	2024	2029 (QIV)	1500		NOR-9-3	2029 (QIV)	2000	N-III
2030	N-10.2	2025	2030 (QIII)	500	9500				
	N-12.1	2023[a)]	2030 (QIII)	2000		NOR-12-1	2030 (QIII)	2000	N-III
	N-12.2	2023[a)]	2030 (QIV)	2000		NOR-12-2	2030 (QIV)	2000	N-V
	O-2.2	2023[a)]	2030 (QIII)	1000		OST-2-4[b)]	2030 (QIII)	2000	O-I
	N-10.1	2025	2030 (QIII)	2000		NOR-10-1[b)]	2030 (QIII)	2000	N-II
	N-11.1	2023[a)]	2030 (QIII)	2000		NOR-11-1	2030 (QIII)	2000	N-V
2031	N-11.2	2024[a)]	~~2031 (QIII)~~ 2031 (QIV)	1500	4000	NOR-11-2	~~2031 (QIII)~~ 2031 (QIV)	2000	N-III
	N-13.1[b)]	2026	~~2031 (QIII)~~ 2031 (QIV)	500					
	N-12.3	2024[a)]	2031 (QIII)	1000		NOR-13-1	2031 (QIII)	2000	N-III
	N-13.2	2026	2031 (QIII)	1000					
2032	~~N-21.1~~ N-6.8[b)]	2027	2032 (QIII)	2000	4000	~~NOR-21-1~~ NOR-6-4	2032 (QIII)	2000	N-II
	N-9.4	2025[a)]	2032 (QIII)	2000		NOR-9-4	2032 (QIII)	2000	N-III
2033	N-12.4	2026[a)]	2033 (QIII)	2000	4000	NOR-12-3	2033 (QIII)	2000	N-V
	N-9.5	2028	2033 (QIII)	2000		NOR-9-5	2033 (QIII)	2000	N-III
2034	N-12.5	2029	2034 (QIII)	2000	4000	NOR-12-4	2034 (QIII)	2000	N-V
	N-14.1	2027[a)]	2034 (QIII)	2000		NOR-14-1	2034 (QIII)	2000	N-III

Commissioning calendar year	Site name	Tender calendar year	Calendar year/quarter of commissioning	Expected to be installed Capacity [MW]	Commissioning per calendar year [MW]	Designation of grid connection system	Calendar year/quarter Commissioning	Transmission capacity [MW]	Gate to the territorial sea
2035	N-14.2	2028[a)]	2035 (QIII)	2000	4000	NOR-14-2	2035 (QIII)	2000	N-III
	N-16.1	2030	2035 (QIII)	2000		NOR-16-1	2035 (QIII)	2000	N-V
2036	N-16.2	2029[a)]	2036 (QIII)	2000	6000	NOR-16-2	2036 (QIII)	2000	N-V
	N-16.3	2029[a)]	2036 (QIII)	2000		NOR-16-3	2036 (QIII)	2000	N-III
	N-16.4	2031	2036 (QIII)	2000		NOR-16-4	2036 (QIII)	2000	N-III
2037	N-14.3	2030[a)]	2037 (QIII)	2000	4000	NOR-14-3	2037 (QIII)	2000	N-III
	N-16.5	2032	2037 (QIII)	2000		NOR-16-5	2037 (QIII)	2000	N-III
Sum - designations draft Site Development Plan[c)]				24000					
Sum - Site Development Plan 2023[c)]				24738					
Projected park population 2025				11,000[d)]					
Gennaker OWF (territorial sea of Mecklenburg–Western Pomerania)				900					
Total				60638					

Colour coding: Designations in a previous Site Development Plan | Designations in a previous Site Development Plan with changes | New designation

[a)] These invitations to tender are issued as invitations to tender for centrally non-pre-investigated sites. The period between tender and commissioning is extended accordingly.

[b)] Spatial change.

[c)] The defined sites N-13.3, N-13.4 and N-16.6 were not included in this total, as no time frame is specified for them.

[d)] The expected population in 2025 (rounded) was adjusted compared to the assumption in the Site Development Plan 2023 due to the additional capacity allocations made (Section 14a of the Offshore Wind Energy Act).

4 Draft infrastructure area plan for the EEZ

4.1 Designations

In this infrastructure area plan, the Federal Maritime and Hydrographic Agency designates routes, route corridors and converter sites for offshore grid connection cables in the EEZ as infrastructure areas in accordance with Section 12j, para. 1 of the Draft Energy Industry Act. The following offshore grid connection cables are designated as infrastructure areas within the meaning of Section 12j of the Draft Energy Industry Act:

Table 15: Infrastructure areas and associated preventive and mitigation measures

Grid connection system (Grid connection cable and converter platform)	Designated mitigation measures as per the catalogue from section 5.3 in Appendix
NOR-9-4	A to K, M, N, P to T
NOR-9-5	A to K, M, N, P to T
NOR-12-3	A to K, M, N, P to T
NOR-14-1	A to K, M, N, P to T
NOR-12-4	A to K, M, N, P to T
NOR-14-2	A to K, M, N, P to T
NOR-16-1	A to K, M, N, P to T
NOR-16-3	A to K, M, N, P to T
NOR-16-2	A to K, M, N, P to T
NOR-16-4	A to K, M, N, P to T
NOR-14-3	A to K, M, N, P to T
NOR-16-5	A to K, M, N, P to T

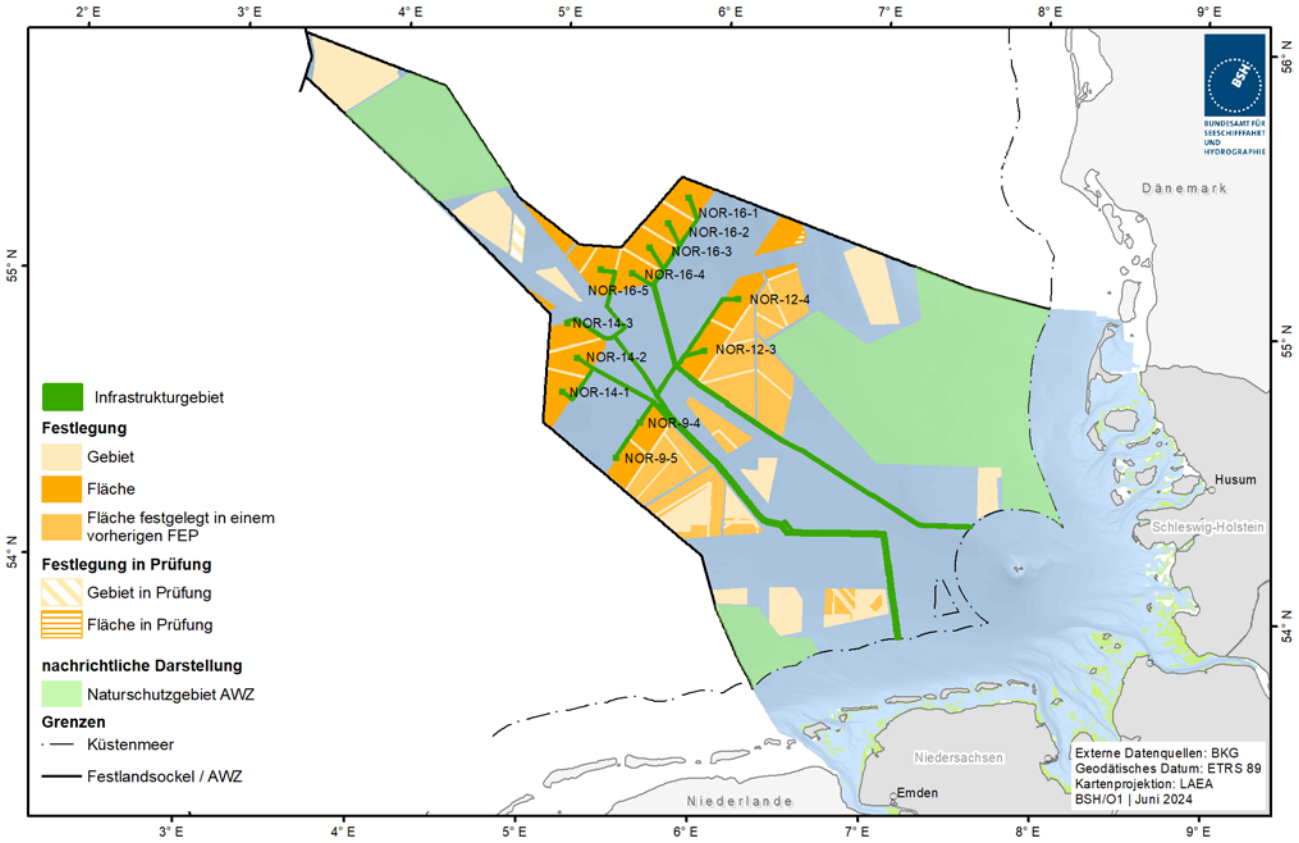


Figure 21: Overview of infrastructure areas in the EEZ of North Sea

No infrastructure areas will be designated in the Baltic Sea.

It should be noted that, according to the Federal Government's draft bill for an "Act to implement the EU Renewable Energy Directive in the area of offshore wind energy and electricity grids to amend the Offshore Wind Energy Act and other regulations" (BT Drs. 20/11226 of 29.04.2024), in accordance with Section 70b, para. 2 of the Draft Offshore Wind Energy Act, routes or route corridors and converter platform locations that have been defined in a site development plan published before 20 November 2023 are considered infrastructure areas within the meaning of Article 15e, para. 2, sentence 2 of Directive (EU) 2018/2001.

4.2 Reasoning

For routes and route corridors defined for the first time in the Site Development Plan as well as converter locations for offshore grid connection cables in the EEZ, the planning approval authority may designate infrastructure areas for the implementation of grid projects within the meaning of Article 15e of Directive (EU) 2018/2001 in an infrastructure area plan using existing data.

The infrastructure area plan avoids Natura 2000 areas in accordance with Section 12j, para. 1, sentence 7, nos. 1 and 2 of the Draft Energy Industry Act. Areas with significant occurrences of one or more species pursuant to Section 12j, para. 1, sentence 7, no. 5 of the Draft Energy Industry Act and marine areas pursuant to Section 12j, para. 1, sentence 7, no. 6 of the Draft Energy Industry Act, which are protected by an ordinance pursuant to Section 57 of the Federal Nature Conservation Act, are also not affected by the designation of infrastructure areas.

Reference is also made to sections 12, 4 and 5 of the environmental report for the North Sea.

A separate strategic environmental assessment for the infrastructure area plan for the EEZ is not required in accordance with Section 12j, para. 6, sentence 2 of the Draft Energy Industry Act, since the strategic environmental assessment carried out for this Site Development Plan also takes into account the environmental impacts of the infrastructure areas in the EEZ.

In accordance with Section 5, para. 2c, sentence 1 of the Draft Offshore Wind Energy Act, the Site Development Plan also specifies effective and proportionate mitigation measures or rules for mitigation measures for infrastructure areas within the meaning of Section 12j of the Draft Energy Industry Act in order to avoid potential negative environmental impacts or, if this is not possible, to significantly reduce them where necessary. The mitigation measures are listed in detail in section 7 of the North Sea environmental report. As part of the assessment in section 12 of the North Sea environmental report, mitigation measures and rules for mitigation measures within the meaning of Section 5, para. 2c, sentences 1 and 3 of the Draft Offshore Wind Energy Act are taken into consideration on an environmental basis. For the definition of mitigation measures and rules for mitigation measures, please refer to Table 15: Infrastructure areas and associated preventive and mitigation measures. Mitigation measures as well as concrete specification of rules are defined and applied by the Federal Maritime and Hydrographic Agency in the approval procedure.

New types of mitigation measures pursuant to Section 5, para. 2c, sentence 2 of the Draft Offshore Wind Energy Act are not specified in this Site Development Plan.

5 Mitigation measures and rules for mitigation measures within the meaning of Section 5, para. 2c of the Draft Offshore Wind Energy Act for acceleration sites and infrastructure areas

5.1 Introduction

According to Section 5, para. 2c of the Draft Offshore Wind Energy Act, the Site Development Plan designates effective and proportional mitigation measures or rules for mitigation measures for all acceleration sites and infrastructure areas in accordance with Section 12j of the Draft Energy Industry Act to avoid possible negative impacts on the environment or, if this is not possible, to considerably reduce them where applicable. The Site Development Plan can provide for the possibility that the approval agency can order novel mitigation measures, the effectiveness of which has not yet been comprehensively tested, for a limited period of time on and outside of acceleration areas for one or more pilot projects, Section 5, para. 2c, sentence 2 of the Draft Offshore Wind Energy Act. Corresponding new mitigation measures are not specified in the current Site Development Plan.

These measures are described in this section. The necessary mitigation measures or rules for mitigation measures are defined for each site as part of the determination of the acceleration sites in the Site Development Plan. The Federal Maritime and Hydrographic Agency monitors the effectiveness of these measures and, in consultation with the Federal Agency for Nature Conservation, immediately takes suitable and proportionate measures if new mitigation measures prove to be ineffective, Section 5, para. 2c, sentence 3 of the Draft Offshore Wind Energy Act. The term mitigation measures also includes possible measures that lead to the prevention of negative environmental impacts, such as the deterrence of potentially affected fauna. The rules

to be defined are rules that serve to prevent, minimise or significantly reduce the impacts of offshore wind energy, including regulations on the design of mitigation measures in downstream procedures.

In the following presentation, a distinction is made between measures for acceleration sites on the one hand and measures for infrastructure areas on the other.

5.2 Mitigation measures and rules for mitigation measures for acceleration sites

Mitigation measures and rules for mitigation measures for acceleration sites can be referred to from the following Table 16. The measure is specified in concrete terms by referring to the planning principle in the Site Development Plan. Here, the measure or the rules for the measure are described in more detail and are to be referred to during implementation. This also applies insofar as further reference is made to the environmental report in the planning principles. In particular, the explanations in section 4 et seq of the North Sea environmental report must be observed. Insofar as reference is made to further environmental assessments in the description of the planning principles, it can be assumed that these can be omitted for the acceleration sites.

Table 16: Mitigation measures and rules for mitigation measures for acceleration sites

Measure	Designation	Brief description	Description can be found under:
A	Observance of environmental and nature conservation framework conditions	Maximum possible prevention of any adverse effect of legally protected biotopes in accordance with Section 72, para. 2 of the Offshore Wind Energy Act; compatibility of the specifications with the protective purpose of the nature conservation areas in accordance with Section 57 of the Federal Nature Conservation Act; planning and implementation to save as much space as possible; requirement of preventive and mitigation measures within the designated bird migration corridors	Planning principle (PG) 7.1.1
B	Overall temporal coordination of the construction and installation work	Prevention and reduction of cumulative effects through optimised construction planning and scheduling	PG 7.1.2
C	Avoidanvce and reduction of material emissions	Avoidanvce and/or maximum possible reduction of emissions: Preparation of emissions study, use of environmentally friendly operating materials wherever possible, safeguarding and monitoring of all technical installations and infrastructure by means of structural safety systems and safety measures, provisions for corrosion protection, system cooling,	PG 7.1.3

		waste and wastewater disposal, handling of extinguishing foam, use of diesel generators, grouting processes and grouting material	
D	Prevention and reduction of light emissions	Lighting that is as environmentally friendly as possible during operation to reduce attraction effects, such as switching obstruction lighting on and off as required, selecting suitable light intensities and spectra or lighting intervals.	PG 7.1.3
E	Maximum possible low-noise construction process and working method	For the foundations and installation of a system, a construction process and a working method, which is as quiet as possible under the circumstances found according to the latest technological advancements, must be used.	PG 7.1.4
F	Noise protection during the foundations of installations in compliance with the noise mitigation concept of the BMU	Use of effective technical noise mitigation measures during installation by impulse pile driving to ensure that noise emissions at a distance of 750 metres do not exceed 160 decibels for the broadband sound exposure level SEL05[22] and 190 decibels for the peak sound pressure level[23].	PG 7.1.4
G	Deterrence	Deterrence of fauna from the hazard area before pile driving work	PG 7.1.4
H	Duration of the pile driving operation	Limiting the duration of the ramming process including the deterrence to a minimum in pile driving	PG 7.1.4
I	Noise mitigation concept with noise forecast	Submission of the noise mitigation concept (draft) at least 12 months before the start of construction with reasoning of the planned foundation structure, the planned construction process, the planned working method and the planned noise mitigation measures as well as the noise forecast	PG 7.1.4
J	Coordination of pile driving work	Overall temporal and spatial coordination of the pile driving work within the framework of the subordinate approval procedure	PG 7.1.4
K	Noise protection during ammunition blasting	Requirement for noise mitigation concept for blasting of non-transportable munitions, including deterrence measures	PG 7.1.4
L	Noise protection during operation of the installations	The installation design that is as low in operating noise as possible according to the latest technological advancements.	PG 7.1.4

[22] Sound exposure level in dB re 1 µPa² s; dB = decibel; re = in reference to; 1 µPa = 1 microPascal; 1 µPa² s = 1 microPascal squared * second; the reference level for water is 1 µPa.

[23] Peak sound pressure level in dB re 1 µPa; dB = decibel; re = in reference to; 1 µPa = 1 microPascal; 1 µPa² s = 1 microPascal squared * second; the reference level for water is 1 µPa.

M	Minimisation of scour protection measures	Reduce scour protection to a minimum; minimise hard substrate; only fill made of natural stones or inert and natural materials are to be used as scour protection.	PG 7.1.5
N	Minimisation of cable protection measures	Reduce the use of hard substrate to a minimum, natural/inert cable protection	PG 7.1.5
O	Bird collision monitoring	Installation of state-of-the-art collision detection systems for monitoring the bird collision with the wind turbines	PG 7.1.6
P	Increase of sediment temperature	Adherence with the 2 K criterion	PG 7.1.7
Q	Traffic logistics concept	Reduction and bundling of shipping traffic and other shipping-related measures in special protection area for birds	PG 7.1.8
R	Consideration of objects	Fundamental prevention of blasting, otherwise noise mitigation concept	PG 7.6
S	Reduction of crossing structures	Reduction of crossing structures to the technically necessary minimum; if possible, structure-free crossings	PG 7.13.4

5.3 Mitigation measures and rules for mitigation measures for infrastructure areas

Mitigation measures and rules for mitigation measures for infrastructure areas can be referred to from the following Table 17. The measure is specified in concrete terms by referring to the planning principle in the Site Development Plan. Here, the measure or the rules for the measure are described in more detail and are to be referred to during implementation. This also applies insofar as further reference is made to the environmental report in the planning principles. In particular, the explanations in section 4 et seq of the North Sea environmental report must be observed. Insofar as reference is made to further environmental assessments in the description of the planning principles, it can be assumed that these can be omitted for the infrastructure areas.

Table 17: Mitigation measures and rules for mitigation measures for infrastructure areas

Measure	Designation	Brief description	The description can be found in the Site Development Plan under:
A	Observance of environmental and nature conservation framework conditions	Maximum possible prevention of any adverse effect of legally protected biotopes in accordance with Section 72, para. 2 of the Offshore Wind Energy Act; compatibility of the specifications with the protective purpose of the nature conservation areas in accordance with Section 57 of the Federal Nature Conservation Act; planning and implementation to save as	Planning principle (PG) 7.1.1

		much space as possible; requirement of preventive and mitigation measures within the designated bird migration corridors	
B	Overall temporal coordination of the construction and installation work	Prevention and reduction of cumulative effects through optimised construction planning and scheduling	PG 7.1.2
C	Avoidance and reduction of material emissions	Avoidanvce and/or maximum possible reduction of emissions: Preparation of emissions study, use of environmentally friendly operating materials wherever possible, safeguarding and monitoring of all technical installations and infrastructure by means of structural safety systems and safety measures, provisions for corrosion protection, system cooling, waste and wastewater disposal, handling of extinguishing foam, use of diesel generators, grouting processes and grouting material	PG 7.1.3
D	Prevention and reduction of light emissions	Lighting that is as environmentally friendly as possible during operation to reduce attraction effects, such as switching obstruction lighting on and off as required, selecting suitable light intensities and spectra or lighting intervals.	PG 7.1.3
E	Maximum possible low-noise construction process and working method	For the foundations and installation of a system, a construction process and a working method, which is as quiet as possible under the circumstances found according to the latest technological advancements, must be used.	PG 7.1.4
F	Noise protection during the foundations of installations in compliance with the noise mitigation concept of the BMU	Use of effective technical noise mitigation measures during installation by impulse pile driving to ensure that noise emissions at a distance of 750 metres do not exceed 160 decibels for the broadband sound exposure level SEL05[24] and 190 decibels for the peak sound pressure level[25].	PG 7.1.4
G	Deterrence	Deterrence of fauna from the hazard area before pile driving work	PG 7.1.4
H	Duration of the pile driving operation	Limiting the duration of the ramming process including the deterrence to a minimum in pile driving	PG 7.1.4
I	Noise mitigation concept with noise forecast	Submission of the noise mitigation concept (draft) at least 12 months before the start of construction with reasoning of the planned foundation structure, the planned construction process, the planned working method and the planned noise mitigation measures as well as the noise forecast	PG 7.1.4

[24] Sound exposure level in dB re 1 µPa² s; dB = decibel; re = in reference to; 1 µPa = 1 microPascal; 1 µPa² s = 1 microPascal squared * second; the reference level for water is 1 µPa.

[25] Peak sound pressure level in dB re 1 µPa; dB = decibel; re = in reference to; 1 µPa = 1 microPascal; 1 µPa² s = 1 microPascal squared * second; the reference level for water is 1 µPa.

J	Coordination of pile driving work	Overall temporal and spatial coordination of the pile driving work within the framework of the subordinate approval procedure	PG 7.1.4
K	Noise protection during ammunition blasting	Requirement for noise mitigation concept for blasting of non-transportable munitions, including deterrence measures	PG 7.1.4
M	Minimisation of scour protection measures	Reduce scour protection to a minimum; minimise hard substrate; only fill made of natural stones or inert and natural materials are to be used as scour protection.	PG 7.1.5
N	Minimisation of cable protection measures	Reduce the use of hard substrate to a minimum, natural/inert cable protection	PG 7.1.5
P	Increase of sediment temperature	Adherence with the 2 K criterion, monitoring in the operation phase	PG 7.1.7
Q	Traffic logistics concept	Reduction and bundling of shipping traffic and other shipping-related measures in special protection area for birds	PG 7.1.8
R	Consideration of objects	Fundamental prevention of blasting, otherwise noise mitigation concept	PG 7.6
S	Reduction of crossing structures	Reduction of crossing structures to the technically necessary minimum, if possible structure-free crossings	PG 7.13.4
T	Minimally disruptive cable laying procedure	Selection of a cable laying procedure depending on the geological conditions, which has the least interference and impacts on the marine environment, but at the same time can be expected to safely achieve the specified covering over.	PG 7.13.5