Suffolk

Seascape sensitivity to offshore wind farms

UPDATE ADDENDUM

Final Report

for

Suffolk County Council
East Suffolk Council
Suffolk Coast & Heaths AONB Partnership

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PART 1: Update of baseline, approach and summary of findings

1. Introduction

1.1. White Consultants were appointed in April 2023 to carry out an update of the 'Suffolk seascape sensitivity study to offshore wind farms' report[1] 2020 located in the inshore and offshore waters off the Suffolk coast. The study was commissioned and funded by Suffolk County Council and Suffolk Coast & Heaths AONB Partnership in consultation with East Suffolk Council.

1.2. The intention of the Suffolk seascape sensitivity study is that it contributes to the baseline evidence for the Seascape, Landscape and Visual Impact Assessment (SLVIA) and development of the proposals for a series of projects in waters off Suffolk's coast.. This update is necessary in order to accommodate the more rapid than anticipated changes in offshore wind technology and considers the potential effects of turbines greater than 400m to blade tip–above Lowest Astronomical Tide (LAT).

1.3. The function of this report is as an addendum to the 2020 report and together they will act as baseline evidence and a framework for assessment. As such there is a minimum of repetition in this document. Unless otherwise expressly stated in this document the content of the Suffolk seascape sensitivity study to offshore wind farms report, 2020 (from here on referred to as the Suffolk, 2020 report) including text and figures remain unchanged and relevant.

1.4. The study considers the same study area as the Suffolk, 2020 report and the analysis of sensitive receptors is limited to the County of Suffolk including Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB) within the county.

1.5. The Suffolk, 2020 report relied on the buffers the turbines up to 400m to blade tip set out in the 'Review and update of OESEA seascape and visual buffer study', 2020[2] (from here on referred to as the OESEA, 2020 study.) These were derived from substantial research including reviewing and analysing 28 UK windfarm SVIAs, wireframe analysis and considering visibility modifiers alongside results of examinations and European experience. In order to future proof the study, turbines upto 550m high to blade tip are considered in this update even though none of this size are known to be in development at present.

1.6. It is not intended to carry out baseline analysis of further SVIAs or wireframes for this study as this should be carried out as part of future OESEA reports. As such it is proposed to:

- Briefly review the current national and local planning policy context and status of the OESEA 4 Environment Report and related studies (Section 2).
- Summarise any changes in the baseline (Section 3).
- Review the findings of the OESEA, 2020 study and the factors which influenced the proposed buffers with a commentary on how this relates to turbines over 400m to blade tip. This will be divided into expected effects of different sizes of turbines and different distances on the one hand and consideration of visibility modifiers and visual acuity on the other. Other studies such as NRW seascape sensitivity studies are also referred to (Section 3).
- Summarise the findings (Section 5).
- Review each seascape zone and set out a commentary on the sensitivity to turbines over 400m high for each (Part 2).

2. Policy update

UK National Policy Statements

2.1. The UK Government's National Policy Statements (NPSs) under the Planning Act (2008) set out Government policy for the development of Nationally Significant Infrastructure Projects (NSIPs). National policy statements EN-1 and EN-3 address national infrastructure planning

[1] Suffolk: Seascape sensitivity to offshore wind farms, White Consultants, October 2020.
[2] Offshore Energy Strategic Environmental Assessment (OESEA): Review and update of Seascape and Visual Buffer study for Offshore Wind farms, BEIS/Hartley Anderson, 2020

in relation to renewable energy including offshore wind farms with an output above 100MW but are a material consideration for smaller projects.

2.2. EN-1 and EN-3 drive the evidence for this guidance. They were published in 2011 and are current at the time of writing this report. However, there are revised drafts dated March 2023 out to consultation at present. These are broadly consistent with the current versions and do not affect the relevance or weight of the Suffolk 2020 study or this addendum. Relevant potential changes are set out below.

EN-1

2.3. The EN-1 March 2023 revised draft expresses a renewed sense of urgency to work towards net zero emissions by 2050 and provides more detail on achieving this. Like the previous policy substantial weight is given to the need for renewable energy infrastructure (3.2.5-3.2.6).

2.4. Nationally designated landscapes are confirmed as having the highest status of protection in relation to landscape and natural beauty (5.10.7). The duty to have regard to the purposes of nationally designated areas also applies in consideration of projects outside the boundaries of an area but which may have impacts within them. The aims should be to either avoid harm to the purposes or minimise adverse effects (5.10.8).

2.5. As before, the assessment should include the visibility and conspicuousness of the project and potential impact on views and visual amenity (5.10.20).

EN-3

2.6. The key difference in the EN-3 March 2023 revised draft is that the provision of offshore wind and associated infrastructure is now considered a 'critical national priority' (CNP) (3.8.12). However, applicants must continue to show how their application meets the requirements of EN-1 and EN-3 applying mitigation hierarchy.

2.7. An additional paragraph indicates that seascape is an issue for consideration especially where it provides the setting for a nationally designated landscape and supports the delivery of the designated area's statutory purpose (3.8.221).

2.8. The text states that where a proposed offshore windfarm will be visible from the shore within the setting of a nationally designated landscape with potential effects on the area's statutory purpose, an SLVIA should be undertaken in accordance with the relevant offshore windfarm EIA policy and the latest offshore energy SEA including the 'White 2020'[3] report (ie OESEA, 2020 report). This will always be the case where coastal national park or their settings are potentially affected. (3.8.224).

2.9. Four principal considerations on the likely effect of offshore windfarms on the coast are mentioned (3.8.225):

- the limit of visual perception from the coast under poor, good and best lighting conditions:
- the effects of navigation and hazardous lighting on dark night skies;
- individual landscape and visual characteristics of the coast and the special qualities of designated landscapes, such as World Heritage Sites, which limits the coast's capacity to absorb a development;
- how people perceive and interact with the coast and natural seascape.

2.10. This adds to the previous EN-3 text to include lighting and special qualities.

2.11. In terms of decision-making the Secretary of State should not refuse to grant consent unless the harmful effects on the statutory purposes of designated landscapes are considered to outweigh the benefits taking into consideration offshore wind energy's CNP status (3.8.369).

2.12. Overall, the draft revised EN-3 text reinforces and expands on the EN-3 text specifically supporting the OESEA, 2020 report and potential effects on designated landscapes and their setting which underpin the Suffolk 2020 study.

[3] Offshore Energy Strategic Environmental Assessment (OESEA): Review and update of Seascape and Visual Buffer study for Offshore Wind farms, BEIS/Hartley Anderson, 2020

AONBs and Heritage Coasts

2.13. Policies on AONBs and Heritage Coasts have not changed since the Suffolk 2020 study. However, the extent of the AONB has been increased to include an area in Essex and the AONB Management Plan has been updated. The statutory purposes remain the same. There has been a review of the Heritage Coasts report dated 30 August 2022. The landscape character baseline information remains essentially the same.

Marine Planning

2.14. Marine planning policies have not changed since the Suffolk 2020 study. The seascape character information baseline also remains the same.

2.15. The OESEA 4 Environmental Report[4] (ER) was published in March 2022 along with Feedback[5] and Consultation Response[6] reports in September 2022. The ER refers to the OESEA, 2020 report and sets outs its findings and these are not substantially challenged in the contributions to the Feedback report although the Response makes appropriate corrections. As such the OESEA, 2020 report remains valid as the underpinning analysis to the Suffolk, 2020 report. The plan/programme based on OESEA 4 is expected to have a lifespan of approximately four years from 2022.

3. Baseline seascape and consents update

Baseline

3.1. No substantive changes have occurred in the physical baseline since completion of the Suffolk 2020 study.

Consents

3.2. The following developments have been consented since completion of the Suffolk 2020 study:

- East Anglia ONE North offshore windfarm 37.7km at its closest point from shore with wind turbines upto 282m to blade tip.
- East Anglia TWO offshore windfarm 32.6km at its closest point from shore with wind turbines upto 282m to blade tip.
- Sizewell C nuclear power station.
- Kittiwake nesting structures, 17.5m high above LAT and 11m wide, as compensation for Hornsea Three offshore windfarm. One is proposed 1.4km offshore from Minsmere and up to two are proposed 1km off the coast of Lowestoft. These will be in situ for 40 years.

3.3. The consented proposals will add to cumulative effects of development and will be reflected in the update for each seascape zone.

4. Update approach

Focus and limitations of the report

4.1. The OESEA, 2020 study sets out visual buffers for different types of coastal character and designations at an England and Wales level. These are refined in the Suffolk seascape study, 2020 and seascape zones are derived with different levels of sensitivity to different sizes of turbines upto 400m to blade tip. The aim is to avoid significant adverse effects on high sensitivity seascape receptors. The premise that the study works on is that the most

[4] UK Offshore Energy Strategic Environmental Assessment, OESEA 4 Environmental Report, BEIS, March 2022
[5] UK Offshore Energy Strategic Environmental Assessment, Consultation Feedback, BEIS, September 2022
[6] UK Offshore Energy Strategic Environmental Assessment, Government response to OESEA 4 public consultation, BEIS, September 2022

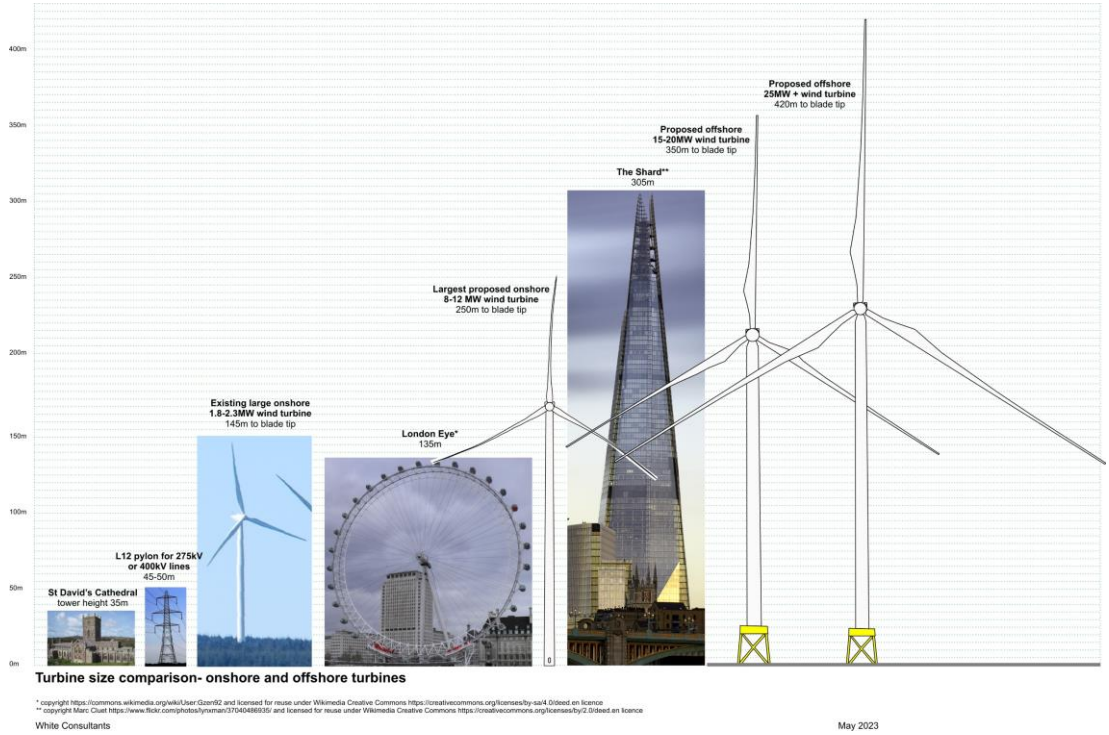
important effect of offshore windfarms is on the perception of seascape character from the coast ie the relationship between any proposed development with coastal seascape character when seen in juxtaposition with each other. This means that the main drivers are distance from the coast and the character and value of the coastal seascape and its component sensitive receptors. Therefore, the seascape zones identified are focussed on this purpose alone and should not be used for other purposes or development types which may need full seascape characterisation taking intrinsic natural and cultural processes and other characteristics into account.

Relevant guidance, reports and publications

4.2. The most relevant guidelines and reports are the Suffolk, 2020 report itself and those set out in paragraph 3.3 of that report.

4.3. An article published in Landscape Design 2021[7] sets out the case for a strategic approach to offshore wind farm planning incorporating seascape and visual factors. The scale of offshore turbines in relation to established landmarks such as the Shard at 305m high was set out in a diagram. This has been updated to incorporate turbines currently proposed as an option for Five Estuaries offshore windfarm (see **Figure 1**). These are 420m tall to blade tip- just under 40% taller than the Shard. These are therefore very large structures with associated movement of blades with very wide swept paths at high levels which are likely to be seen over long distances.

Figure 1 Relative size of offshore wind turbines



Seascape sensitivity and zones

4.4. Based on a review of the updated planning and baseline context it is considered that the findings of the Suffolk, 2020 report remain valid for turbines upto 400m to blade tip.

4.5. As it is not intended to carry out further baseline analysis of SVIAs or wireframes for this study the approach is to consider if the findings can be reasonably built upon or extrapolated to consider turbines upto 550m to blade tip to reasonably future proof the study.

4.6. A NRW, 2019[8] study predated the OESEA, 2020 study but used a similar approach analysing

[7] https://issuu.com/landscape-institute/docs/landscape_issue_3-2021/s/12849347

[8] Seascape and visual sensitivity to offshore wind farms in Wales: Strategic assessment and guidance.

fewer SVIAs. The findings showed a relationship between the likely scale of effect of different sizes of turbines to distance from the viewer. The 'very approximate ratio' between turbine height and distance for an average low magnitude of effect was found to be 1:133. For an average medium magnitude of effect the ratio was 1:100 (2.3 on page 14 and 7.8 on page 37). For example, a 300m high turbine is likely on average to have a low magnitude of effect at around 40km and a medium magnitude of effect at 30km. These are the equivalent of 'possible' and 'probable' significant effects respectively when considering views from high sensitivity receptors (2.5 page 15). This is relevant to Suffolk Coast & Heaths AONB. These are useful rules of thumb although there are caveats including the fact these are averages and there could be significant effects beyond these distances. These also assume worst case visibility conditions ie very good or excellent visibility.

4.7. It is useful to consider the OESEA, 2020 analysis of visual effects of offshore windfarms for 28 SVIAs based on turbine height summarised in Tables 7.2, 7.3 and 7.4 of that report to plot the relationship between turbine height and effects at various distances and to consider if similar rules of thumb apply. This is illustrated in **Figure 2** with derived potential distances for low and medium magnitude of effects in **Table 1**.

Table 1 Derived potential low and medium magnitude of effects

Heights of turbine to blade tip (m)	Low magnitude of effect average distance (to nearest km)	Medium magnitude of effect average distance (to nearest km)
425	56.5	42.5
450	60	45
500	66.5	50
550	73	55

4.8. **Figure 2** indicates that the low magnitude of effect is likely to occur at a ratio of *over* 1:133 for turbines over 225m- the line shows the 1:133 ratio and most of the levels of effects are above this. For example, turbines 400m high potentially have a low magnitude of effect at around 53km. Medium magnitudes of effect are likely to occur at a ratio of just *over* 1:100- the line shows the 1:100 ratio and most of the levels of effects are above this. These bear out the NRW, 2019 study findings. So, for example, an array of 425m high turbines potentially/probably have significant effects on high sensitivity receptors at 42.5km depending on visibility modifiers and other factors such as their relationship with existing turbines.

4.9. The OESEA, 2020 study also included an assessment of likely visual effects of turbines over 300m high to blade tip using wireframes. This was a useful additional analysis which supported the trajectory of expected effects from the SVIA analysis. As such it is not intended to repeat or extend these findings in this report.

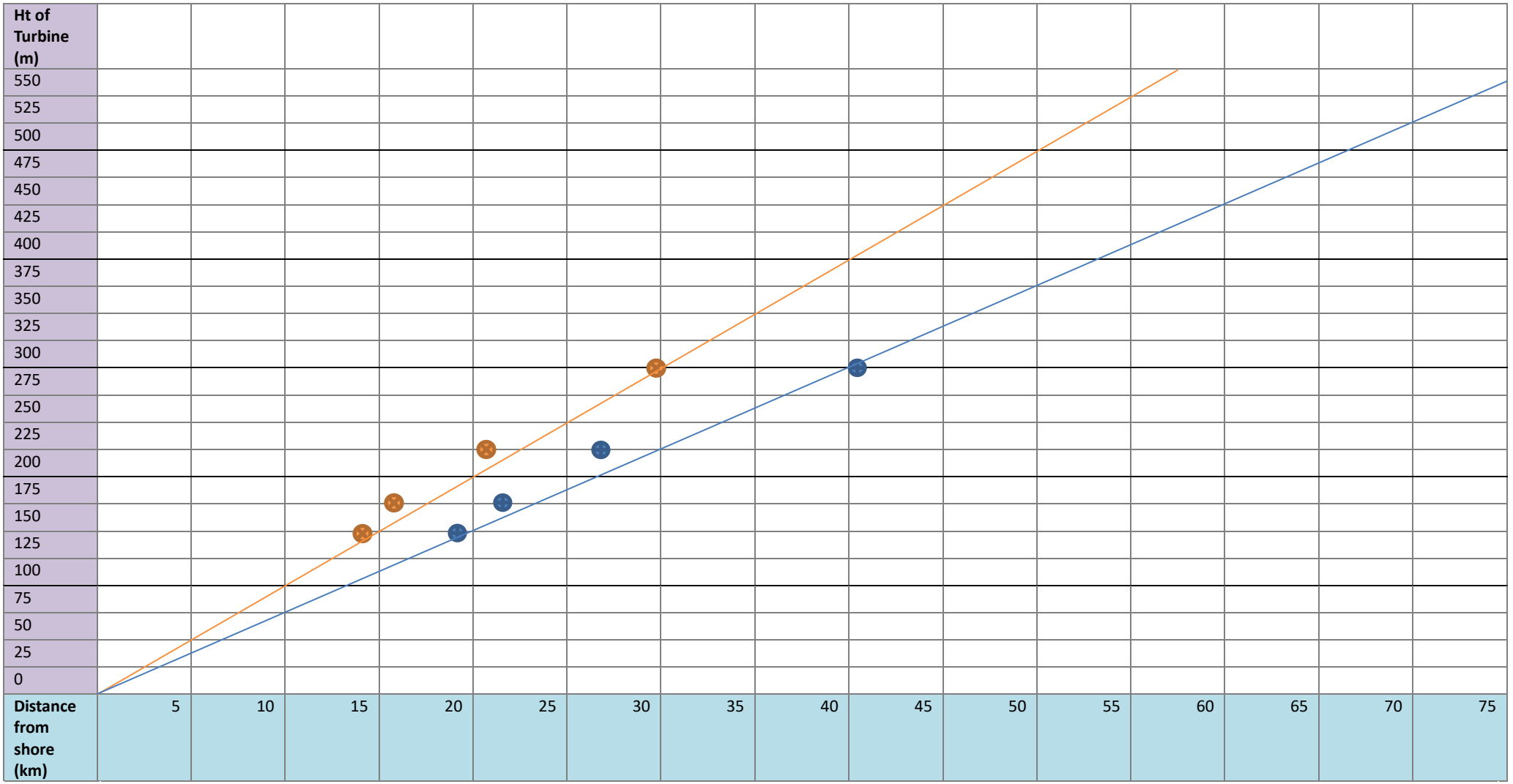
Visibility modifiers

4.10. The influence of visibility modifiers increases with distance. The Suffolk, 2020 report considered visibility modifiers off the Suffolk coast in Appendix 2 using data from the OESEA, 2020 report. The nearest coastal stations identified were Weybourne and Manston (Ramsgate). It was concluded that visibility from these locations have substantially larger proportions of time with visibility over 35km and 40km than the national average. This is explored further in **Table 2** below which extracts and analyses data from those two coastal stations. This measures only upto 40km in increments with distances over 40km left open. **Figure 3** graphically illustrates the measured percentage of days' visibility from the data and then extrapolates to explore a possible range of percentage of days where visibility may be possible above 40km.

4.11. The key conclusion of the existing data visibility analysis is that developments at around 39km offshore may be visible for 20% days annually. This is a significantly larger proportion than the national average of 10% noted for 40km in the OESEA, 2020 report. This latter figure fed into the OESEA, 2020 conclusions that 40km was a reasonable buffer from designated

Stages 1-3. NRW Evidence Series. Report No: 315, NRW, Bangor, 2019

Figure 2: Low and medium magnitude of visual effects of wind turbines



Key

Average distance for low magnitude of effect

Average distance for medium magnitude of effect

Source of average effects: OESEA, 2020: Table 7.4 Summary of SVIA visual effects of offshore windfarms excluding extensions, page 66.

Average 1:133 ratio of turbine height to distance for low magnitude of effect

Average 1:100 ratio of turbine height to distance for medium magnitude of effect

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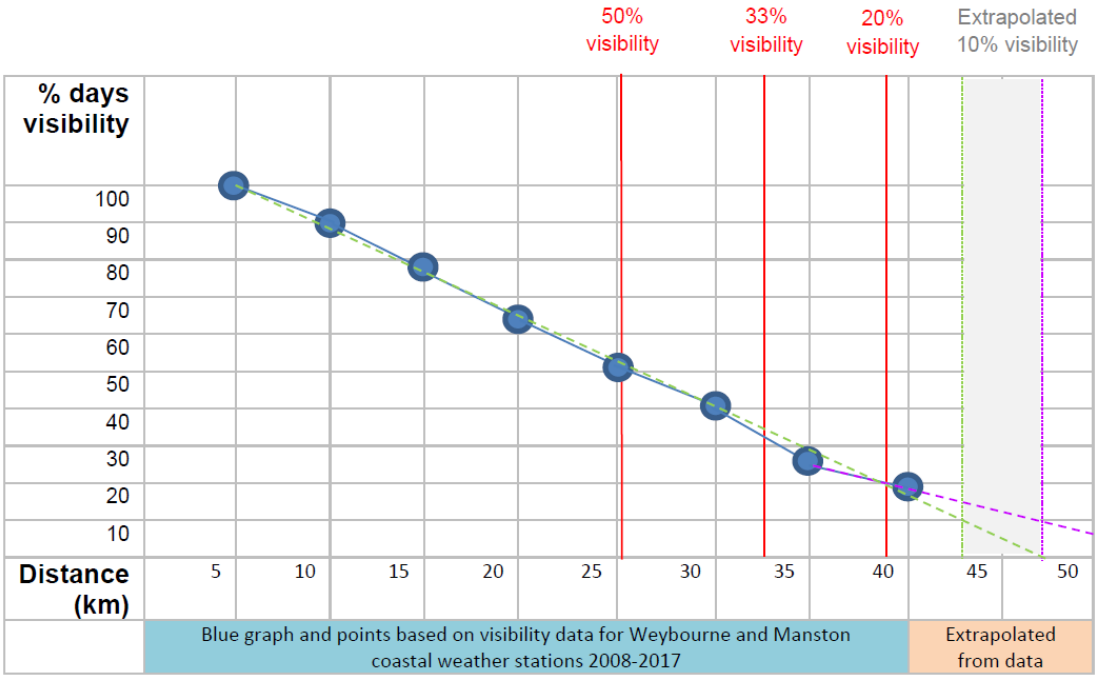
coastal landscapes for turbines upto 400m high to blade tip.

4.12. The extrapolated part of **Figure 3** explores visibility over 40km. It illustrates that 10% days visibility may be possible 43-47km offshore but this depends on the rate of reduction of visibility over distance being roughly the same as for lesser distances. Observation indicates that landscape features and objects can be seen over long distances eg Lundy at around 50km from the Gower and Whitelee wind farm's upto 140m high turbines visible from 57km away (mentioned in the East Anglia TWO Environmental Statement (EA2 ES) Appendix 28.8 on visibility, paragraph 28).

Table 2 Visibility distances at East Coast coastal stations in a 10 year period (2008-2017)

Weather Stations	Visibility Distance (km)							
	0-5	6-10	11-15	16-20	21-25	26-30	35	40+
Weybourne % days visibility	9.90%	13.00%	13.50%	11.10%	9.80%	14.10%	6.00%	22.60%
cumulative totals	100%	90.10%	77.10%	63.60%	52.50%	42.70%	28.60%	22.60%
Manston % days visibility	10.70%	13.20%	12.70%	13.10%	12.80%	17.00%	6.70%	13.70%
cumulative totals	100%	89.30%	76.10%	63.30%	50.20%	37.40%	20.50%	13.70%
Average % days visibility	10.3%	13.1%	13.1%	12.1%	11.3%	15.6%	6.4%	18.2%
Avg. cumulative totals	100%	90%	77%	63%	51%	40%	25%	18%

Figure 3 Average offshore visibility distances related to percentage days per annum



4.13. The Suffolk, 2020 report Appendix 2 also noted the seasonal variation set out in the EA2 ES Appendix 28.8. This shows that visibility over longer distances are most prevalent in summer. This is when the most people would be visiting or enjoying coastal and sea views.

4.14. It is appropriate to mention EA2 ES Appendix 28.9 concerning visibility measured on vessels off the East coast and compiled by the Met Office. This indicated that developments at distances over 36km may be visible less than 10% of the year (10, page 4). This analysis has not been verified in this study.

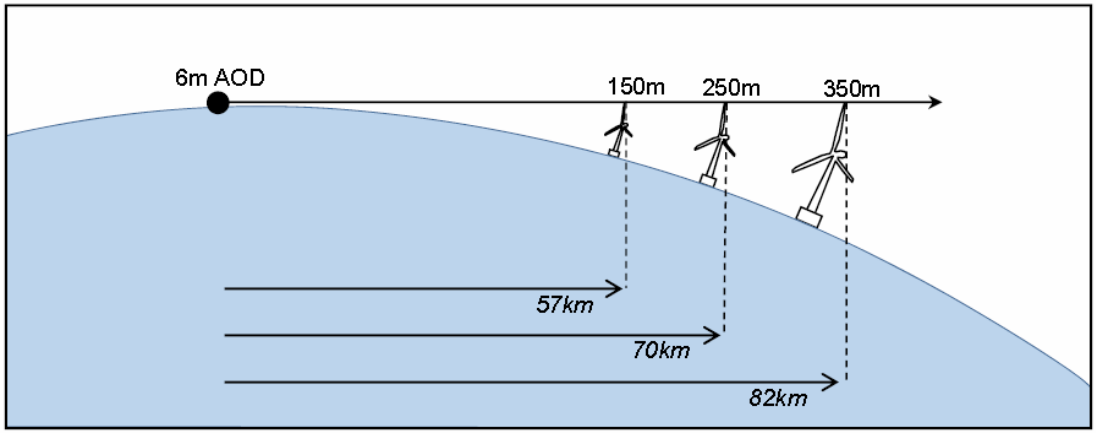
Aspect

4.15. The direction and angle of the sun in relation to a wind turbine and visual receptor is a notable factor influencing how clearly a turbine can be seen. Viewed from the east coast, offshore turbines broadly have the sun behind them in the morning, to one side in the middle of the day and highlighting them in the afternoon and evening. The effect of a lower angle of sun, particularly in the latter part of the day means turbines beyond 40km may be more likely to be visible in the afternoon/early evening. It is broadly the case that more people are likely to be enjoying the coast and views out to sea at this time which in turn influences sensitivity.

Earth's curvature

4.16. As the distance from the coast increases the effect of the earth's curvature on the amount of turbine visible also increases. This factor is implicitly already taken into account in SVIAs magnitude of visual effects analysed in the OESEA, 2020 study which underpin the buffers in the Suffolk 2020 study. The furthest SVIA distance analysed is 53km (Moray West in Table 7.2). The height of turbines screened by the earth's curvature at different distances from a viewpoint at 6m AOD is illustrated in **Figure 2**. This may be typical of views from the lower parts of the Suffolk Coast. For instance, at 57km a 150m high turbine is completely below the horizon. Therefore, the top 275m of a 425m high turbine, including the majority of its blade sweep, would theoretically be visible at this distance.

Figure 4 Effect of curvature of the Earth on visibility of turbines (Source: NRW (2019))



Discussion

4.17. A low magnitude of effect combined with a high sensitivity of receptor is relevant to visual buffers in the study area upto 40km. However, beyond this distance the influence of visibility modifiers as set out in **Figure 3** increases in influence. Therefore, a reasonable, if conservative, measure for significant effects is the medium magnitude of effect set out in **Table 1**. It is suggested that the following constraints buffers from the Suffolk Coast & Heaths AONB should be considered to guide development:

- Turbines 400+-425m high to blade tip- 42.5km buffer
- Turbines 425+-450m high to blade tip- 45km buffer
- Turbines 450+-500m high to blade tip- 50km buffer (although visibility may be less than 10%)
- Turbines 500m+-550m high to blade tip- 55km buffer (although visibility may be less than 10%)

4.18. The buffers above (effectively in the western part of Seascape Zone 8) are part of a reasoned approach to the future strategic location of offshore wind farms in relation to the AONB and are relevant in reviewing the likely seascape and visual effects of current proposals. However, it is recognised that 40km is a substantial buffer for larger wind turbines off sensitive designated coastal landscapes based on the evidence and meteorological data set out in OESEA, 2020. In determining individual proposals, decision-makers will need to balance the potential harm to the purposes of the AONB, including the combined cumulative effects of existing and proposed developments, with the likely future status of offshore wind as CNP

development.

5. Summary of findings and recommendations

5.1. In general, larger wind turbines both in terms of overall height and diameter of tower and swept path have a larger magnitude impact than smaller wind turbines at the same distance. Therefore, larger buffers for larger turbines are reasonable.

5.2. The percentage of time visibility is possible over long distances and the aspect of the east coast both increase the likelihood of visibility of turbines beyond 40km.

5.3. Turbines over 400m to blade tip are likely to be visible beyond 40km at times although their visibility decreases with distance due to reduced perceived scale of effect and the influence of visibility modifiers.

5.4. Wind farms with turbines over 400m high should be at least 40km away from the coast and preferably more as set out in the buffers in 4.17. If the nearest turbines of any given array are around 40km away from the AONB coast it is highly desirable for the number around this distance to be minimised in order to avoid significant adverse effects on the AONB and curtaining effects on the skyline in excellent visibility conditions.

5.5. The sensitivity of each seascape zone (SCZ) to wind turbine development remains the same except where East Anglia TWO windfarm overlaps with SCZ04 where it reduces to medium- see text for this zone below.

5.6. The treatment of turbines over 400m to blade tip in each Seascape Zone is set out in Part 2.

PART 2: Detailed seascape zone updates

Note: The sensitivity noted below is the overall sensitivity of each seascape zone to wind turbines generally as per the Suffolk, 2020 study, not specifically to turbines over 400m high to blade tip.

Seascape zone No: 01	Name: Suffolk Heritage Coast Inshore- South
Sensitivity	High/medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations for offshore windfarms apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the existing development at Greater Gabbard/Galloper. This would be likely to increase cumulative effects.	

Seascape zone No: 02	Name: Suffolk Heritage Coast Offshore- South
Sensitivity	Medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations for offshore windfarms as a suggested constraints buffer apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the existing development at Greater Gabbard/Galloper and increasing a curtaining effect towards the London Array. This would be likely to increase cumulative effects.	

Seascape zone No: 03	Name: Greater Gabbard Environs
Sensitivity	Medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations describing this zone as a constraints buffer for turbines above 175m high apply to a greater degree to turbines more than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the existing development at Greater Gabbard/Galloper. This would be likely to substantially increase cumulative effects.	

Seascape zone No: 04	Name: Suffolk Heritage Coast Inshore- North
Sensitivity	High
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations for offshore windfarms apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the existing development at Greater Gabbard/Galloper where extensions are proposed. This would be likely to increase cumulative effects. Now that East Anglia TWO is consented this becomes part of the baseline. Sensitivity *within* its boundaries reduces to medium as per SCZ03 which includes Greater Gabbard. Any replacement of turbines within the windfarm extent should not exceed 282m to blade tip. Sensitivity within the zone directly adjacent to East Anglia TWO remains high due to the proximity to the coast. It should remain as a constraint buffer for turbines of all sizes, especially those above 400m, to avoid significant adverse effects on the combined AONB and Heritage Coast. As with Greater Gabbard/Galloper extensions of the arrays into this zone may also exacerbate adverse combined cumulative effects if the turbines are above 400m high due to the contrast in scale and spacing. In addition, turbines over 400m could contribute strongly to a curtaining effect on the skyline between existing and consented wind farms and to the north.	

Seascape zone No: 05	Suffolk Heritage Coast Offshore- North
Sensitivity	Medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations as a constraints buffer for turbines above 225m-400m high apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the	

existing development at Greater Gabbard/Galloper and East Anglia TWO. This would be likely to increase cumulative as well curtaining effects.

Seascape zone No: 06	Name: North Suffolk and Norfolk Inshore
Sensitivity	Medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations for offshore windfarms apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale acutely with existing development at Scroby Sands. This would be likely to increase cumulative effects.	

Seascape zone No: 07	Name: North Suffolk and Norfolk Offshore
Sensitivity	Medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations for offshore windfarms as a buffer for turbines over 350m high clearly also applies to turbines over 400m. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale with existing development at Scroby Sands. This would be likely to increase cumulative effects.	

Seascape zone No: 08	Name: East Anglia Outer Offshore
Sensitivity	Medium/low
Additional comments relating to turbines above 400m to blade tip	

The comments made in the summary of recommendations for offshore windfarms apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the existing development at Greater Gabbard/Galloper where extensions are proposed and also East Anglia ONE North and East Anglia TWO. This would be likely to increase cumulative effects. In addition, turbines over 400m could contribute to a curtaining effect on the skyline between existing and consented wind farms and to the north.

A low magnitude of effect combined with a high sensitivity of receptor is relevant to visual buffers in the study area upto 40km. However, beyond this distance the influence of visibility modifiers as set out in **Figure 3** increase in significance. Therefore, a measure for significant effects is the medium magnitude of effect set out in **Table 1.** it is recommended that the following constraints buffers should be considered to guide development:

- Turbines 400+-425m high to blade tip- 42.5km buffer
- Turbines 425+-450m high to blade tip- 45km buffer
- Turbines 450+-500m high to blade tip- 50km buffer (although visibility may be less than 10%)
- Turbines 500m+-550m high to blade tip- 55km buffer (although visibility may be less than 10%)

Now that East Anglia TWO is consented this becomes part of the baseline. Any replacement of turbines within the windfarm extent should also be subject to the above buffers due to potential contrasts in scale with consented turbines.