

Wind farm zone Borssele

Relocation of telecom cables, a good idea or not?

Workshop presentation

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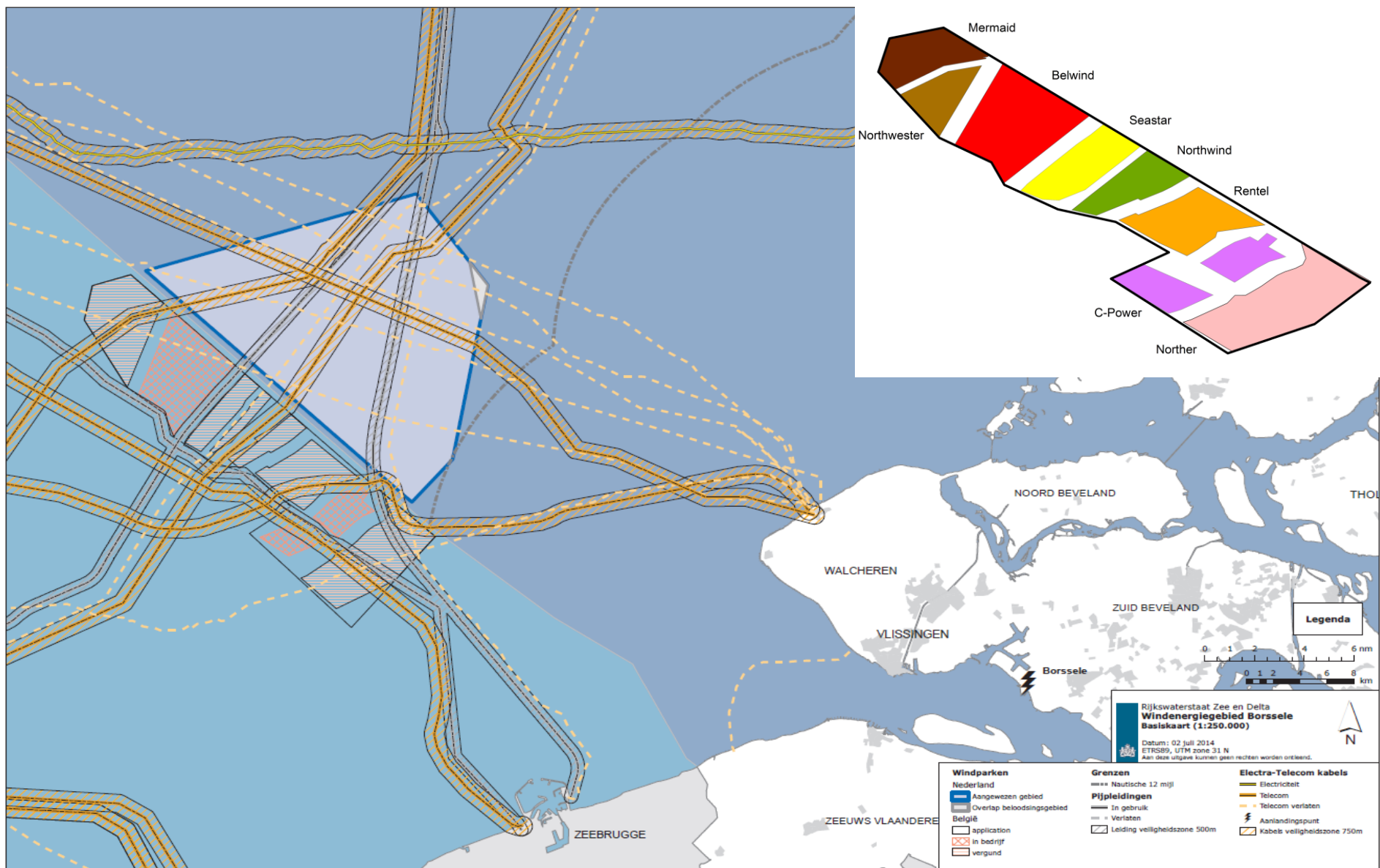


Contents

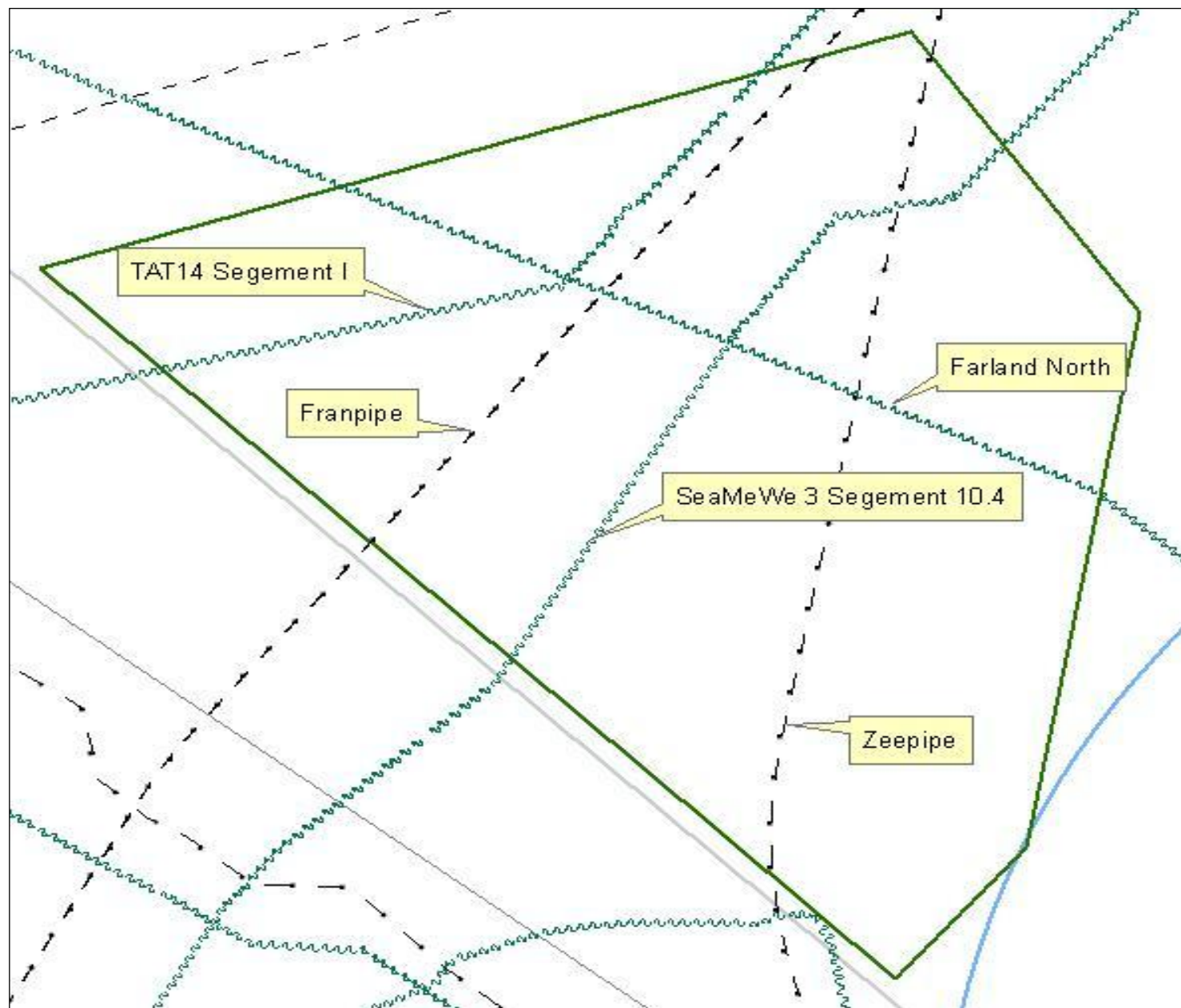
1. What is the issue? Some maps of the Borssele wind farm zone
2. Results of actions taken
3. Costs & benefits of relocation in various scenario's
4. Conclusions
5. Recommendation & process



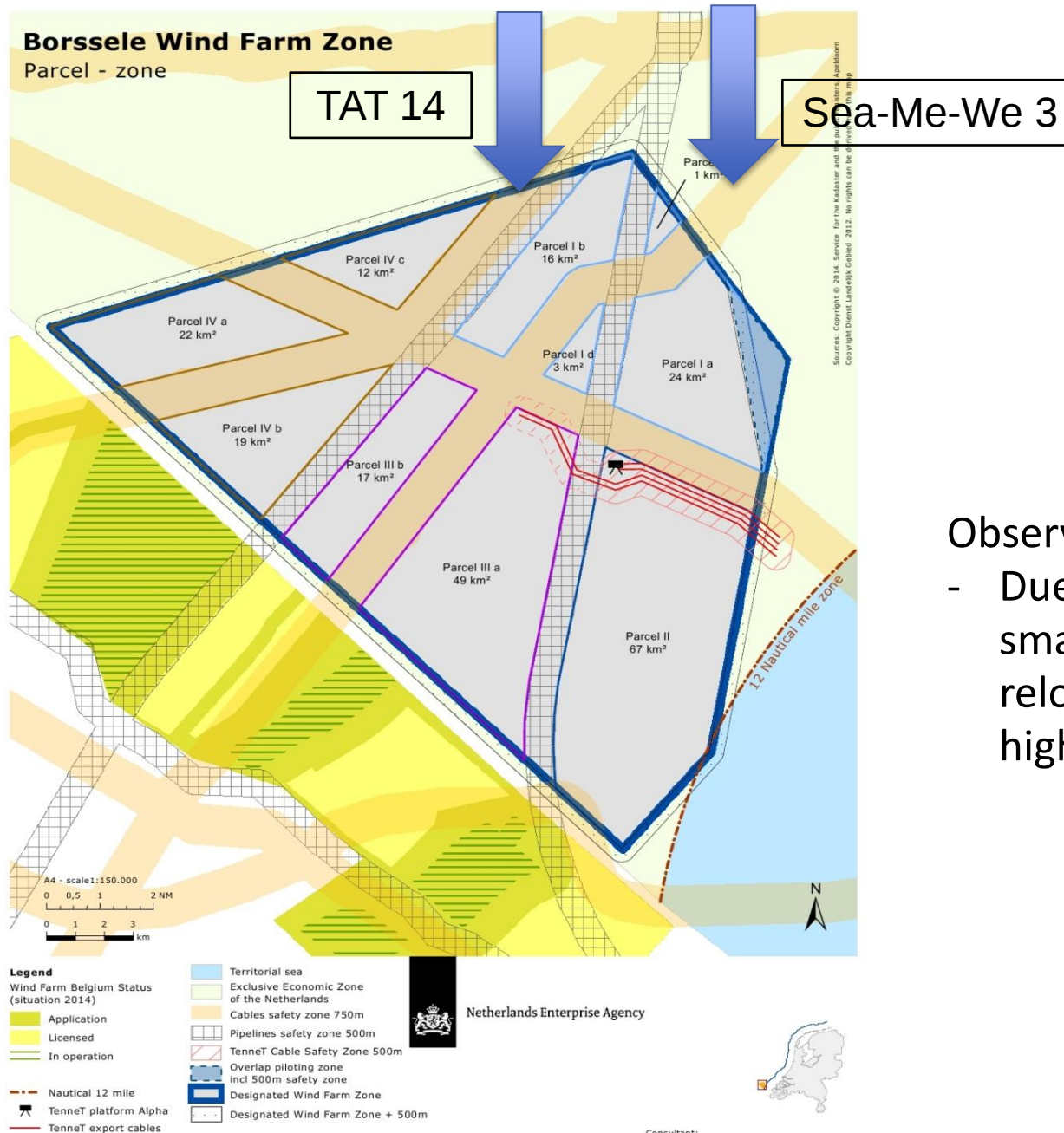
1.1 Borssele wind farm zone & Belgium wind farms



1.2 Overview of active telecom cables & pipelines



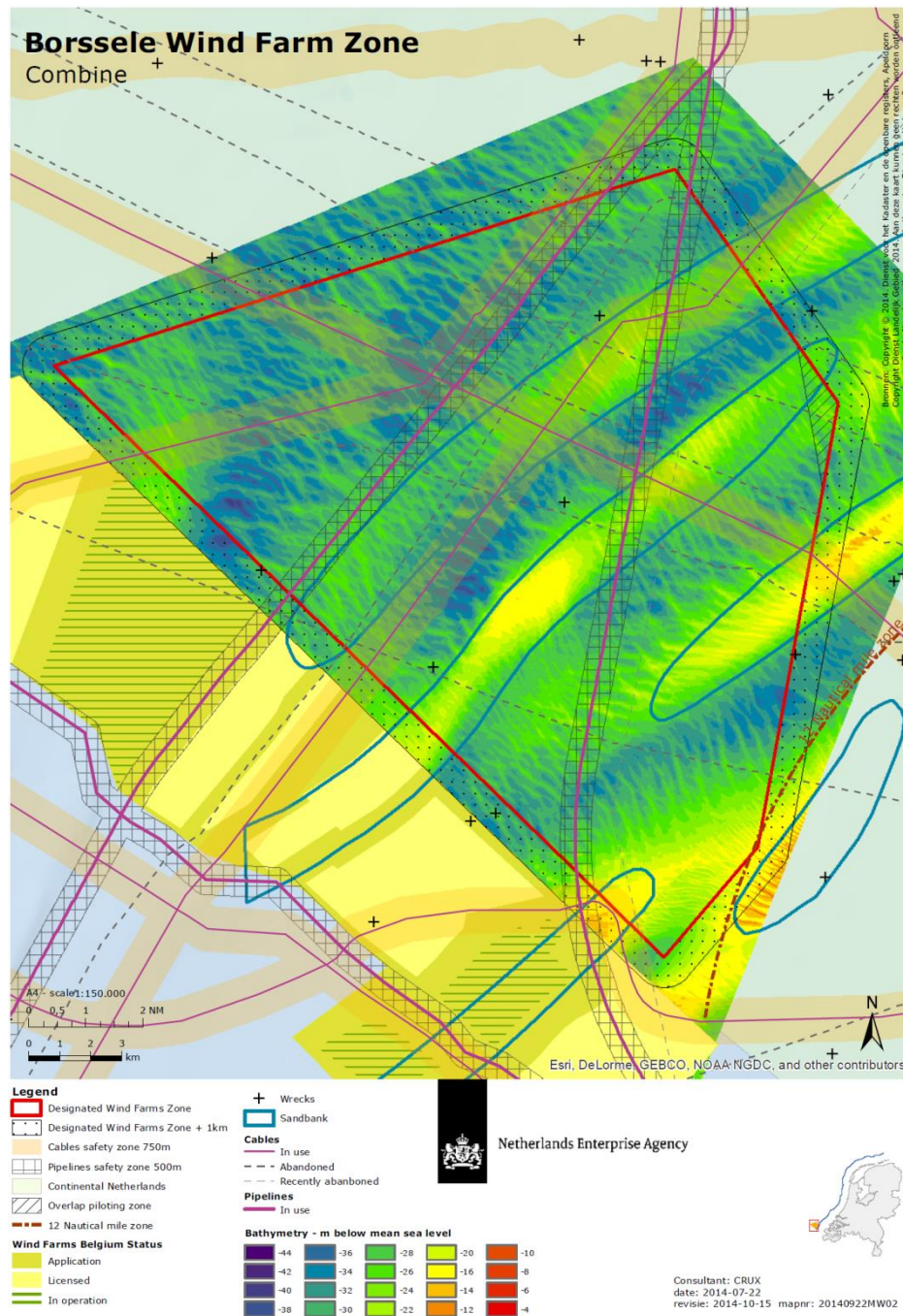
1.3 Telecom cable exclusion zones



Observation:

- Due to Sea-Me-We 3 there are 2 small parcels in Site II → thus relocation of Sea-Me-We 3 has higher benefits than TAT14

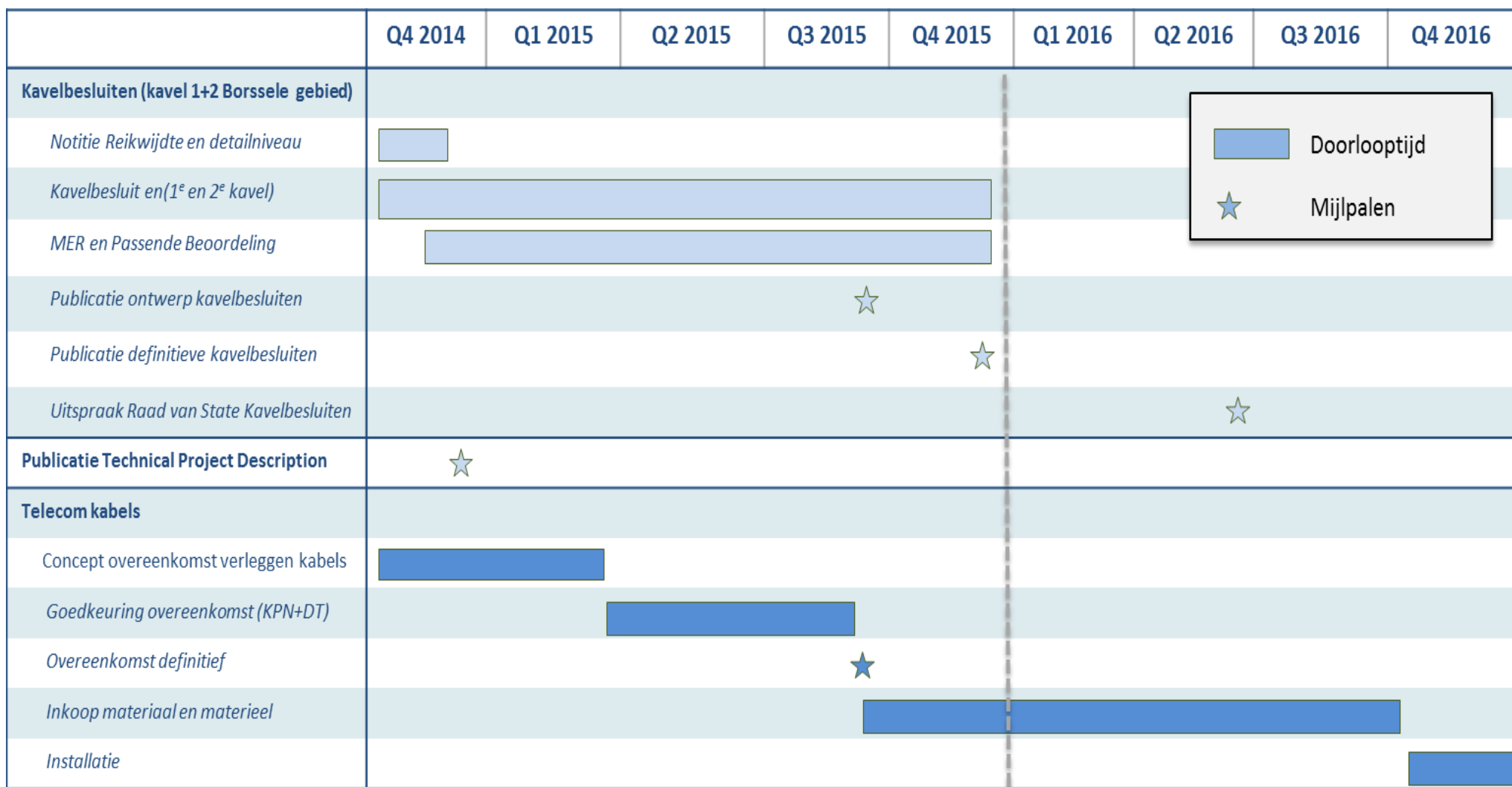
1.4 Bathymetry with cable locations



Observation:

- Sea-Me-We 3 cable is partly positioned at a bank
- This “eats away” cheaper development locations

1.5 Master planning Borssele wind farm zone



Opening SDE Tender



2.1 Results of interviews with Deutsche Telekom & KPN

- Sea-Me-We 3 has 82 owners. They will only agree to relocation if cost neutral and seems reasonable to all owners.
- TAT14 has 34 owners and operates in the same way.
- TAT14 & Sea-Me-We 3 reach end of lifetime 2025/2024, but may be used longer.
- According to cable owners approx. 6 months of research and negotiations is needed prior to Q4 2015 on:
 - Approach & routing
 - Permitting & costing
- KPN and DTAG prefer rock dumping over mattresses, in order to reduce weight and for the safety of their cable
- KPN and DTAG want the right to lay a new cable over the infield crossing in case the cable cut.



2.2 Results of interviews with MUMM

- Recently a new marine spatial plan was agreed in Belgium.
- Cable corridors were designated but none of these are usable for relocation of Sea-Me-We 3
- Relocation of Sea-Me-We 3 south of the Belgian wind farms is impossible due to existing sea-lanes and objection of Antwerp harbor
- Relocation of Sea-Me-We 3 north of the Belgian wind farms is possible but with many telecom and pipeline crossings and a lengthy planning (estimated at minimum 2 years) consisting of:
 - Strategic EIA + project EIA
 - Approval of route
 - Change of marine spatial plan (heavy procedure with no official deadlines)



2.3 Results of interviews with Belgian developers

Results of interviews with Rentel and Parkwind:

- Both developers claim to have no benefit of relocation of the Sea-Me-We 3 cable



3.1 Number of cable & pipeline crossings

The number of (bundled) cable & pipeline crossings will depend on the following factors:

- Selected location of each TenneT substation of 700 MW
- Location of telecom cables and pipes
- Size and shape of parcels (and possibly water depth in the parcels)
- Layout of infield cables in the parcels

The number of (bundled) cable & pipeline crossings do not depend on the following factors:

- Selection of voltage level of infield cable (e.g. 33kV or 66kV) → it does however affect the number of infield cables per bundled crossing
- Capacity of wind turbine selected (e.g. 3MW vs 7 MW)



3.2 Number of turbines per string of infield cable

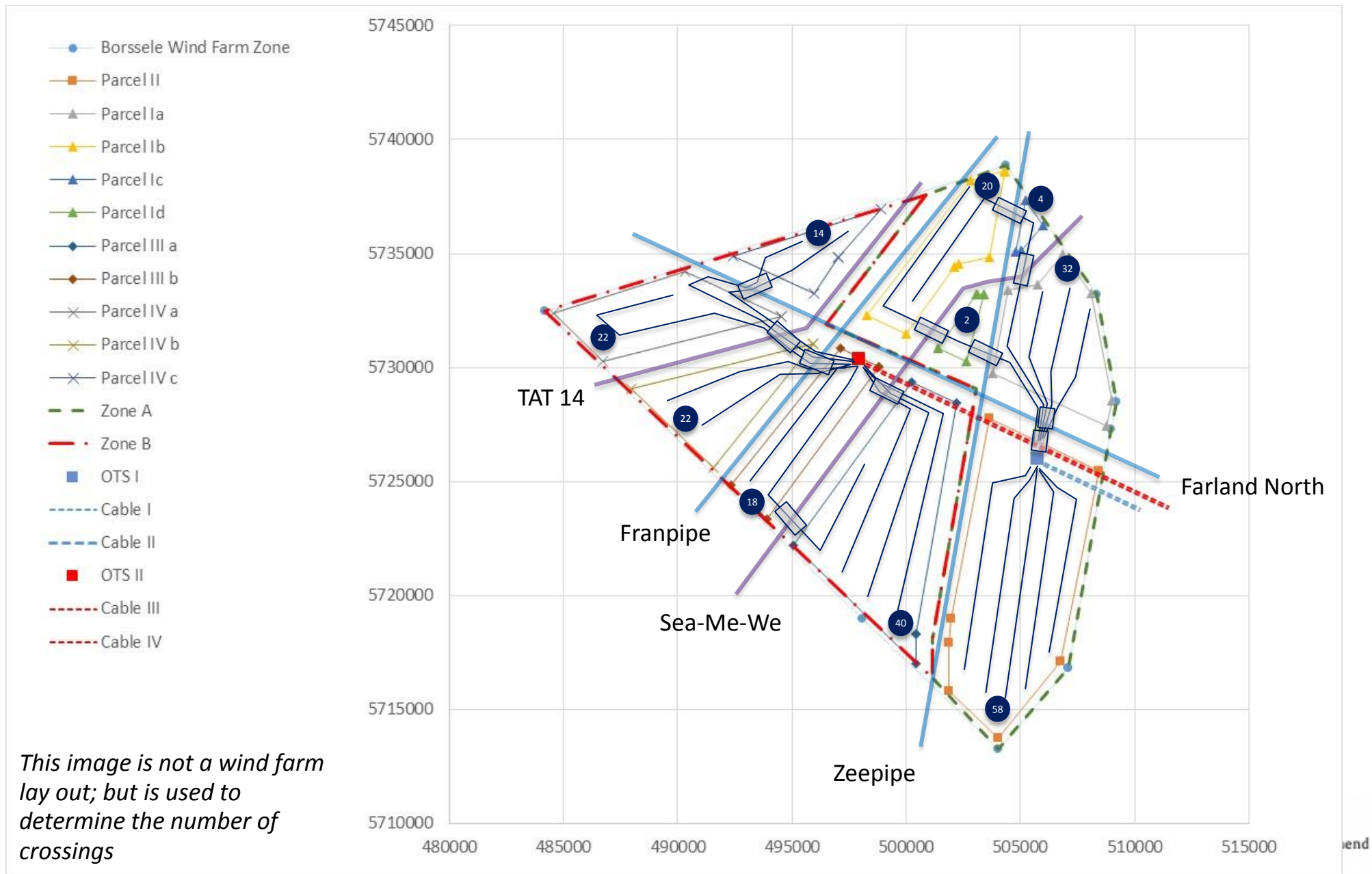
Scenario	Capacity turbine (MW)	Voltage of string (kV)	Number of turbines per string	Capacity per string (MW)
1	6	66	12	72
2	6	33	6	36
3	7	66	10	70
4	7	33	5	35

Source: DNV-GL & TKF (Twentse KabelFabrieken)

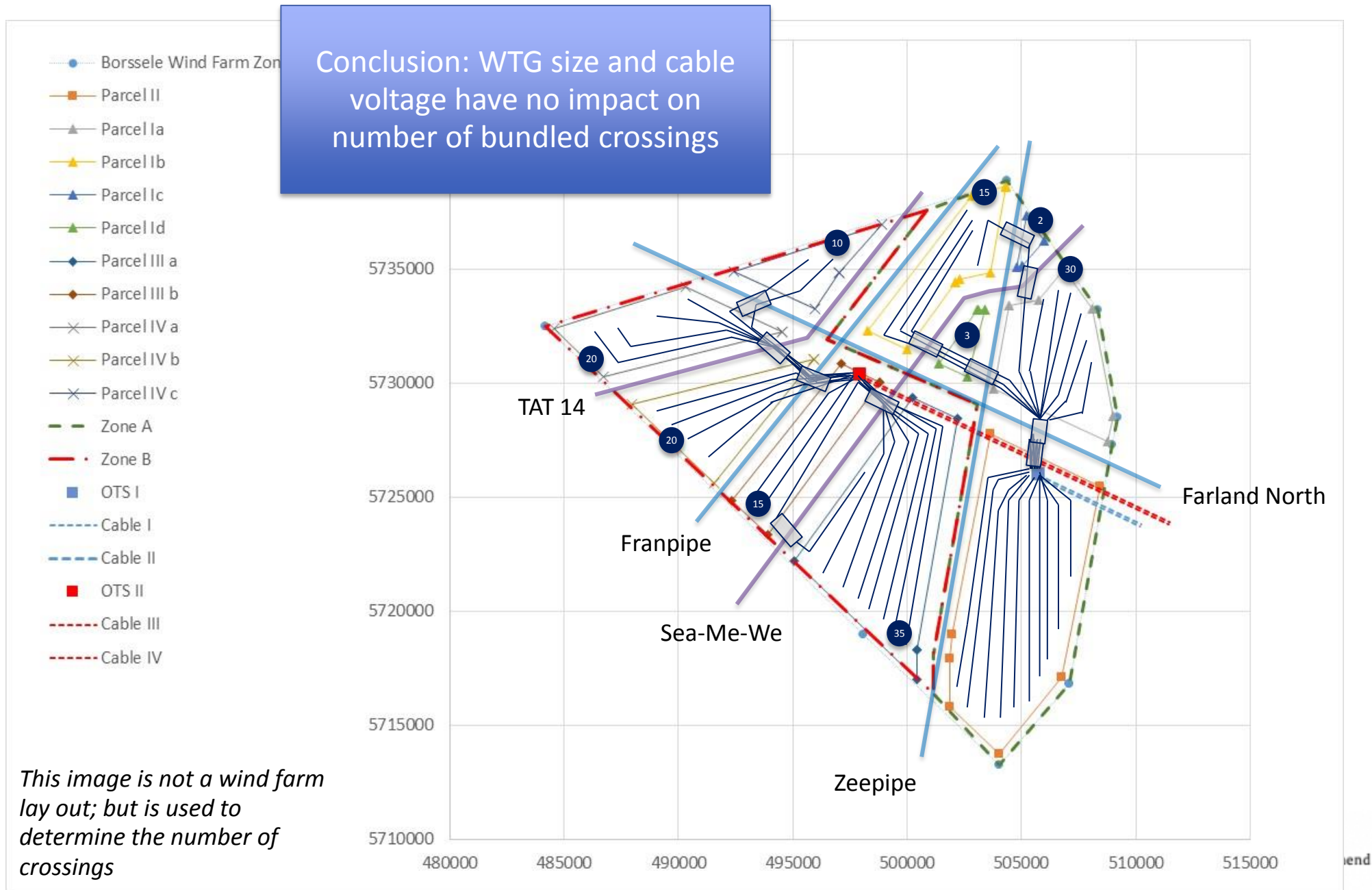


Rijksdienst voor Ondernemend
Nederland

3.3 Possible layout for 7MW WTGs @ 66kV (10 WTGs per string) → 11 bundled crossings



3.4 Layout for 7MW WTGs @ 33kV (5 WTGs per string) → 11 bundled crossings



3.5 After removing SeaMeWe cable @ 6MW WTGs @ 66kV (12 WTGs per string) → 6 bundled crossings

Conclusion: number of bundled crossings reduce after removal of SeaMeWe cable

Borssele Wind Farm Zone

Parcel II

Parcel Ia'

Parcel Ib'

Parcel III'

Parcel IV a

Parcel IV b

Parcel IV c

Zone A

Zone B

OTS I

Cable I

Cable II

OTS II

Cable III

Cable IV

5735000

5730000

5725000

5720000

5715000

5710000

480000

485000

490000

495000

500000

505000

510000

515000

send

TAT 14

Franpipe

Zeepipe

Farland North

This image is not a wind farm lay out; but is used to determine the number of crossings

3.6 Estimated costs for developers of cable & pipeline crossings for the whole Borssele zone (million Euro)

	With Sea-Me-We 3	Without Sea-Me-We 3
Number of bundled crossings	11	6
Costs at 66 kV	9,8	5,4
Costs at 33 kV	10,6	5,8



4.1 Conclusions

1. We do not know the cost benefit of utilizing sand banks now used by SeaMeWe 3
2. Benefits of relocation of TAT-14 cable are too small (it saves only one bundled crossing)
3. Relocation of the Sea-Me-We 3 North of Belgian windfarms is feasible but organizationally very complex and uses a minimum 2 year period according to MUMM
4. Relocation of the Sea-Me-We cable has benefits. Five bundled crossings less saves ca. 4.5 million euro in crossing costs.
5. Costs of relocation of Sea-Me-We 3 is estimated at circa 15 million euro (based on RWS assumption of 100k euro/km for 50km extra telecom cable including installation; 5 MEuro, 6 MEuro for 7 crossings + 2 MEuro for repeaters + 2MEuro for development & project management)
6. The balance of benefits vs costs is negative
7. Crossing of telecom cables and pipelines with bundles of infield cables is common practice



5.1 Recommendation & process

1. Although the impact on LCoE of relocation is not completely clear, the negative effect of the lengthy planning on the current Borssele tender preparations is sufficient reason to recommend not to relocate
2. We therefore inform developers now that EZ/RVO propose to decide not to relocate any telecom cables or pipelines in the Borssele zone
3. We are happy to receive your feedback

