

Q&A Webinar Geotechnical and Geophysical Investigations HKN

June 13, 2019

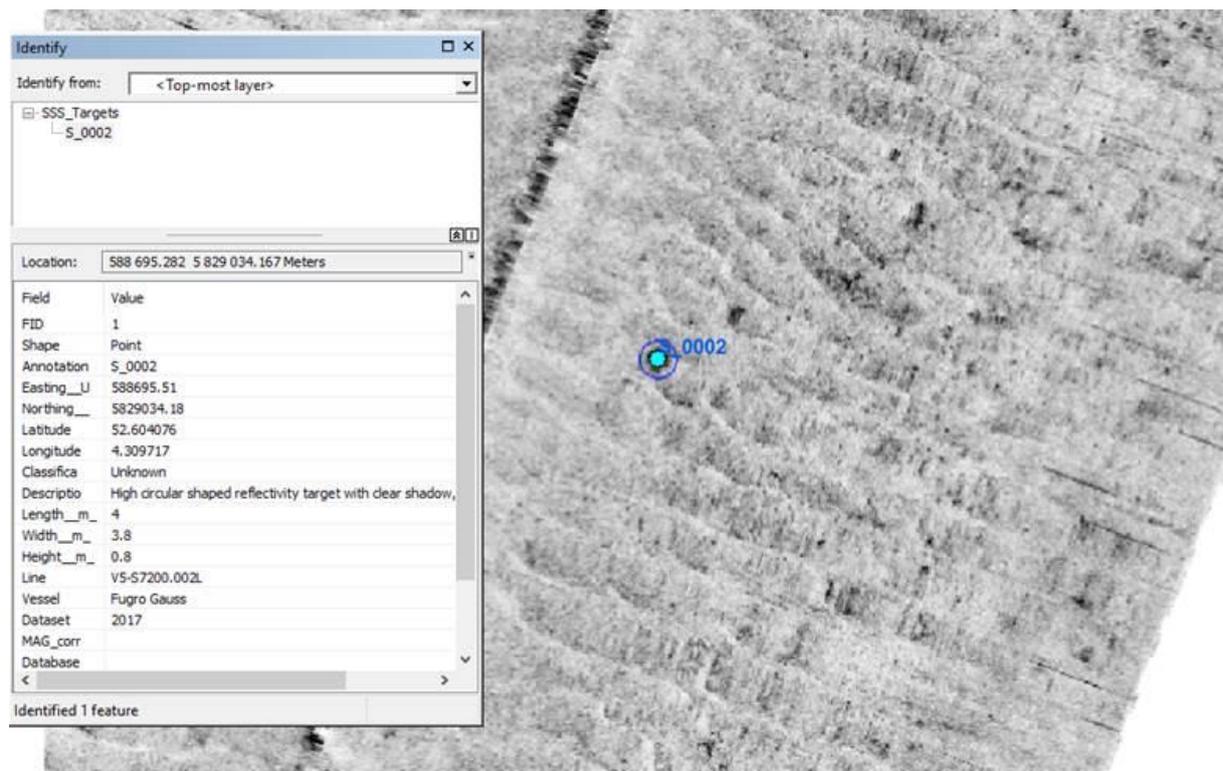
Questions: from the audience

Answers given by: Erik Schoute (Fugro), Kostas Kaltekis (Fugro), Daniël Brouwer (Fugro), Ben de Sonnevile (Blix), Hauke Zachert (Arcadis), Hans-Martin Raeker (Arcadis), Amandine Longuet (Cathie Associates)

Question: Side scan sonar contact S_0002 appears to have an offset of about 80m from the actual target. Could this be an error?

Answer:

Fugro has reconfirmed that the location of side scan sonar target S_0002 as provided in attached target list does match with the location as presented in the GeoTIFF image of the contact ('S_FG_0002.tif', see below).



Question: Can you elaborate further how the data density (line spacing) has been decided? What has been considered in this aspect?

Answer: The primary line density (100 m) was driven by the need to achieve 100 % data coverage for the multibeam survey. The SBP, SSS, MAG and SCS-UHR were also mounted on the vessel that measured the bathymetry, so these were also measured on a 100 m density. The MCS-UHR measurements were performed with a different vessel. These measurements are typically more sensitive to weather and more expensive. Therefore, the line spacing of this measurement was increased to 500 m. The geological desk

study results were also used to refine the scope of the geophysical campaign, define the instrumentation to be used and to determine the general line spacing requirements. Overall, it's a compromise between the available budget and maximum reduction of uncertainties.

Question: Have you also considered 3D seismic instead of only 2D seismic.

Answer: We have considered 3D seismic and it would provide an enhanced dataset, but would require a much denser line spacing. So it was considered unfeasible for this large site in the timeframe considered.

Question: Has the substation location also been investigated in detail?

Answer: Yes, four boreholes with CPTs one at each platform corner and one borehole with sampling at the centre of the platform were performed. The results are presented in an annex of the geotechnical borehole location report (P903749/02).

Question: Were the seismic CPT performed seabed, downhole or both?

Answer: Most of the seismic CPTs were performed during the seabed phase, but the results were completed during the downhole phase where required (e.g. when investigated depth during the seabed phase was insufficient).

Question: In addition to the thermal CPTs were there any laboratory tests performed (offshore or onshore) to determine thermal conductivity of the soil?

Answer: Yes, thermal conductivity and heat capacity tests were performed during the onshore laboratory testing phases. The results are presented in the geotechnical borehole location report (P903749/02).

Question: How was the target depth chosen?

Answer: The target depth was chosen based on a preliminary assessment on potential foundation depths assuming future generation wind turbine generators.

Question: Where can I find a plot summarising the shear wave velocity (V_s) by soil unit versus depth?

Answer: Plots of the shear wave velocity vs depth and G_{max} vs depth are provided per soil unit and per location in report P903749/03 (Geological Ground Model).

Question: Is the glacial deformation confirmed somehow with lab testing results (for instance oedometer)?

Answer: Overconsolidation was noticed during the laboratory testing in cohesive soil. In granular soil no intact samples were collected to confirm possible overconsolidation.

Question: Did you perform PSD or other chemical tests on the samples tested for MIC?

Answer: PSDs and dissolved organic content were determined for all samples on which MIC analyses were performed.

Question: Was a potential hazard analysis performed based on the geological history? Think about (paleo-) landslides and/or faultlines?

Answer: This is covered in Section 4 of the geological ground model report (P903749/03).

Question: Is the correspondence between the geological units and new geotechnical testing groups reflecting the cyclic response described in the reports?

Answer: Yes, this is described in report P903749/04 (Laboratory Test Data) which details the approach followed for the cyclic/dynamic testing programme in terms of grouping.

Question: Can you give an overview of the most likely potential hazards?

Answer: A selection of assessed geological hazard are shown in slide 70 of the webinar presentation. The main selection is bedform and bedform mobility (with scour as a possible result), sand extraction areas and alternations of sands and clays e.g. due to channels. The geological ground model excluded an assessment of most probable geological hazards occurring.

Question: When will the geotechnical parameter report (P903749/06) be uploaded to the RVO website?

Answer: The certification by DNV GL of the geotechnical parameter report is still ongoing. We expect the finalization of this certification shortly and will upload it as soon as we have the certificate.

Question: Will the parameter report only provide best estimate values and no lower and upper bound values?

Answer: For most of the parameters best estimate, lower and upper estimates values are provided. For some (e.g. soil unit weight) only best estimate will be provided.