



Government of the Netherlands

wind &
water
works®

Status Site Investigations Hollandse Kust (west)

Peter-Paul Lebbink and Frank van Erp – Senior Advisors Offshore Wind (RVO)

Webinar Offshore Wind Energy - July 9 2020

Status and Planning



- Published
 - Geological, UXO, and Archaeological Desk Studies
 - Geophysical Survey
 - Geotechnical Survey: CPT and Vibrocore report
 - Metocean Desk Study: Feasibility Level
- Q3
 - Geotech: Geological Model
 - Morphodynamic Assessment
 - Metocean Campaign: 12 Month and following months
- Q4
 - Metocean Desk Study: Design level
 - WRA
 - Geotech: Borehole locations, geotechnical parameters, synthetic CPTs
 - Archaeological Assessment Geotechnical Data



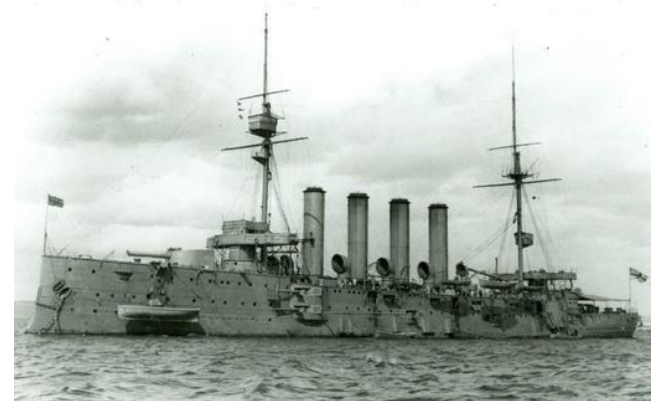
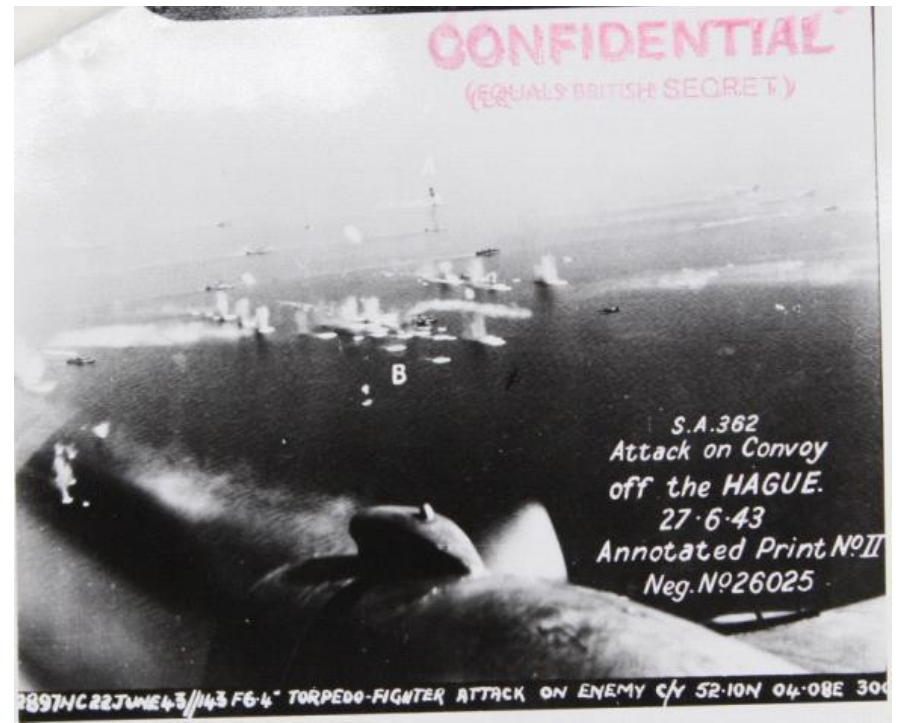
➤ Webinars planned for Oct-Nov 2020





UXO Assessment

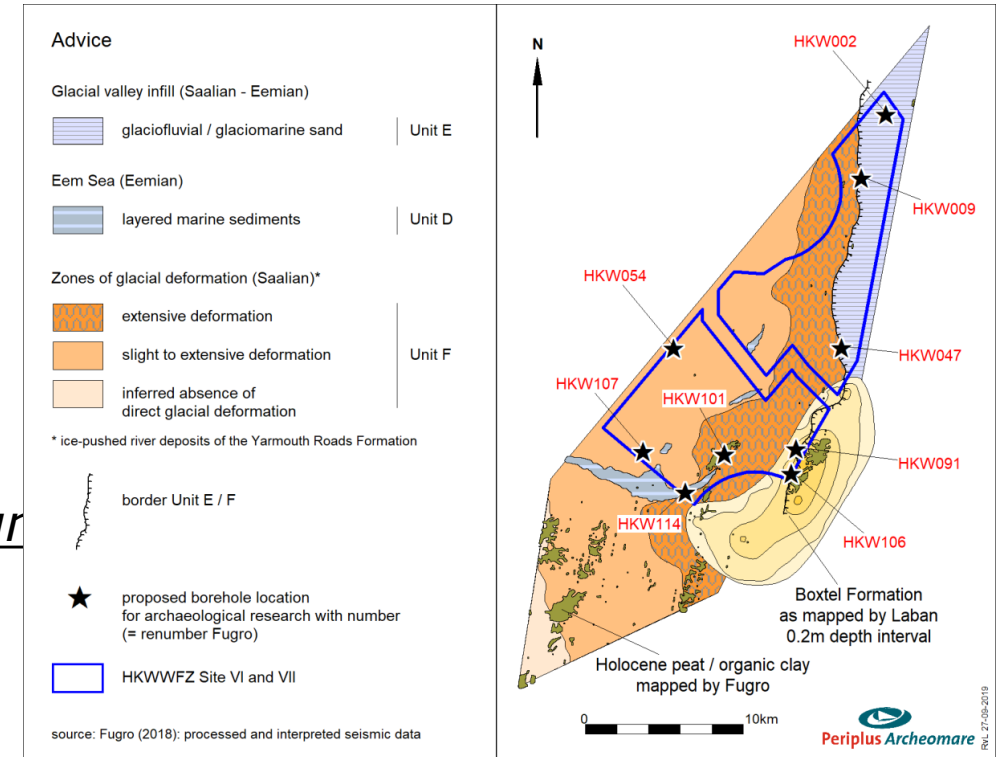
- Objective: assess risk for Unexploded Ordnance from previous wars for developers
- Main results:
 - Desk study report with historical review
 - Outline of appropriate UXO risk management strategy
 - Risk more types of UXO researched
 - Confidence Level added
- Contractor REASeuro





Archaeology

- Objective: provide insight into presence of archaeological objects in wind farm area
- Three step approach
 1. Archaeological Desk Study to assess likelihood of encountering objects
 2. Assess Data of Geophysical Campaign to identify archaeological objects
 3. Assess samples of Geotechnical Campaign to identify depositional environment
- Main deliverables:
 1. Desk Study report with historical review
 2. Assessment of observed objects
 3. Reconstruction paleo landscape
- Contractor Periplus



Archaeological Assessment contacts

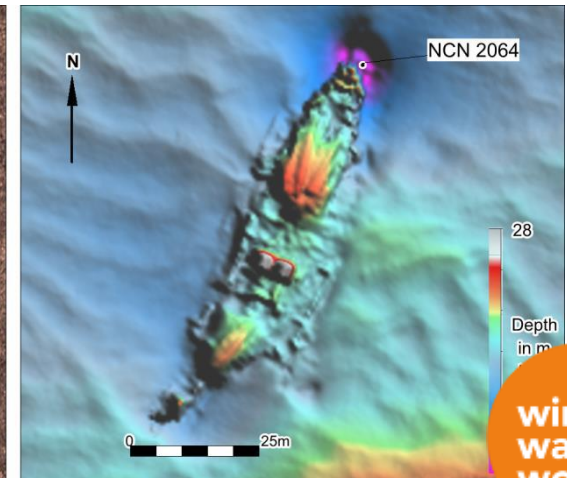
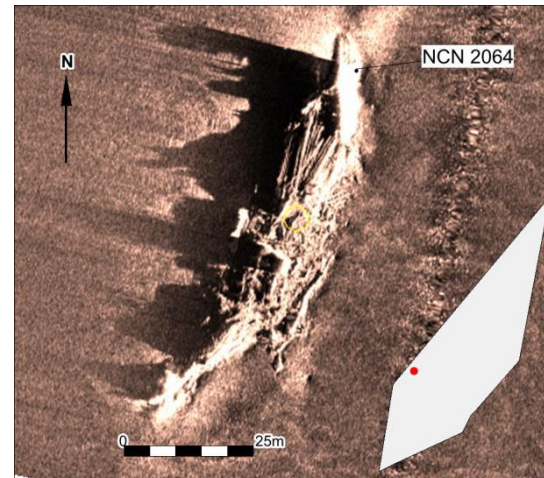
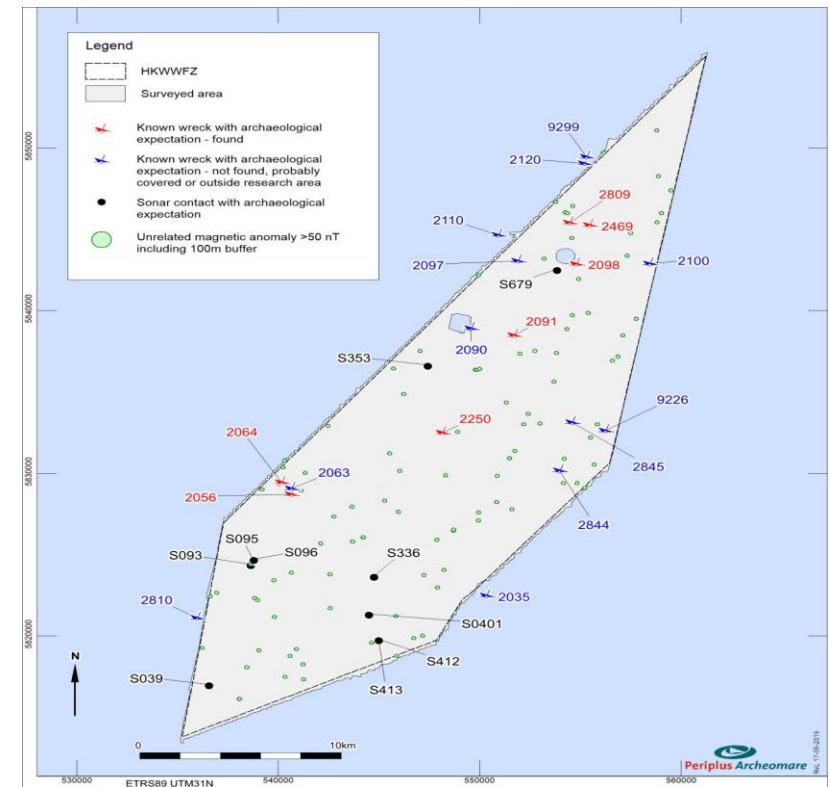


Method

- Based on Geophysical data

Lessons learned for developers

- Available wreck databases not so accurate
- Field investigations essential to establish presence of wrecks
- Many identified wrecks not found
- Difficult to establish archaeological value

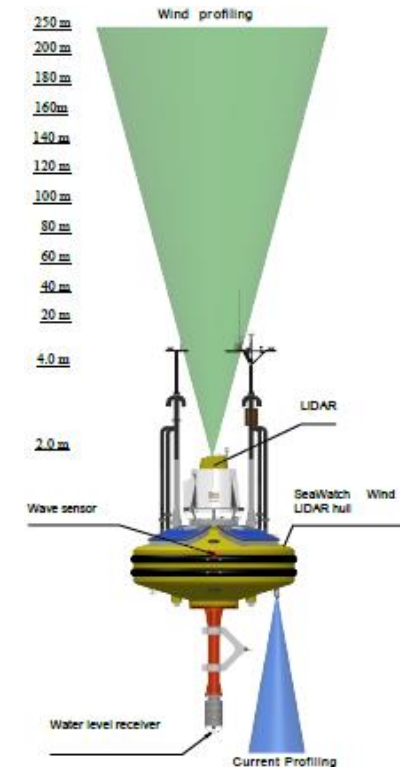




Metocean Campaign

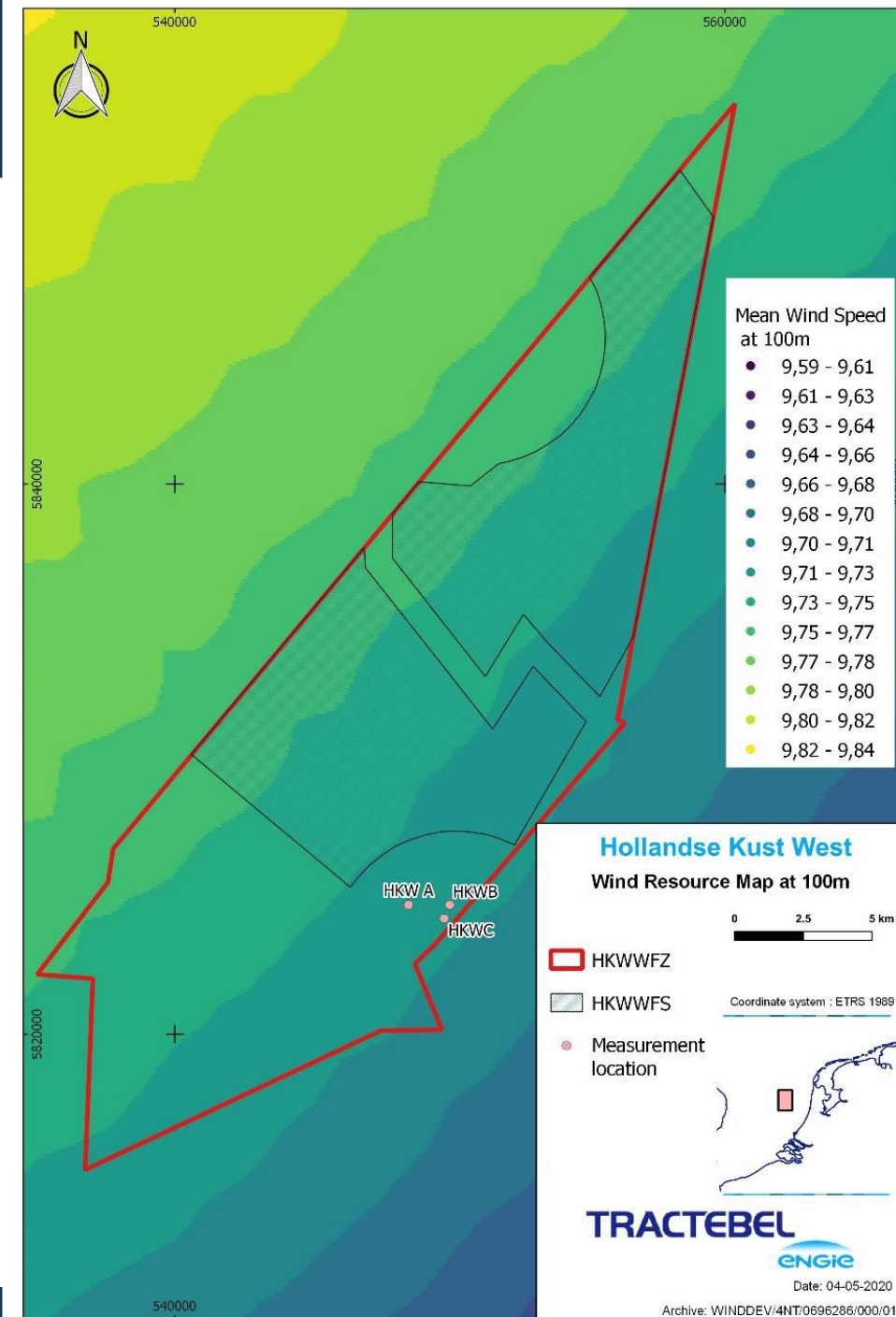


- Measuring 24 months of metocean conditions at HKW (Feb 2019 – Feb 2021)
- New buoys (WS187 and WS188)
 - Measuring up to 250 m
 - Differential Global Positioning System
- Contractor: Fugro



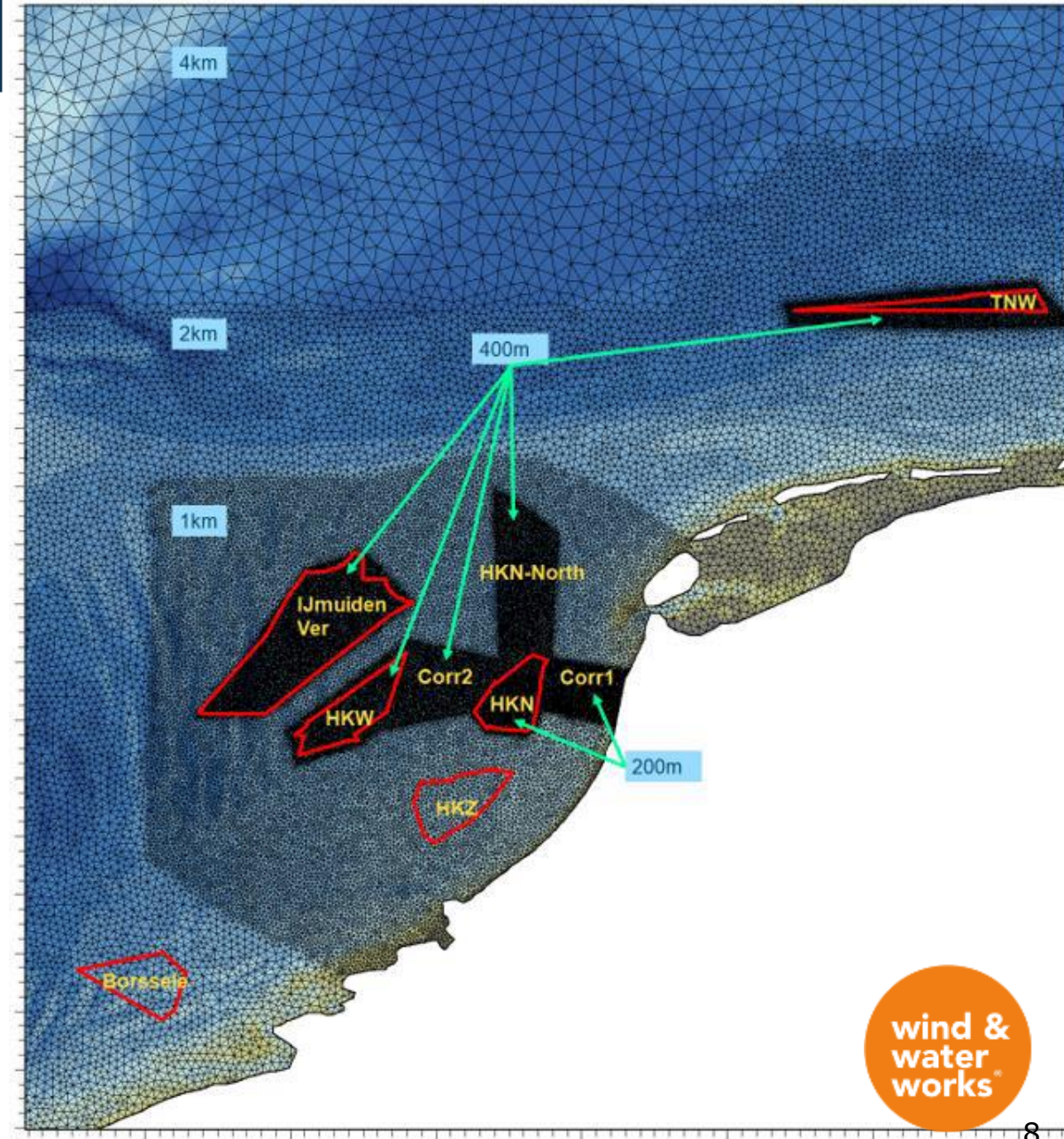
Wind Resource Assessment

- Long-term wind speed at the HKWWFZ centre estimated to be **9.7 m/s at 100 m**.
- Contractor: Tractebel



Metocean Desk Study

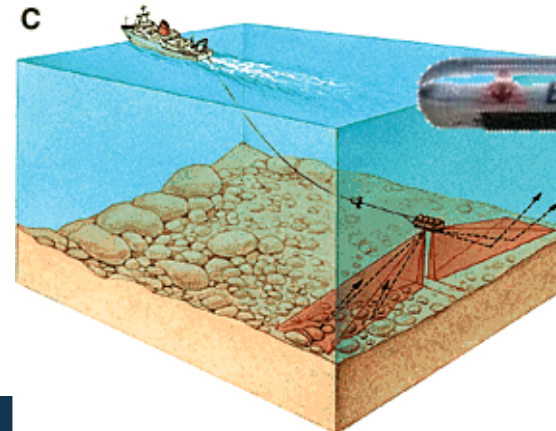
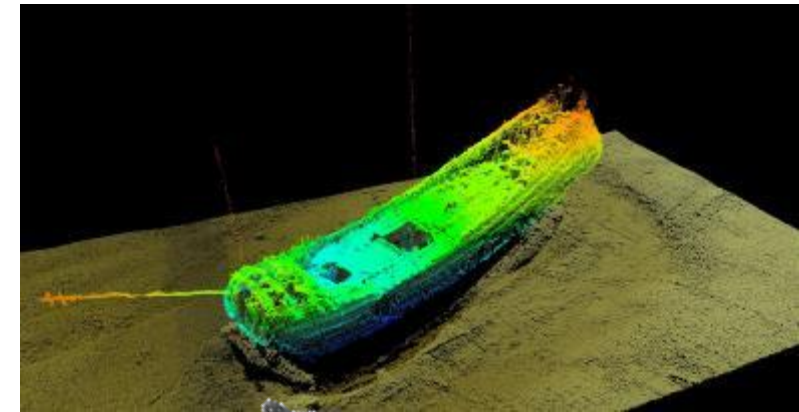
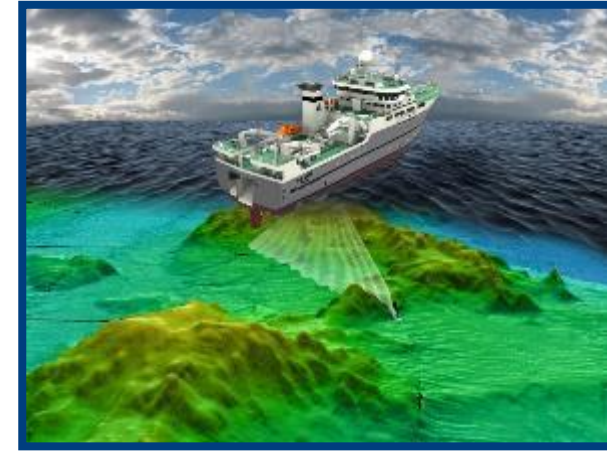
- 12 month buoy dataset serving as input
- From feasibility level to design level
- Contractor: DHI



Geophysical Survey



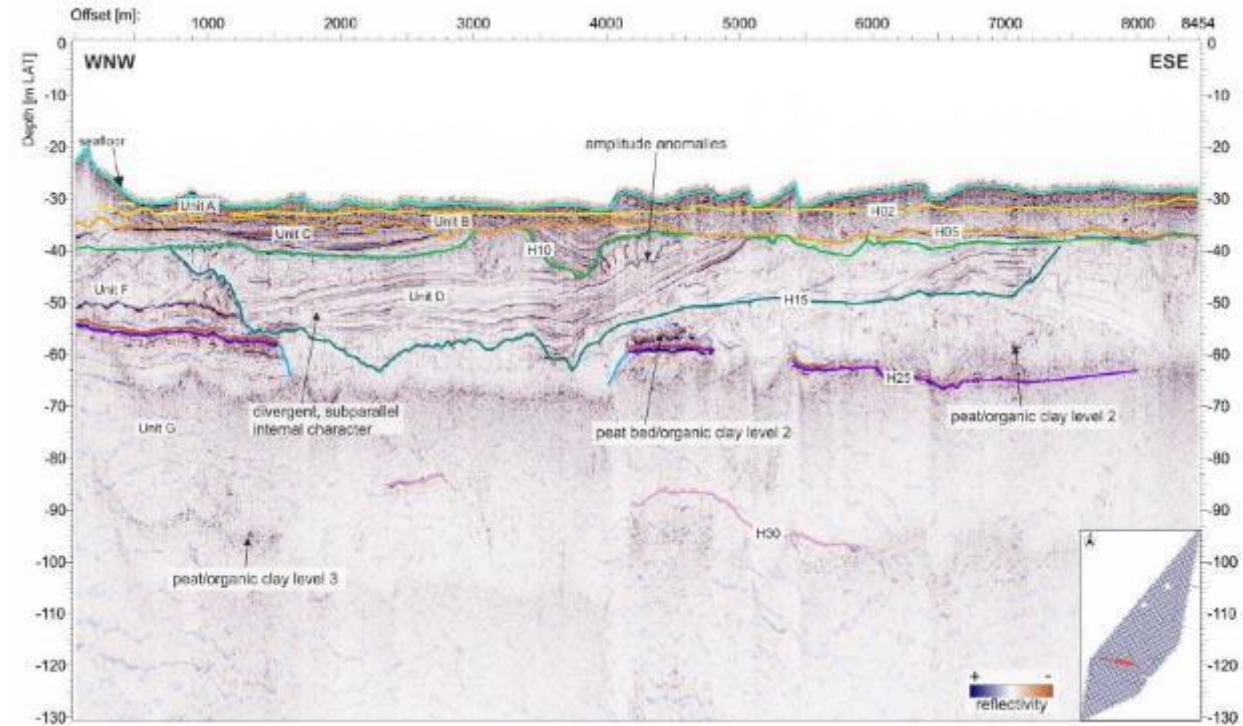
- Main objectives:
 - Map bathymetry
 - Identify locations of existing infrastructure and obstacles
 - Map shallow geology and geohazards
- Approach
 - State-of-the-art equipment
 - Two parallel vessels used to speed up offshore campaign
- Main deliverables:
 - Geophysical report
 - Charts
 - GIS GEO database



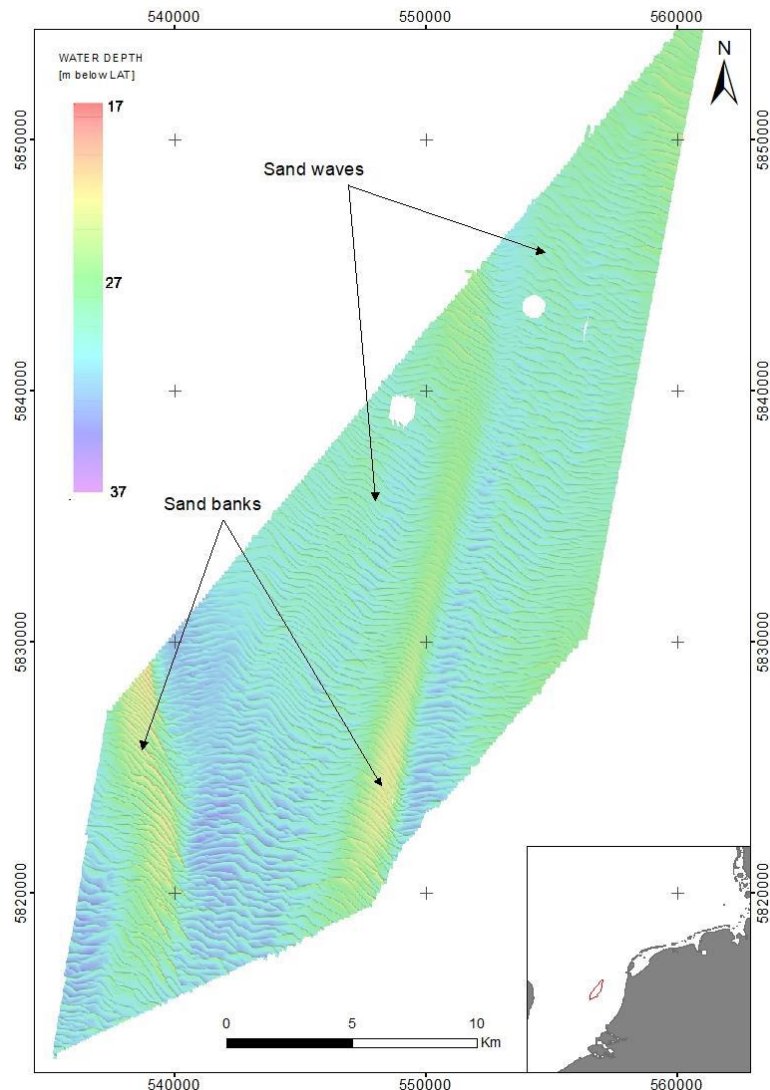
Geophysical Survey



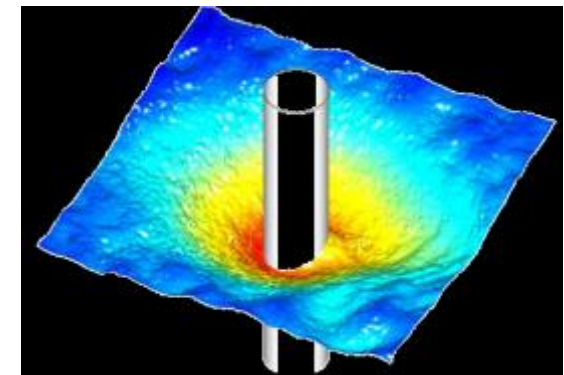
- Instrumentation used:
 - Multibeam echosounder for bathymetry
 - Side scan sonar for surface objects
 - Magnetometer for ferrous objects
 - Single and multichannel seismics for shallow geology
- Seismics acquired for advanced ground modelling methods
- HKW geology shows more pronounced results compared to HKN & HKZ
- Contractor: Fugro



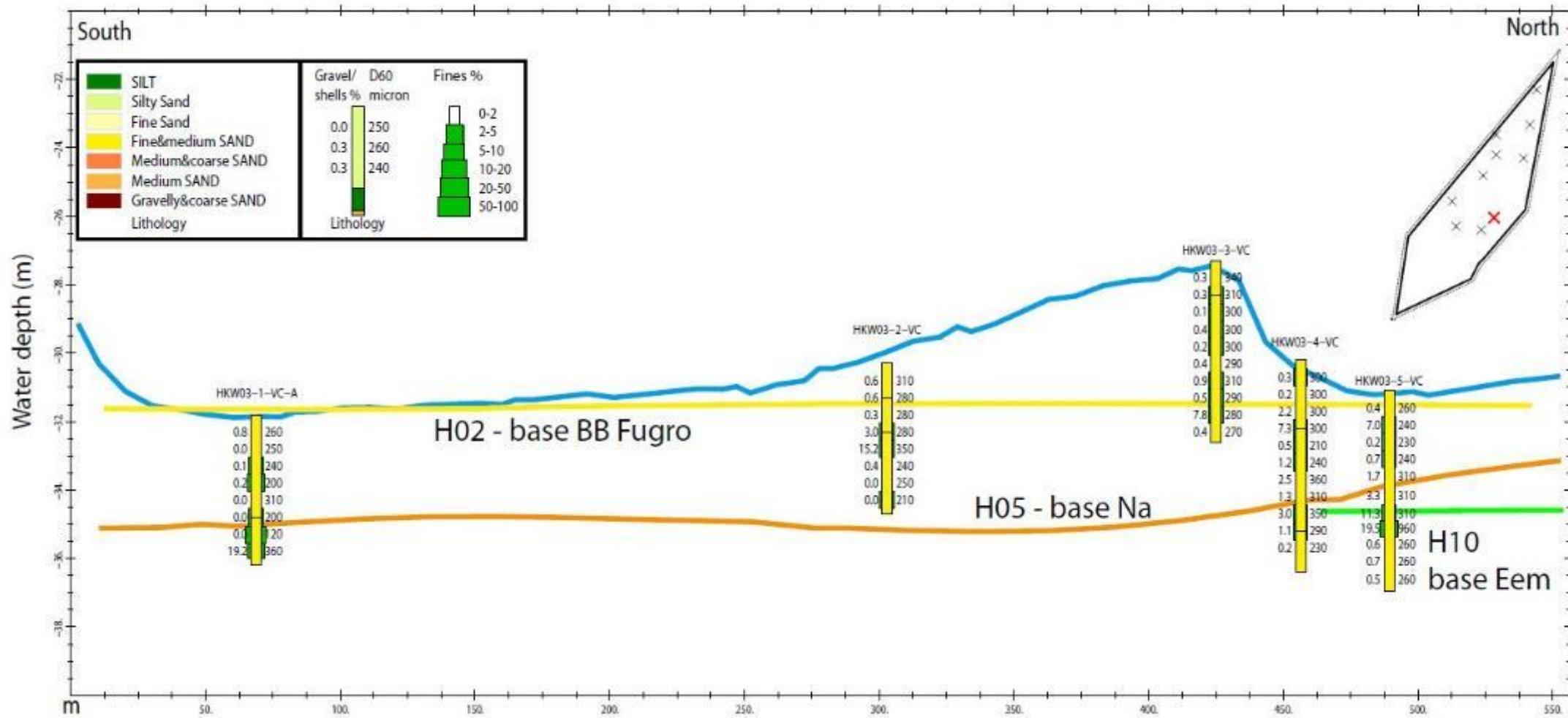
Morphodynamical Study and Scour protection



- Approach
 - Desk Study based on available bathymetrical data
 - Vibrocore data
- Main deliverables:
 - Desk Study report
 - Morphology Assessment
 - prediction minimum/maximum seabed levels
- Contractor: Deltares



Vibrocores PSDs





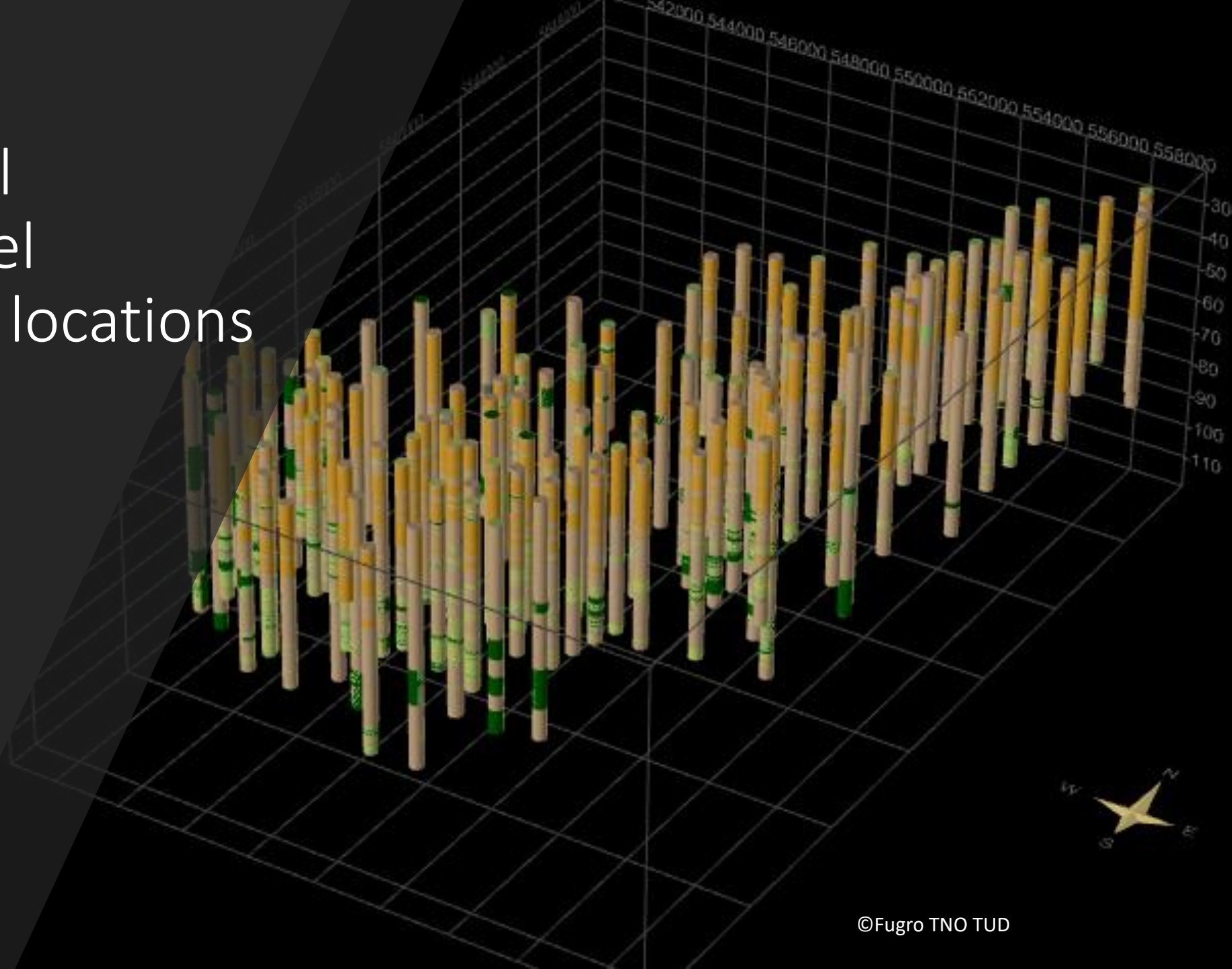
Geotechnical Survey

- Provide relevant geotechnical data for the design of a wind farm, including, but not limited, to foundations and cables
- Reduce resources to go from soil data collection to wind farm design
 - Subsurface viewer
 - Geotechnical parameters
 - Synthetic CPTs
- Contractor: Fugro (TNO, TUD)

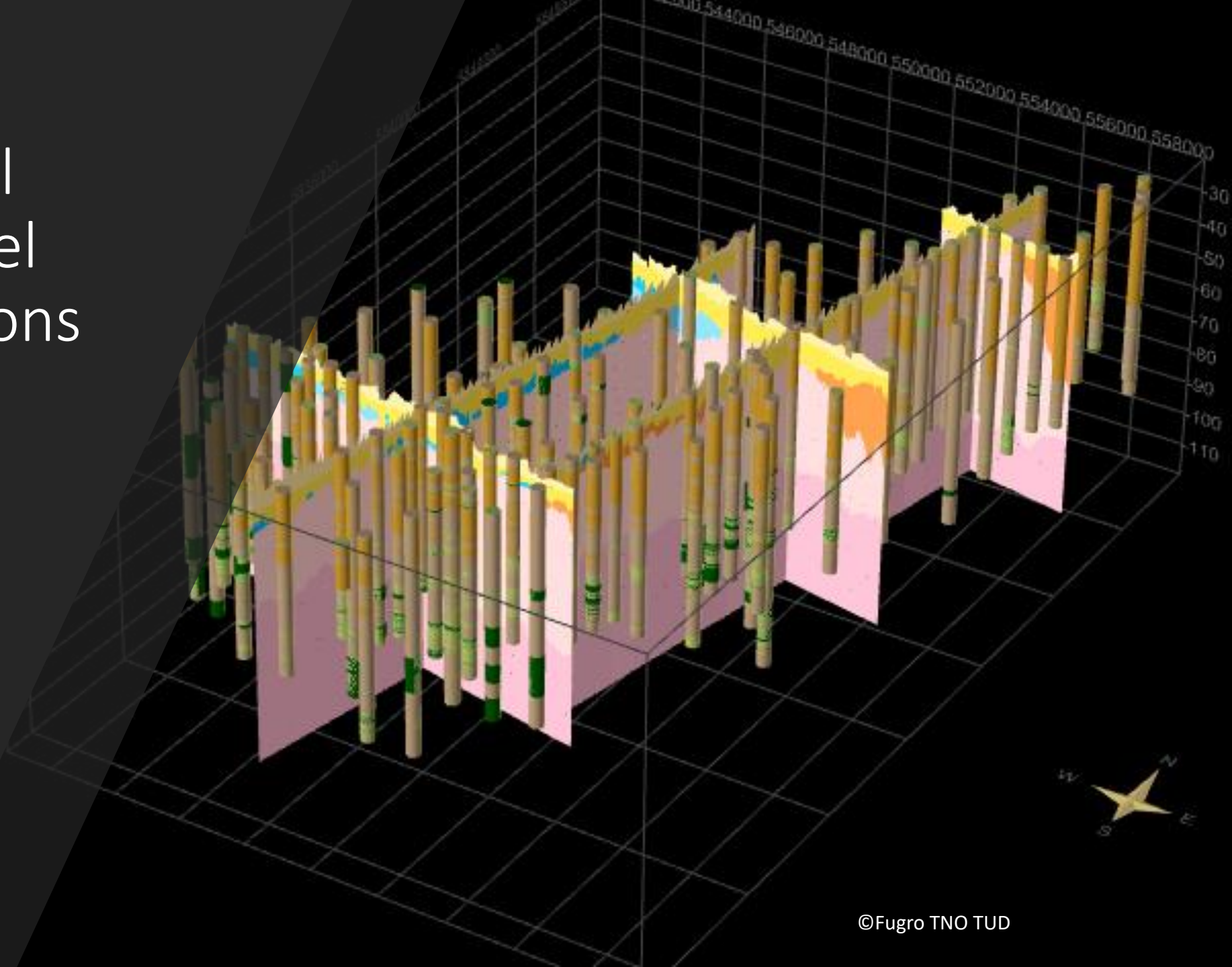


Assembly of the Coiled Rod System on board of the Despina

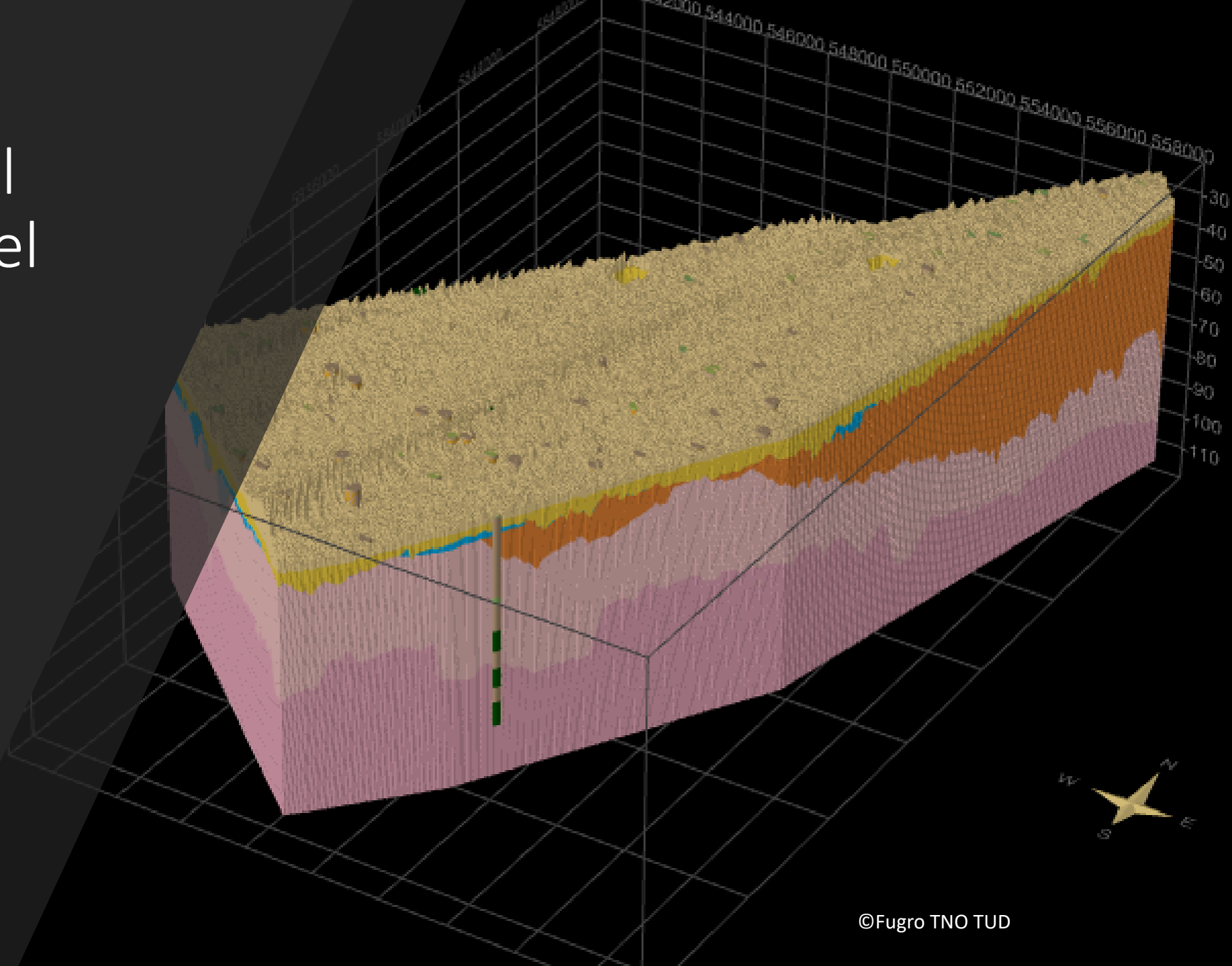
3D Geological Ground Model Geotechnical locations



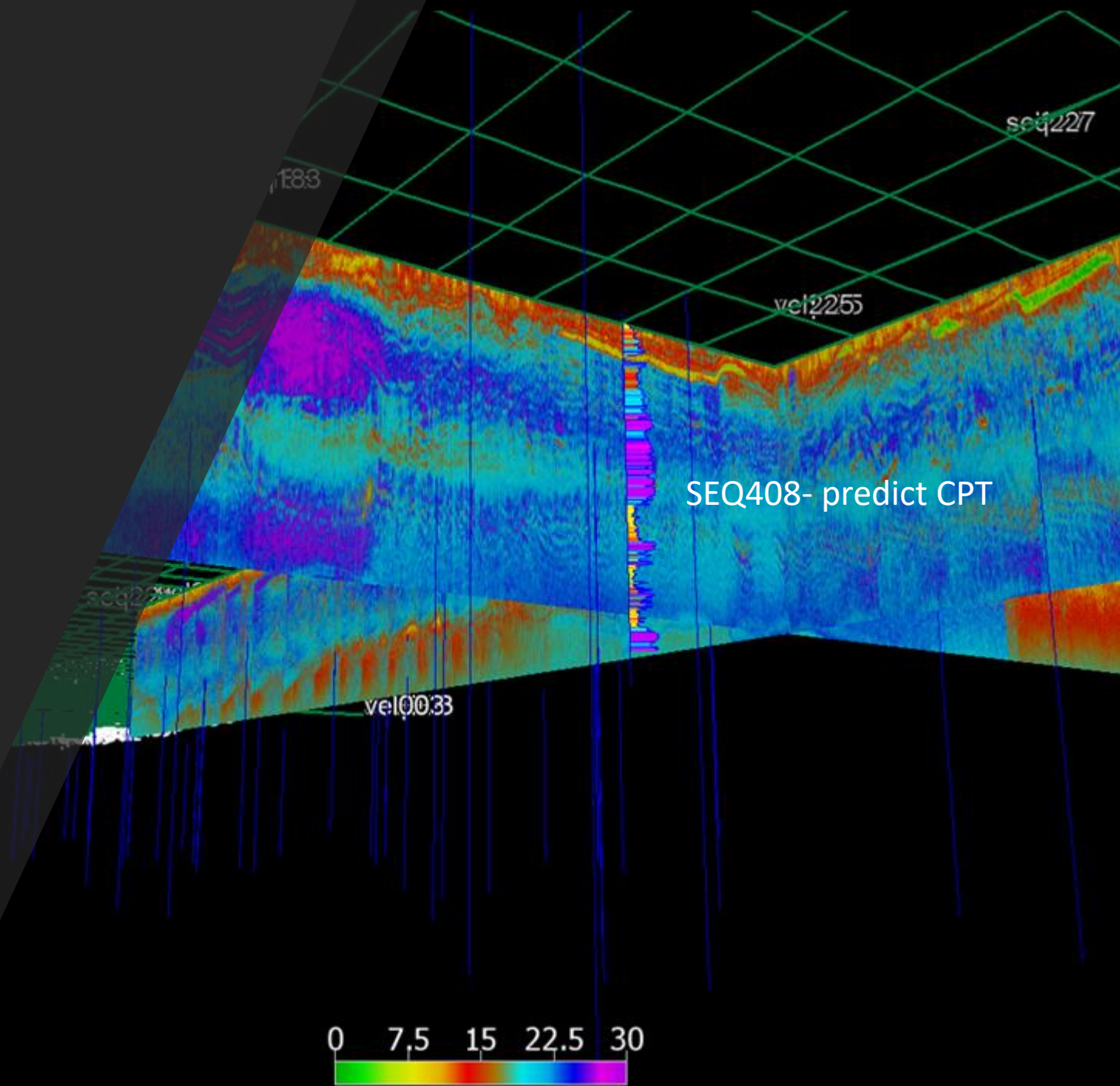
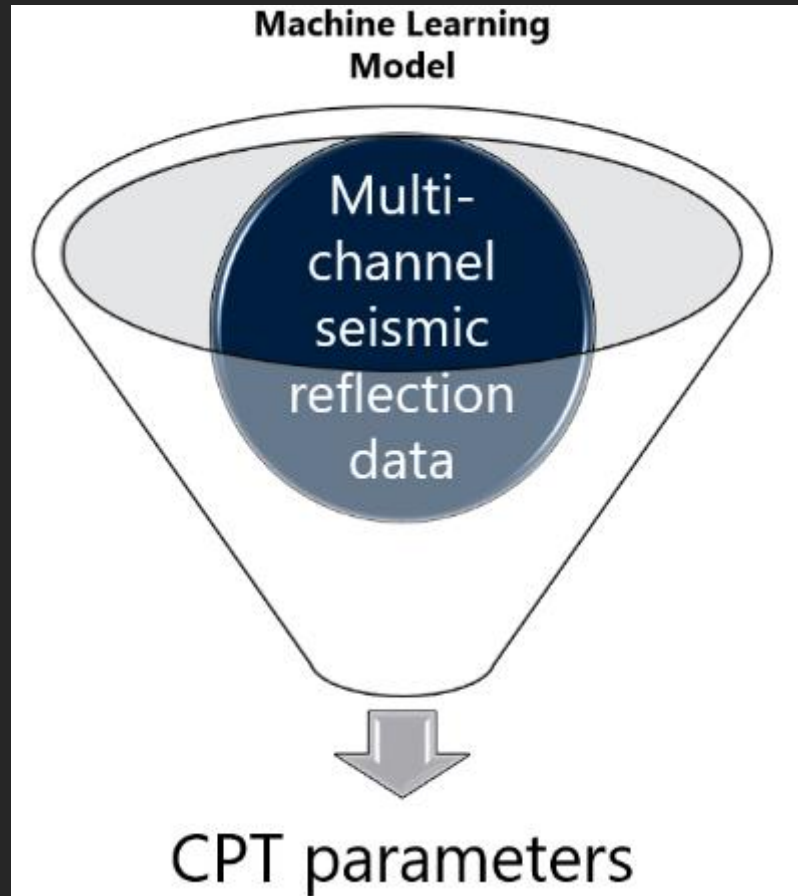
3D Geological Ground Model Seismic sections



3D Geological Ground Model 3D model



Synthetic CPT Profiles





Have a successful tender preparation!

**wind &
water
works®**