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Dear Kay, K-J

Please find attached the 11th instalment of documents.

Best regards,
Dr Dominika Chalder PIEMA
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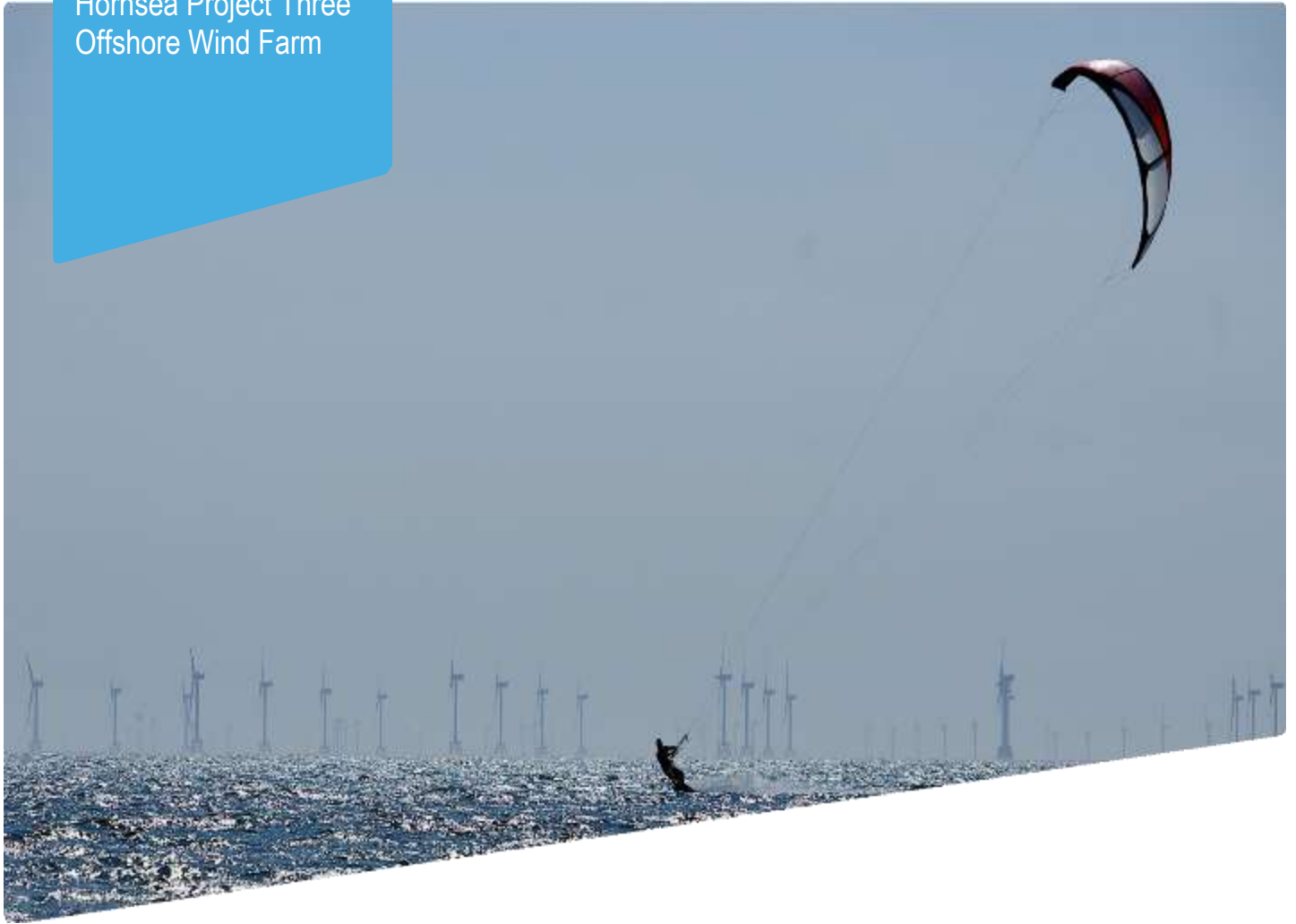
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Hornsea Project Three Offshore Wind Farm

Appendix 40 to Deadline 4 Submission
– Chris McDermott, IEMA Quality Mark Article

Date: 15th January 2019

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EIA Quality Mark Article



Predicting the growth of tree and hedge planting when determining the effectiveness of mitigation

Landscape mitigation for schemes in the UK is often provided in the form of native hedge and tree planting. It is usual practice to predict the effect of such mitigation after set periods, such as 5 and 15 years after planting. To do this, forecasting is required of the likely extent of growth, and particularly height, for these periods. This is particularly important if preparing photomontages to show the effectiveness of the mitigation over time.

The Guide for Landscape and Visual Impact Version 3 (paragraph 4.42) states “*Assumptions about plant growth or other changes over time should be realistic and not over optimistic. The design concept for the mitigation has to have a good chance of being achieved in practice to be taken seriously by the competent authority.*” There are many variables active in achieving this, and this article explores the issues that must be considered.



Predicting plant growth and height over time

The growth of native trees and shrubs is influenced by many factors, such as soil type, climate, species, seasonal weather, maintenance and management. Much can be learnt from examining the conditions on a site. For example is the soil a lowland arable rich loam or a poor thin stony soil? Growth can be impeded if planting is to be on soils that have been compacted by construction activities – is amelioration possible? Is the site cold and exposed, or sheltered? Is the vegetation shaped by the wind? Are the leaves scorched by salt spray?

A good indication of likely annual growth at a site can be gained by examining the growth patterns of existing nearby vegetation. Annual extension growth is not difficult to measure on young trees or hedges in autumn when the fresh green or light brown shoots are easily distinguished from the older weathered bark of the previous season.

Certain species, such as willows, poplars and alders have a ‘*sustained*’ growth pattern and can grow continuously throughout the growing season, extending up to 200 cm if conditions are favourable. Other species, such as oak and conifers, have growth patterns which are ‘*preformed*’ from bud development that has taken place in the previous year. They tend to put on a 20 – 60 cm growth surge in spring and then slow down.

Whilst it may be tempting to plant faster growing sustained growth species for quick effect, it is often preferable to plant species typical of the location or which support ecological objectives. While planting a solid line of willow or poplar will rarely be appropriate, temporary use of fast growing ‘nurse species’ (to be removed later) to provide shelter for slower species could be considered. Preformed growth species are usually longer lived and stronger than sustained growth species.

Extension growth also varies depending upon the maturity of the plant. Newly planted trees can require 2 -5 years to overcome the shock of being transplanted. Once established, however, they can go through a phase of maximum extension growth before slowing towards maturity. Browsing by deer, drought and disease can further limit growth. Good management is important. Grass growing around the base of new planting can restrict growth to a significant degree and, if plants are planted densely and not thinned, competition will reduce growth.

To establish a good thick twiggy hedge it will be necessary to clip it annually and therefore increase height slowly. Since hedges often only need to be 2-3 m high (above head height) to provide effective mitigation, this is not necessarily problematic. Such a hedge can be achieved in 4 years in the right conditions, but 5-7 years is probably a good estimate.

Is there a rule of thumb with so many variables?

Newly planted stock is unlikely to have any significant screening effect in Year 1 since it is typically planted as 60-80 cm high transplants. It can be useful to include some feathered trees and standards 2-3 m in height for a more instant effect. Stakes and shelters could be considered to have a negative visual effect.

Given that most UK mitigation planting will be of mixed natives in largely unexposed conditions, an average annual growth of 30 cm/year in the first 5 years can normally be assumed. Once established, growth rate will increase and circa 50 cm/year for the next 10 years can be anticipated. If planted as transplants, this gives a height of 2-2.5 m in the first year and 7-7.5 m after 15 years. For more exposed locations it is recommended that annual growth is calculated by taking clues from the existing trees and hedges in the locality.

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