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Status Approved

Geological Desk Study for Various Wind Farm Sites in the Dutch North Sea – Search area 6/7 & Search area 3

Annex 5 – Section II

SCOPE OF WORK

Colophon

Project name	Geological Desk Study for Various Wind Farm Sites in the Dutch North Sea - Search area 6/7 & Search area 3
Project number	202501025
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Geological Desk Study

SCOPE DESCRIPTION OF STUDIES TO BE CARRIED OUT FOR OFFSHORE WIND TENDER

GEOLOGICAL DESK STUDY's SECTIONS	TASKS
1. PURPOSE	Get insight in expected soil conditions, geological features and bathymetry of two Wind Farm Search areas; Sa 6/7 and Sa 3. Studies must be based on existing literature, publicly available data and data provided by the Contracting Authority. These studies will serve as basis for the scope of the planned geophysical surveys and geotechnical surveys as well as integrated ground models.
2. MAIN OBJECTIVES	1. Provide literature overview including a geological framework that can be used as the basis to define the scope of a geophysical and geotechnical survey (including but not limited to the seismic profiling survey and the scoping for suitable geotechnical locations). 2. Development of a legacy data ground model based on the integration of publicly available data and data (including seismic) provided by the Contracting Authority and applying the following process: a) Reprocessing of publicly available 3D seismic data b) Interpretation and gridding of key subsurface interfaces and features in the publicly available 3D seismic and provided reprocessed 2D seismic data c) Providing both a GIS archive and a 3D geological visualization model including all relevant information. 3. Provide in an early stage of development information on areas that might be less suitable for the construction of offshore wind farms. 4. Provide bathymetric, seismic, geotechnical and geological information/overview required for the Environment Impact Assessment (EIA). 5. Provide a recommendation per site for preliminary geotechnical locations and recommended lab work where possible based on the available data.
3. ASSESSMENT SHOULD INCLUDE	1. Overview of all publicly available geological, geotechnical, geophysical and bathymetric data for all Search areas including borehole and CPT data. Bathymetric data should be in Lowest astronomical Tide (LAT) 2. Overview of all available relevant literature on the geology and geomorphology of the area. 3. Assessment of the suitability of publicly available data for carrying out the assessment. Assessment shall emphasise discrepancies between different sources of information if they exist (including spatial/mapping discrepancies at map edges). 4. Delivery and initial population of suitable seabed topography and sediment classification schemes. 5. Selecting and reprocessing of publicly available and provided 3D seismic data cubes, with the intention to increase the data quality within the top 150 m below seafloor (BSF). It is up to the Tenderer to

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	propose a suitable efficient processing strategy with the intention to improve the interpretability of the top 150 m BSF. 6. Mapping of the key subsurface interfaces representing boundaries of distinct geological units in the available 2D and 3D seismic data up to 150m BSF. Mapping of major geological features (e.g. palaeovalleys, channels, potential shallow gas etc...) up to 150m BSF when present and observable. The subsurface mapping will be based on, but not limited to, a seismic data archive provided by the Contracting Authority. The number of interfaces (horizons) should be proportionate to what is observable within the resolution and quality of the available data. Currently we estimate a maximum of 7 geological horizons (including seafloor) to be mapped across the sites. 7. Gridding of key subsurface interfaces in the depth domain representing boundaries of distinct geological units. It is up to the successful Tenderer to decide in agreement with the Contracting Authority which interpreted horizons on which seismic dataset is suitable enough for gridding. In case the interpreted horizons only exist in the time domain, a simple (e.g. two layer) time-depth conversion method is deemed sufficient. 8. Development of a stratigraphic framework and legacy data ground model based on available public data, seismic interpretation and literature up to a depth of 150m BSF. The stratigraphic framework shall be developed with the aim of defining key interfaces and expected geological units within the depth of interest during subsequent geophysical and geotechnical interpretations. The stratigraphic framework shall therefore describe the geology to the formation level for the stratigraphic sequence within the depth of interest and to the formation-member level where required. When uncertainty exists in developing the stratigraphic framework due to conflicting data sources, the most appropriate source shall be selected. The selection must be justified in order to provide an unambiguous framework for the geological models to be developed as a result of subsequent geotechnical and geophysical investigations. The geotechnical/engineering significance of the different formations and members shall be described. 9. Where available, the indicative spatial rate of change of depth to geological interfaces and/or geotechnical properties shall be provided, together with the dominant structural strike, with a view to guidance for the design of geophysical and geotechnical investigation (e.g. lateral heterogeneity, variation within a geological units, etc.). 10. Identification of possible constraints for the installation of offshore wind farms in all Serach Areas as a result of the soil conditions. Potential geohazards identified from the literature shall be described.

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	11. Recommendations and collateral data for each site to support the development of the scope of a geophysical survey (planned in 2026); including but not limited to the seismic survey, and to support the development of the scope of a geotechnical survey shall be provided. Collateral data should include consideration of probable seabed materials to support the specification of seismic and sub-bottom profiling methods, and the spatial variability of sub-seabed structures developed under section 5. These materials for support of the development of the scope of a geophysical and geotechnical survey should be delivered in a memo for each site (two in total) separately from the report.
4. STARTING POINTS & BOUNDARY CONDITIONS	1. Archaeology will be addressed in a separate archaeological desk study. 2. UXOs will be addressed in a separate UXO desk study. 3. The morphodynamics will be addressed in a separate morphodynamical desk study. 4. The Wind Farm Zone boundaries are made available by the Contracting Authority through a shapefile included in this tender. This also includes other user functions in the area, active and out of use cables and pipelines in the area. 5. Reports of previous desk studies are available on the RVO offshore website, examples of these studies are: Soil IJmuiden Ver · Offshorewind RVO, Soil TNW Offshorewind RVO and Soil Nederwiek Deltares OFW RvO 6. Seismic data will be made on the RVO website, and Sa 6/7 specific web page 7. Further information is provided in Annex 7 – Starting Points and Assumptions
5. MEETINGS	Supplier must be available for meetings with Contracting Authority at: 1. Start of the assignment (kick-off) – in person. 2. After finalizing Tasks 1, 2 and 3 of the assessment (Section 3). Overview of publicly available data and available literature and its assessment for suitability for all sites - online. 3. Propose and present a suitable efficient seismic processing strategy of task 5 (Section 3) – online. 4. After finalizing Task 6 (section 3) to present identified major surfaces and geological features from the seismic mapping part – online. 5. Workshop with the contractor for the archaeological desk study to discuss findings that are relevant for the archaeological desk study and improve integration between the two. 6. Presentation of the end results – in person.
6. PLANNING	Due to time constraints for the Contracting Authority, there are first and second priority areas identified. 1st Priority: Sa 6/7 2nd priority: Sa 3

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	The total review process and the finalization of the report is planned according to the schedule below: <table> <tr> <td>Delivery first draft report Sa 6/7</td><td>30th September 2025</td></tr> <tr> <td>Review first draft report Sa 6/7</td><td>2 weeks October 2025</td></tr> <tr> <td>Issue second draft report Sa 6/7</td><td>3 weeks November 2025</td></tr> <tr> <td>Review second draft report Sa 6/7</td><td>2 weeks November 2025</td></tr> <tr> <td>Issue final report Sa 6/7</td><td>1 week December 2025</td></tr> </table> <table> <tr> <td>Delivery first draft report Sa 3</td><td>30th November 2025</td></tr> <tr> <td>Review first draft report Sa 3</td><td>2 weeks December 2025</td></tr> <tr> <td>Issue second draft report Sa 3</td><td>2 weeks December 2025</td></tr> <tr> <td>Review second draft report Sa 3</td><td>2 weeks January 2026</td></tr> <tr> <td>Issue final report Sa 3</td><td>1 week January 2026</td></tr> </table> Note that the above dates are ultimate final dates. Delivery before these dates is preferred. Draft reporting shall include all deliverables including all digital deliverables.	Delivery first draft report Sa 6/7	30 th September 2025	Review first draft report Sa 6/7	2 weeks October 2025	Issue second draft report Sa 6/7	3 weeks November 2025	Review second draft report Sa 6/7	2 weeks November 2025	Issue final report Sa 6/7	1 week December 2025	Delivery first draft report Sa 3	30 th November 2025	Review first draft report Sa 3	2 weeks December 2025	Issue second draft report Sa 3	2 weeks December 2025	Review second draft report Sa 3	2 weeks January 2026	Issue final report Sa 3	1 week January 2026
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Review second draft report Sa 3	2 weeks January 2026																				
Issue final report Sa 3	1 week January 2026																				
7. REPORT DELIVERABLES	- Descriptive separate report for each site (in English) describing at least: - Dutch and English Management Summary. - Introduction including a specification of objectives and constraints. - Description of the methodology and analysis carried out. - Discussion, results and recommendations on the topics specified under Section 3. - Data that have been used. - Characteristics/parameters that have been defined for carrying out the suitability assessment. - Conclusions of the assessment. - For Sa 6/7; at least 10 geological cross-sections showing the geological sequence of the Search area (including all formations and members as referred to in Section 3, Task 3). At least 2 cross-sections shall be delivered for Sa 3. Any processing required to produce this geological cross-section should be included in the price.																				

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	3. A Holocene subcrop map, i.e. a geological map of the material immediately underlying the base of the Holocene age deposits based on the most up-to-date information publicly available. 4. Bathymetry map of the Search area showing water depth (LAT) over the site, including the seabed morphology. 5. Map of the Search area showing the locations of publicly available boreholes and shallow cores. 6. Maps of the produced grids of the key subsurface interfaces, images of timeslices depicting major geological features and maps of the distribution of interpreted geological features. 7. Any presentations given during the course of the Supplier's work shall be provided as both PowerPoint and pdf files. The descriptive report shall be provided both in Word and pdf format. 8. Recommendations for the scope of the geophysical and geotechnical survey. A memo for each site with recommendations should be delivered separately as Word and pdf files. 9. All deliverables must be according the guidelines in the document Starting Points and Assumptions
8. DIGITAL DELIVERABLES	1. Export of all interpreted horizons in time (two-way-traveltime) and depth domain. This includes both unit boundaries and geological features, in a format which is compatible with conventual seismic workstation software including IHS Kingdom (e.g. X Y line trace time) 2. Export of all produced XYZ-grids in the depth domain (m BSF and m LAT). All grids should be clipped to the area of interest. 3. Two GIS archives (one for each Search area) to accompany the Supplier's report, containing a geodatabase and a map document. All spatial data products developed as part of the work (e.g. no-go areas defined during the work, inferred Formation extent polygons, merged bathymetry data, produced unit boundary grids, locations of any cross-sections displayed in the Supplier's report) shall be compiled into a single ESRI geodatabase. This geodatabase shall also contain information about key background spatial datasets used by the Supplier during the course of the work (e.g. Search area boundaries, locations of previous geotechnical, geophysical and hydrographic Site Investigations) that have not been superseded by new information produced by the Supplier, clipped to the area of interest where appropriate (excluding those items where licensing/copyright arrangements prevent reproduction of these items by the Supplier). The geodatabase shall be accompanied by an ESRI ArcMap document (*.mxd) in which all information in the geodatabase shall be displayed in appropriate grouped layers. The map shall use relative pathnames to the geodatabase content. All information in this map document shall be symbolized consistently with maps presented in the Supplier's report and shall have layer names that are consistent with references in the Supplier's report. Naming and symbol

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	convention shall be consistent for all GIS archives. Appropriate metadata shall be produced such that the provenance and usage limitations of each feature class and raster within the geodatabase are indicated by the metadata for each item. A specification for the metadata shall be provided by RVO. 4. Two interactive visualisations (one for each area) of a 3D legacy data ground model providing the most major information and data collected and produced by the successful Tenderer, including (but not limited to) unit boundary grids, bathymetric data and the location and depth of the provided geotechnical data. The Tenderer is free to propose the software package used for this deliverable (e.g. OpendText), however the end result needs to be accessible and fully functional with free-to-use. The Tenderer is free to suggest more relevant types of information that can be incorporated in the visualisation.
9. INTERFACES	1. Information will be input for the EIA study to be carried out. 2. Information gathered in this desk study should provide sufficient information to inform the development of the scope of the geophysical surveys. 3. Information gathered in this desk study should provide sufficient information to inform the development of the scope of the geotechnical surveys, in particular the determination for suitable locations. 4. Information from this study will be used to define boundaries of the concession areas.
10.INPUT DEVELOPMENT PROCESS	☒ Scope of the planned geophysical surveys ☒ Scope of the planned geotechnical surveys ☒ Scope of the planned integrated ground models ☒ EIA Study