



Netherlands Enterprise Agency

Workshop 24th November 2016

Wind Farm Zone
Hollandse Kust (zuid)

Frank van Erp (RVO.nl)

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>> Sustainable. Agricultural.
Innovative. International.



Content

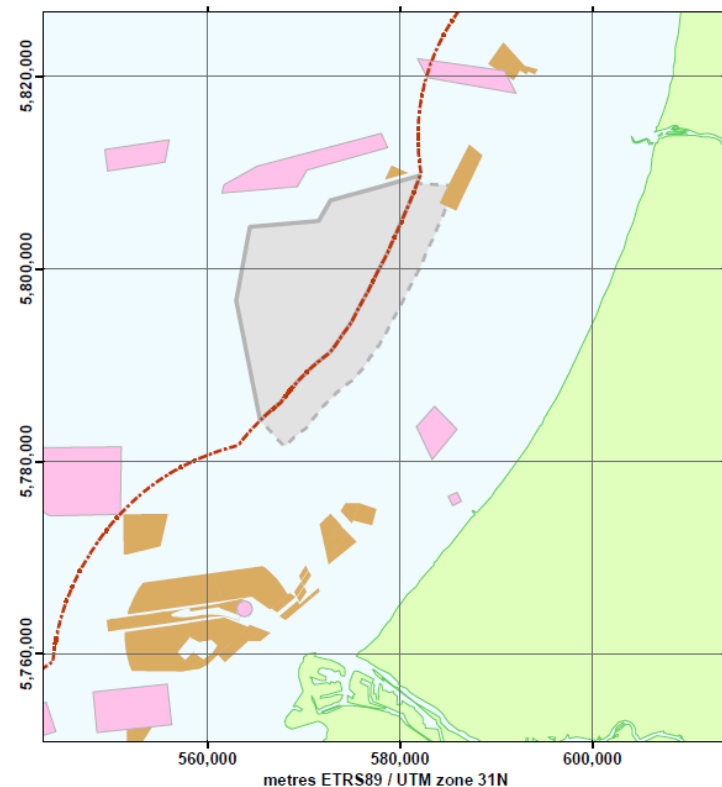
- Wind Farm Zone
- Status and improvements of site studies Hollandse Kust (zuid)
- Communications





Hollandse Kust (zuid)

- Extension 12-10 NM off the coast
- Surroundings
 - shipping routes, anchoring areas
- Four wind farm sites
 - 2017: Tender WFS I & II (700MW)
 - 2018: Tender WFS III & IV (700MW)
- Existing cables, pipelines and maintenance zones
- Existing wind farm: Luchterduinen
- Two offshore substations (TenneT)

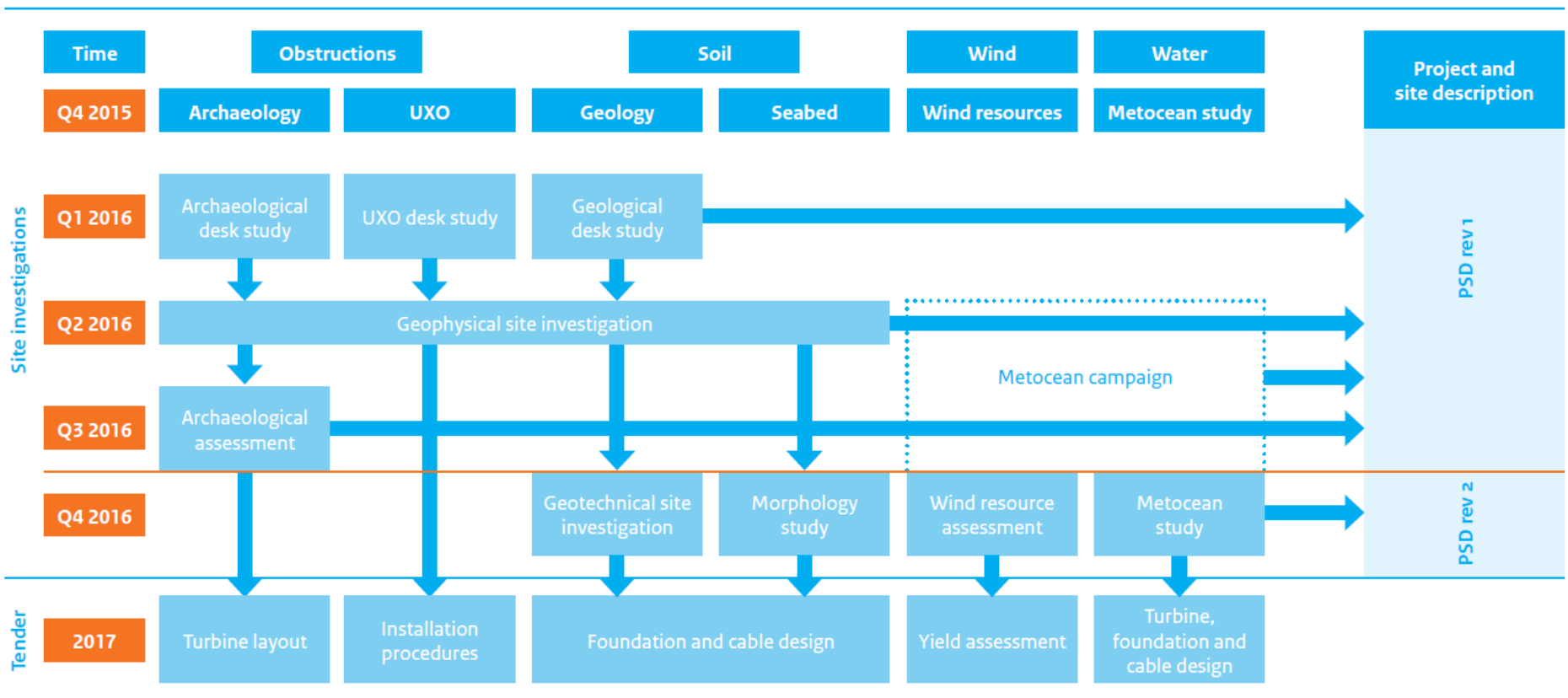




Boundaries and coordinates

- Appendix C PSD: Boundaries and coordinates
- GIS file base map
- GIS viewer (beta version) published







Archaeological assessment

- Contractor: Periplus
- Provide insight possible presence historical and archaeological objects
- Three step approach
 - archaeological desk study
 - assess data geophysical campaign
 - assess data geotechnical campaign for HKZ WFS III and IV (Q2 2017)

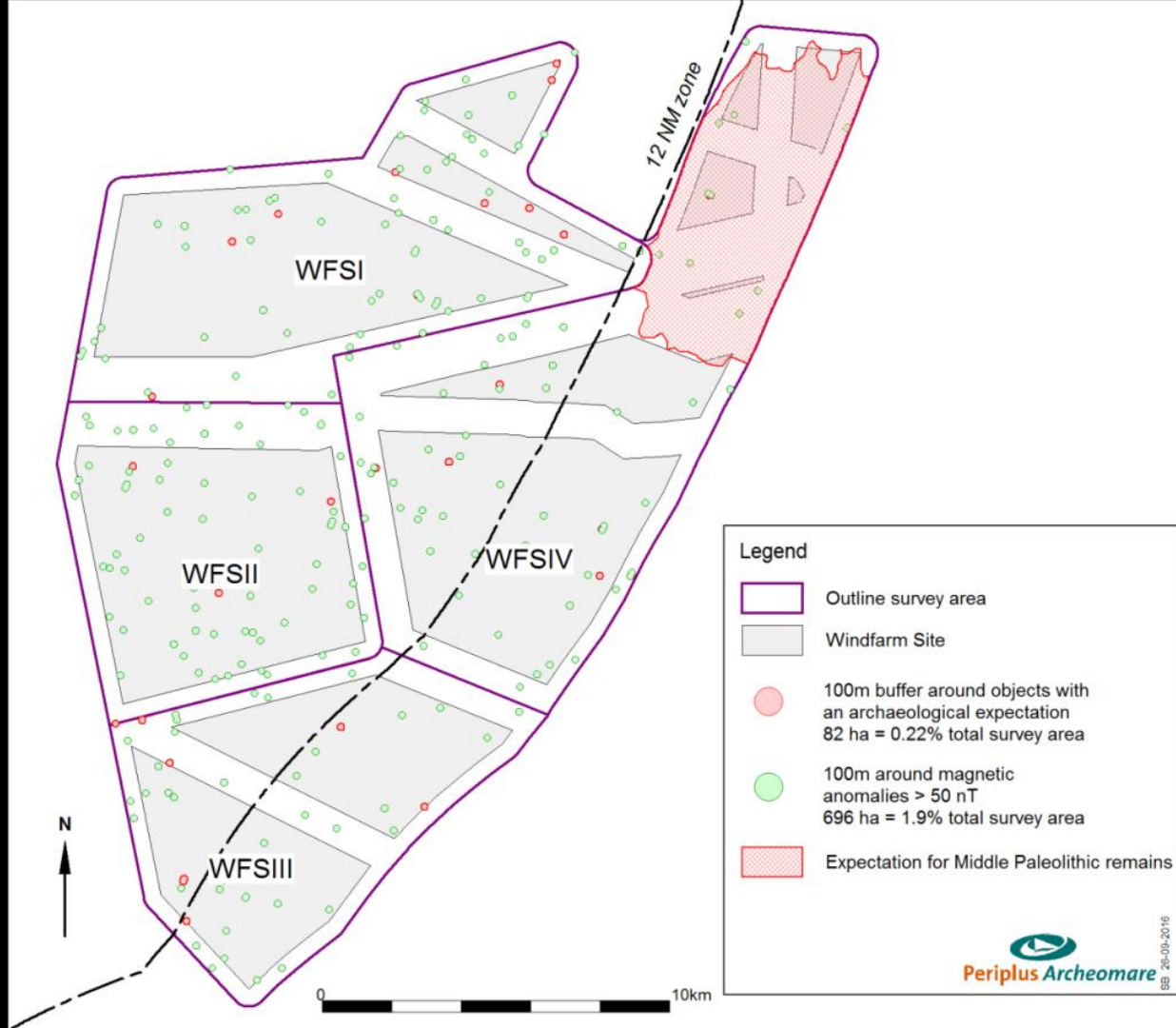




Archaeological Assessment

Objects with a possible archaeological expectation	WFS I	WFS II
Known objects found with SSS exposed at seabed surface	-	-
Known objects found with MAG buried beneath seabed surface	1	-
Known objects not found, probably covered with sediments	7	4
Unknown objects found with side scan sonar	2	-
Total	10	4

Possible buried ferrous objects	WFS I	WFS II
Ferrous objects found with MAG	73	72





UXO desk study

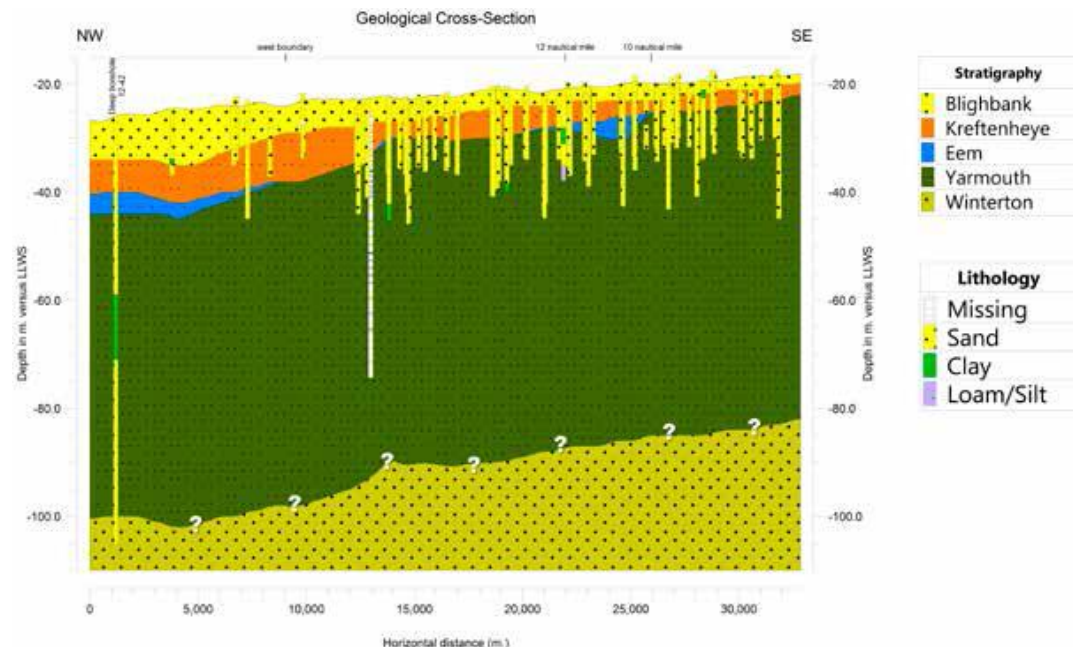
- Executed by REASeuro
- War related activities WW I and II
- A UXO risk area;
 - Main flight path of Allied bomber raids.
 - Large number of naval mines
- No constraint for offshore wind farm related activities





Geological desk study

- Contractor: Deltares
- Input SoW geophysical survey
- No major constraints to wind farm development
- Preliminary geological framework established





Geophysical campaign

- Contractor: Fugro
- Map
 - bathymetry
 - existing cables and pipelines
 - shallow and deeper geology
 - geohazards
- Deliverables include
 - Geological ground model
 - Draft CPT – BH plan

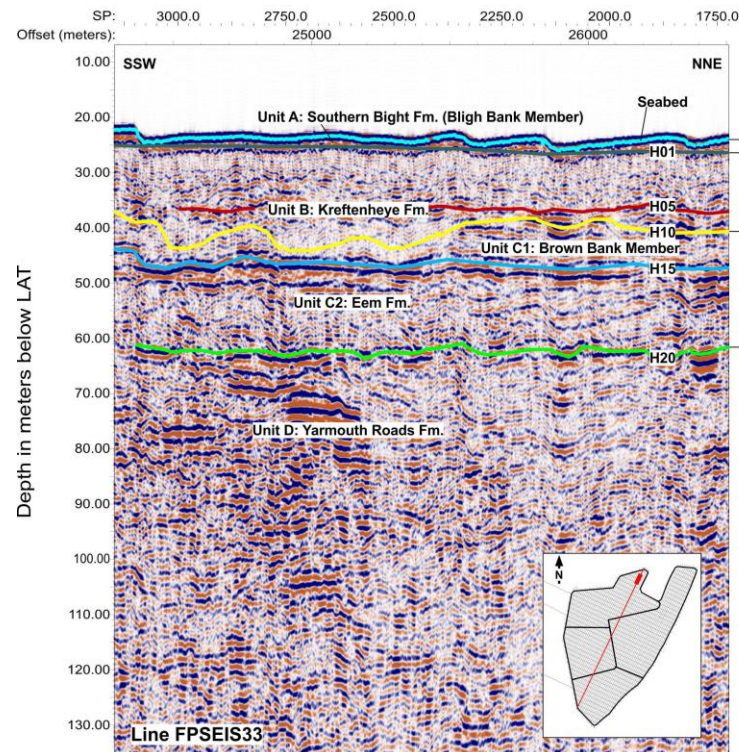




Geophysical campaign

- Improved seismic shallow geology (single and multichannel sparker)
- All layers heavily eroded
- Predominantly sandy soil
- Large mobile sand dunes
- No wrecks found in WFS I & II

All deliverables WFS I-IV including raw data available on HDD





Geotechnical campaign

- Contractor: Fugro
- Main objectives:
 - verify and update ground model
 - lab tests to determine soil engineering properties
- Improvements
 - BH plan optimized on PCPTs results
 - No more boreholes in post-tender phase
 - More cyclic lab tests





Geotechnical campaign

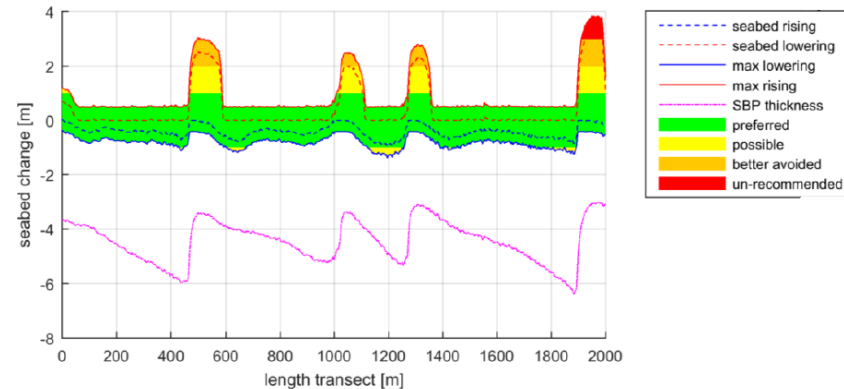
- Performed measurements (to 50m)
 - 102 seabed CPTs
 - 14 seismic CPT boreholes
 - 35 continuous sampling boreholes
 - 2 combined CPT boreholes
- Deliverables WFS I and II to be issued in November
(advanced lab testing report Jan. 2017)





Morphodynamic desk study

- Contractor: Deltares
- Desk study based on bathymetry geophysical survey
- Analysis of geology
- Flow model
- Best-estimate seabed levels delivered (for interval of 5 years)
- To be issued in January 2017





Wind Resource Assessment

- Contractor: Ecofys
- Reference for yield assessment
- Based on available wind data sources and metocean measurements
- Detailed uncertainty analysis
- Consistency with Metocean study
- To be issued: January 2017





Metocean desk study

- Contractor: DHI
- Design loads and weather windows
- Combined detailed study for HKZ and HKN
- Validated with Metocean data
- Improved advanced output in database
- To be issued: January 2017





Metocean campaign

- Measurement period 12
- Support yield analyses,
- Validate / provide input
 - metocean desk study
 - WRA and morphodynamic assessments
- Improvements
 - Two buoys for redundancy and one spare buoy
 - Validation of all instruments by Deltares

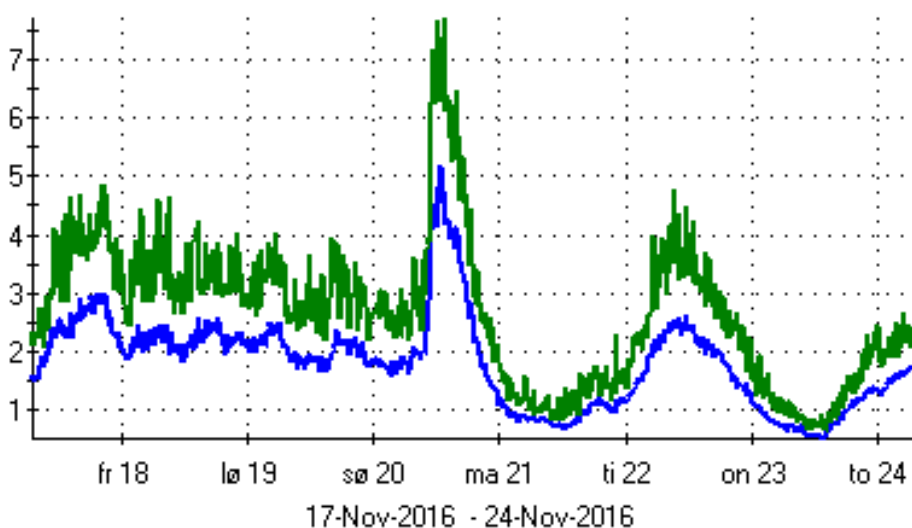


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— HKZA_WS140, WindSpeed160mh (m/s)
— HKZA_WS140, WindSpeed180mh (m/s)
— HKZA_WS140, WindSpeed200mh (m/s)

24.11.2016 06:58:41 Time Zone:UTC +0 H



— HKZA_WS140, hm0 (m)
— HKZA_WS140, hmax (m)



QA/QC and experts

- BLIX Consultancy
- The Cultural Heritage Agency
- Rijkswaterstaat
- Windsupport Ltd
- Reynolds International Ltd
- RPS Energy Ltd
- Rambøll
- ECN (accredit body)
- Ecofys
- Carbon Trust, Offshore Renewable Energy Catapult
- Primo Marine
- Periplus Group
- Ministry of Defence
- DNV GL (accredited body)





Communications

- Regular workshops, webinars, e-mail updates
register: woz@rvo.nl
- Site data & Project and Site Description:
offshorewind.rvo.nl
- SDE+ grant and permit tenders:
www.rvo.nl/sde/windopzee





Upcoming webinars

13 December 2016

- Archaeology
- UXO
- Geophysical survey

17 January

- Metocean Desk Study
- Metocean Measurement Campaign
- Wind Resource Assessment

24 January 2017

- Geotechnical survey
- Morphodynamics





Success!

