Morlais Project

Metocean and Physical Processes ES Supplementary Note

Applicant: Menter Môn Morlais Limited

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1 Introduction

Following Natural Resources Wales (NRW) review of the metocean conditions and coastal processes chapter of the Morlais Project Environmental Statement (ES), and two subsequent meetings of the Physical Processes Working Group (12th December 2019 and 24th January 2020), NRW have requested a supplementary note expanding and explaining the conceptual analysis approach to the baseline understanding and construction effects used in the ES. This note is a response to all the NRW comments that are not covered by a new numerical modelling completed by HR Wallingford (2020). However, reference is made to the modelling where appropriate. The note is structured in a question (bold italic)/answer format and is divided into three parts; baseline understanding, conceptual assessments of construction effects and other issues.

2 Baseline Understanding

NRW raised concerns with respect to the baseline understanding which are broken down here into three main elements.

2.1 Baseline characterisation of suspended sediment concentrations

Using an Irish Sea broad-scale assessment of suspended sediments over 20 years old for site characterisation of the MDZ is not appropriate to characterise the existing environment

The use of existing data is proportionate to the potential effects on suspended sediment concentrations because most of the site (apart from megaripples in the southwest) is exposed rock or rock covered by a veneer of coarse sediment. In these environments, the potential for release of sediment into the water column as a plume is very limited as the sediment is too coarse to be lifted off the bed. The highly dynamic environment with tidal current velocities exceeding 2m/s also means that any fine sediment is swept away from the development site very quickly. Also, ambient suspended sediment concentrations are unlikely to change over time and so the collection of new data would not add value and the use of old data is justified.

Clarity is required on the location and magnitude of the Anglesey Turbidity Maximum

Ellis et al. (2008) and Robins et al. (2014) showed that satellite visible band, *in-situ* optical data and measured suspended sediment concentrations reveal significant features in the distribution of surface suspended sediment in the Irish Sea. Areas of consistently higher concentration than the average suspended sediment concentration are observed in geographically fixed locations. One of these turbidity maxima lies to the north and west of Anglesey. The surface concentrations in excess of 10 mg/l compare to background levels in the surrounding water of 3-4 mg/l. Hence, the term ‘turbidity maximum’ to describe the feature is a misnomer, because although it is a maximum in the sense that it is measurably greater than the surrounding areas, the maximum concentrations remain very small. A figure showing the modelled location and magnitude of the so-called 'Anglesey Turbidity Maximum is shown in Figure 2.1 in terms of peak suspended sediment transport (Robins et al., 2014). This figure can also be used to support the baseline suspended sediment concentration assessment as the data defining the Anglesey Turbidity Maximum extends across the MDZ.

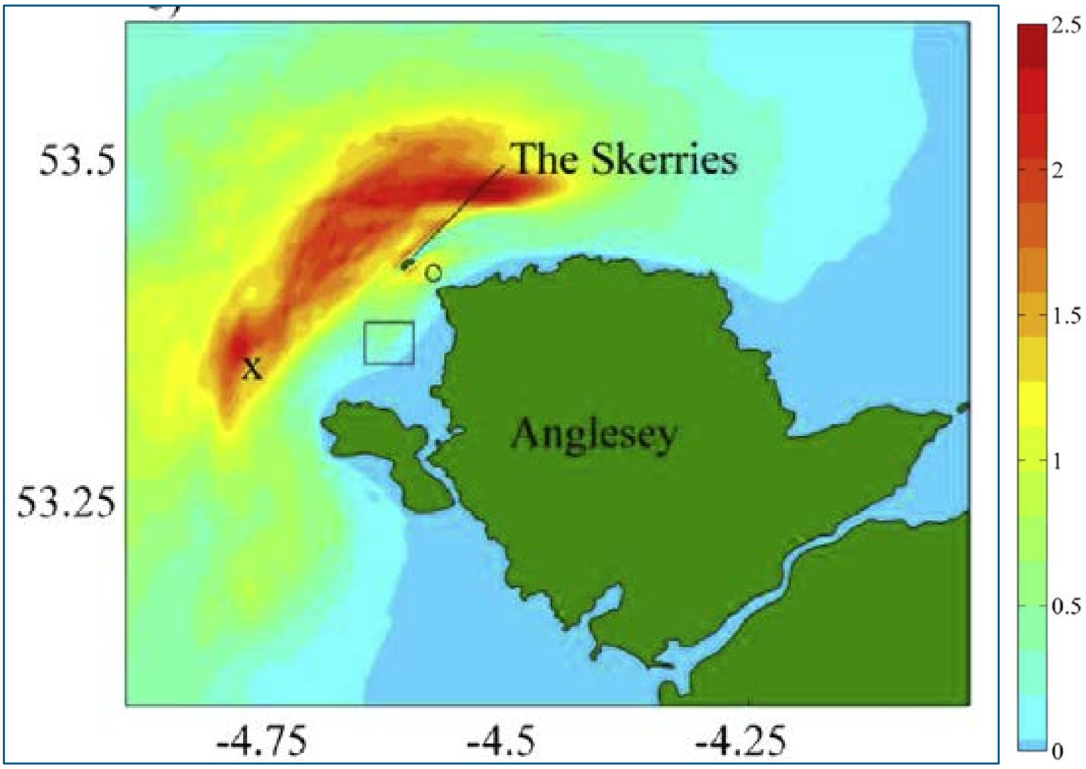


Figure 2.1. Peak suspended sediment transport (m^2/s) x is a modelled location in the original paper (Robins et al., 2014) from which this figure is extracted and not of relevance to this discussion

Ellis, K.M., Binding, C.E., Bowers, D.G., Jones, S.E. and Simpson, J.H. 2008. A model of turbidity maximum maintenance in the Irish Sea. Estuarine, Coastal and Shelf Science, 76 765-774 (this was referenced in the ES chapter).

Robins, P.E., Neill, S.P. and Lewis, M.J. 2014. Impact of tidal-stream arrays in relation to the natural variability of sedimentary processes. Renewable Energy, 72, 311-321.

2.2 Baseline characterisations of sea bed composition and morphology

With respect to the baseline sedimentary environment, bespoke data was collected across the entire site including high-resolution bathymetry, sea bed texture and morphological features, and top-most sub-bottom geology. Drop-down camera and four grab samples were recovered at sites where it was possible to do so.

The applicant states there is 'High' confidence in the subtidal grab sample survey. NRW is concerned that only five samples were obtained and then can only find information on a further four through the ES. For a development of this size NRW would expect more coverage. Figure 7-2 shows 18 grab sites; clarification is required on why these aren't

included in the ES. Three of the grab samples discussed are labelled as video drop sites (15, 20, 42); clarification is sought on what this means

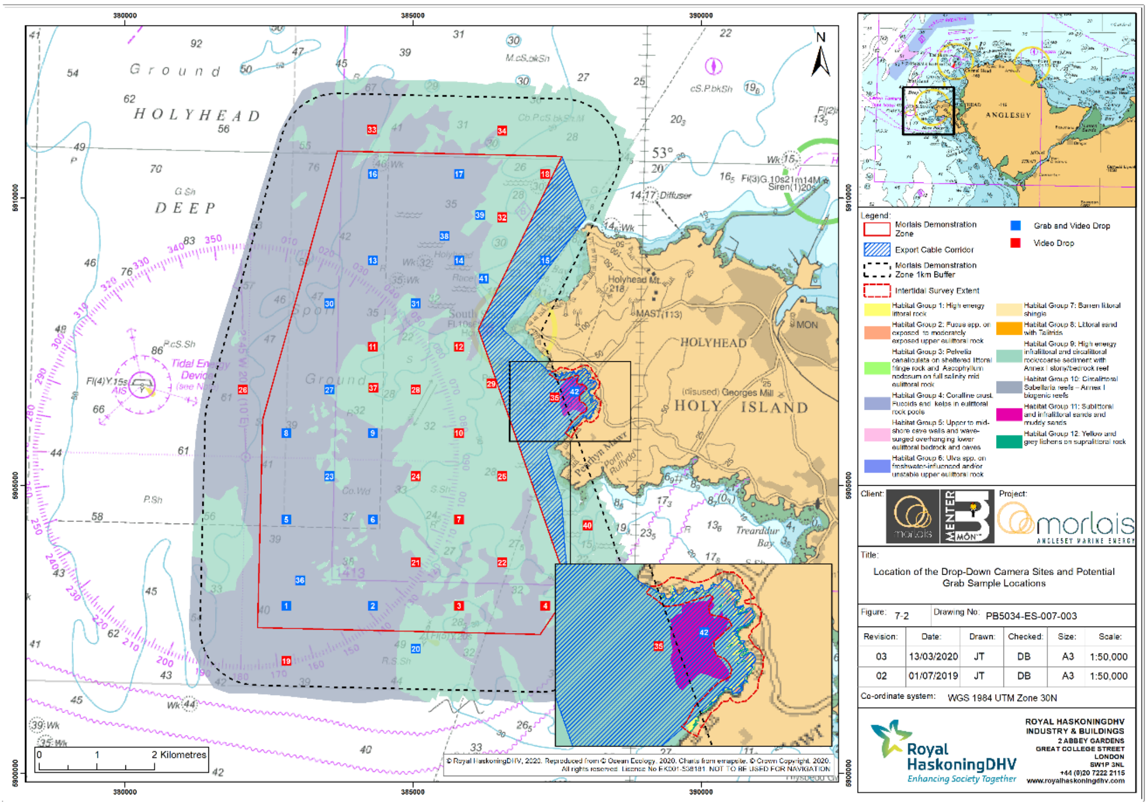
The sea bed sediment sampling methods used to support the ES were part of a targeted sampling plan, with the aim of ground truthing the acoustic data. The use of sediment grabs was planned at those locations where acoustic data indicated sediment was likely to be present.

There is high confidence in the samples that were collected and their analysis for particle size. Forty-two ground-truthing stations were targeted and sampled across the MDZ, buffer area and proposed cable corridors. At every ground-truthing station, a drop-down camera was deployed to collect sea bed imagery. Grab samples were initially considered at 18 stations (based on backscatter interpretation) to collect sediment samples for particle size distribution and for in-situ faunal analysis to inform subsequent biotope mapping. On review of the drop-down camera footage, it was deemed that only five of these 18 stations were suitable for grab sampling due to the hard substrate present, resulting in the acquisition of just four grab samples. The grab sites shown in Figure 7-2 are the proposed sites, not the actual sites, which number only four where sediment could be recovered. The five samples indicated in Table 7.9 is a typing error, it should be four. Grab samples 15, 20 and 42, have been wrongly labelled in Figure 7-2. They should be colour coded blue (grab and video drop), not red (video drop) and this has been changed on the figure.

Additional particle size data has now been acquired from SEACAMS which further supports the baseline characterisation in the ES.

The data presented regarding sea bed habitat type seem different to those presented in Appendix XI: Subtidal EUNIS Biotope Summary so clarification is also sought on this. In Figure 7-2 the grab sample retrieved from station 41 looks to be within the sand wave and is shown as 'surface mobile sands'. However, the analysis states it is 73% gravel and 27% sand. Clarification is sought on this

The underlying sea bed habitat type data was extracted from an existing subtidal habitat mapping web site (EMODnet) and does not relate to the new geophysical and sea bed sediment data collected for this assessment. Therefore, there is the potential for a mis-match between the existing and new data including station 41. Figure 7-2 has been updated to include the EUNIS and Annex I habitat mapping based on the information collected during the benthic survey (supported by the geophysical survey). The figure is provided below.



NRW requests clarification as to whether the grab survey was used to ground-truth the side-scan sonar

The side scan survey was ground truthed using both drop video and grab sampling. The side-scan sonar data was used to define locations to obtain sea bed sediment grab samples. Only a limited number of grabs were possible due to the hard substrate, but the four that were collected were then used to ground-truth the side-scan along with the drop-down video evidence. The side-scan sonar data also supports the evidence of the baseline description (i.e. mostly hard sea bed), and further samples would only confirm the same.

Partrac (2018) state "the size and shape of the bedforms makes it difficult to determine a long-term net transport direction as they are generally symmetric and change their geometry on different states of the tide". NRW would like further clarification of this as understanding the baseline environment is imperative to the assessment of change, but the above statement infers the applicant is unsure as to the baseline processes.

Bedforms of this type can be classified in terms of scale, morphology, orientation, and their relationship to the physical processes driving them. In general, smaller-scale bedforms are not in equilibrium with the processes driving them, in this case tidal currents, and so will reverse their asymmetry on every change in tidal current direction. They tend to form rapidly and normally possess a characteristic shape reflecting the short-term conditions of transport. Larger-scale bedforms tend to have equilibrium with the drivers and so would have a geometry reflecting the long-term tidal conditions. They would have an asymmetry driven by the net dominant tidal current direction. The bedforms at Morlais fall into the former category, so the dominant long-term migration direction is not reflected in the geometry of the bedforms. More clarity on bedload sediment transport rates and directions is now available from the results of the new modelling campaign completed by HR Wallingford (2020).

Reference

HR Wallingford. 2020. Morlais Demonstration Zone Coastal Processes. HR Wallingford Report DER6261-RT001-R01-00, March 2020.

2.3 Understanding the morphodynamics of the sand ridge/sand wave to the north of South Stack

Include an improved baseline understanding of the sand ridge/sand wave to the north of the zone including its dynamics and function/role in the system

A detailed section on the baseline morphodynamics and functioning of the sand ridge/sand wave to the north of South Stack and its effects on local morphological conditions and connectivity in terms of sediment transport/budget to adjacent areas, is now available from the results of the new modelling campaign completed by HR Wallingford (2020). A summary is provided here.

- The sand ridge is a banner bank created by large-scale eddies in tidal flow around the South Stack headland;
- The banner bank is composed of gravel and coarse sand;
- Overall, the bank has maintained its position between 2014 and 2018 (observation period) but with seasonal and inter-annual variability in bed levels;
- Changes in bathymetry over the bank are +/-5m on either side of the crest decreasing to +/-1m on the flanks for a variety of observation periods;
- The crest position has varied both intra- and inter-annually; and
- The offshore end of the bank has fluctuated in its movement exhibiting migration to both the northwest and southeast over different periods.

3 Conceptual Assessment

NRW queried the validity of using a conceptual approach to assess construction effects of the development site.

3.1 Conceptual assessments of construction effects

Construction Impact 1: Changes in Suspended Sediment Concentrations During Foundation Installation in the Project and Construction Impact 2: Changes in Sea Bed Level (Morphology) Due to Deposition During Foundation Installation in the Project - NRW disagrees with the magnitude of effect being 'Negligible'. Only one foundation has been considered equating to 1020m3. If this is scaled up for 620 devices there could potentially

be >600,000m3 of sediment displaced; although this appears unlikely due to the nature of the environment, it is unclear what NRW should consider as the worst-case scenario. NRW requests clarification on where this sediment will go and how it will behave when suspended in the water column. Provide clarity on the sediment released during device installation

The maximum number of foundations that could be installed using drilling is 290 and the maximum total volume of sediment is 117,780m^3[1], however due to the sequencing of construction it is not possible that this volume would all be released at the same time. A maximum of two concurrent drilling activities is expected.

The release of approximately 1,020m^3 of sediment per device would be composed of a mix of fine, medium and coarse sediment depending on where the drilling takes place across the zone. As a worst-case scenario, for dispersion of sediment into the water column and its subsequent deposition on the sea bed (Construction Impacts 1 and 2 in ES Chapter 7), it is assumed that 100% of the sediment (1,020m^3) is suspended during every campaign of drilling. This is a very precautionary estimate of fine sediment release given that a large part of the sub-sea bed will be composed of rock that would break down into larger aggregated clasts that would fall directly to the sea bed in the vicinity of the foundations. This sediment would form a passive plume which would become advected by tidal currents and some of it would deposit on the sea bed.

The worst-case 1,020m^3 of fine sediment release at each foundation (or 2,040m^3 for two concurrent drilling activities) is likely to fully disperse before the next release of sediment into the water column. Given the very low concentrations of suspended sediment released at each device and the very high energy environment in which the release occurs (tidal currents are very strong across the MDZ), all the sediment would be dispersed along the axis of tidal flow and reduce rapidly to background levels before the next release takes place. Hence, the subsequent release of sediment enters a water column that is back to the ambient conditions prior to the previous release. So, even though the total amount of sediment released into the water column as a worst-case scenario is high (117,780m^3), because the releases are spaced apart and are not simultaneous means the overall cumulative magnitude of effect is negligible, both in the water column as suspended sediment and as changes to bed level through deposition.

This conceptual assessment of changes to suspended sediment concentrations and bed levels is supported by the findings of a review of the evidence base into the physical impacts of marine aggregate dredging on sediment plumes and sea bed deposits (Whiteside et al. 1995; John et al. 2000; Hiscock and Bell 2004; Newell et al. 2004; Tillin et al. 2011; Cooper and Brew 2013). This review identified that the highest suspended sediment concentrations associated with dredging occur for only a short duration and remain local to the point of sediment release into the water column, while within the wider licensed dredge area concentrations typically remain

[1] Worst-case drilled pin pile footprint based on 240MW deployment achieved using 290 tidal devices and 120 hubs to maximise the footprint: 80 devices @ 4 x drills of 2.6m diameter (21m^2) each device; 120 devices @4 drills of 1.2m dimeter (4.5m^2) per device; and 90 devices @ 3 drills of 2.6m diameter (15.9m^2) per device; then 60 large hubs @ 3 drills of 2.6m diameter (15.9m^2) per hub; and 60 small hubs @ 4 drills of 2.6m diameter (21m^2) per hub. Total area = 5,889m^2 x 20m depth of drilling

modest. Whilst lower concentrations extend beyond licensed dredge areas, along the axis of predominant tidal flows, the magnitudes are indistinguishable from background levels.

Construction Impact 3: Changes in Suspended Sediment Concentrations During Offshore Export Cable Installation (including Nearshore and Landfall) - NRW disagrees with the magnitude of effect being 'Low' across the sand ridge and 'Negligible' elsewhere. The baseline suspended sediment environment is not adequately assessed and information on proposed activities is minimal and unclear. It is therefore not possible to assess Construction Impact 3 at present

The export cables will be laid on the sea bed across the zone, with some burial closer to the coast. Menter Môn has agreed that the cable will also be laid to bypass the sand ridge/sand wave to the north of South Stack. Hence, there will be no jetting of the sand ridge/sand wave for the purposes of cable burial.

The justification for the proportionate use of existing suspended sediment data is provided in Section 2.1 of this note. However, because jetting is now excluded from the export cable construction design, the potential need for a detailed quantification of ambient suspended sediment concentrations is also significantly reduced, with the only construction activities across the offshore zone being to lay either the cable on the sea bed, or cable protection on the sea bed. Neither of these activities across the zone would release suspended sediment in to the water column because of the rock or coarser sediment nature of the bed. Closer to the coast, some areas of sea bed are covered with sand and the cable could be buried along a short length. The worst-case volume for release of suspended sediment during excavation for the nearshore burial trench would be 2,400m^3. This is a precautionary estimate of fine sediment release given that a large part of the sea bed in these areas will be composed of sand that would not be suspended (or only suspended for a short distance) but would settle back to the sea bed close to the cable. This sediment would suffer the same fate as the sediment released by the devices in the high energy coastal zone. It would be dispersed rapidly by waves and nearshore currents back to ambient concentrations. Hence, the magnitude of effect in the nearshore zone is negligible. Also, the release of 2,400m^3 of sediment would be a one-off and not repeated.

Construction Impact 4: Changes in Sea Bed Level Due to Offshore Cable Installation (including Nearshore and Landfall) - NRW disagrees with the magnitude of effect being 'Negligible'. Not enough information is quantified on sediment displacement (depth of cable burial or sediment displaced from jetting/mass flow excavators/dredging) to be able to understand the scale of potential impacts. Similar studies are quoted but no evidence or reference given. It is therefore not possible to assess Construction Impact 4 at present.

As discussed above no jetting of the sand ridge/sand wave will occur. Hence, the only effect on suspended sediments and subsequent deposition may be excavation for burial of the cable towards the coast. The release of sediment would be a one-off, small magnitude and would become dispersed to ambient concentrations very quickly. Deposition on the bed from this dispersal would be minimal, and even if sediment was deposited during intermittent lower energy conditions, it would be re-suspended during the next high energy event. Hence, over a period of hours to days, the thickness of sediment deposited from the very small plume would be effectively immeasurable because it would be winnowed away in the high energy environment. Hence, the magnitude of effect is negligible.

In addition to the aggregate dredging studies described earlier to support the effects of device installation, the types and magnitudes of effects that could be caused by cable installation have previously been assessed within an industry best-practice document on cabling techniques (BERR 2008). This document has been used alongside the conceptual assessment of site conditions to inform the assessment presented.

BERR. (2008). Review of Cabling Techniques and Environmental Effects applicable to the Offshore Windfarm Industry.

Construction Impact 5: Changes in Suspended Sediment Concentrations During Inter-Array Cable Installation - NRW disagrees with the magnitude of effect being 'Negligible'. The baseline suspended sediment environment is not adequately assessed and information on proposed activities is minimal (sediment displacement and depth of cable burial are unclear). It is therefore not possible to assess Construction Impact 5 at present.

The only construction activities across the offshore zone are to lay either the inter-array cable on the sea bed or cable protection on the sea bed. There will be no excavation to create a trench for burial of the inter-array cables, with most of them laid on the sea bed. The surface-lay activities would not release suspended sediment in to the water column because of the rock or coarser sediment nature of the bed. Hence, the need for a detailed quantification of ambient suspended sediment concentrations through new data collection is not necessary and would be disproportionate to the potential effects. A broad-scale view using existing (albeit older) data is considered appropriate and proportionate. Because the construction activities will not release sediment into the water column, the magnitude of effect is negligible (regardless of ambient suspended sediment concentrations).

Construction Impact 6: Changes in Sea Bed Level Due to Inter-Array Cable Installation - NRW disagrees with the magnitude of effect being 'Negligible'. There is not enough information presented to assess Construction Impact 6 at present.

Because the construction activities for inter-array cables will not release sediment into the water column, there will be no changes in bed levels due to deposition. Hence, the magnitude of effect on the sea bed is negligible.

Construction Impact 7: Changes in Sea Bed Level Due to Indentations During Installation in the Project - NRW disagrees with the magnitude of effect being 'Negligible'. There is not enough information presented to assess changes to the geomorphological receptors, such as; position, duration, size and frequency to assess Construction Impact 7 at present.

There is potential for certain vessels used during the installation of the devices and cable infrastructure to directly impact the sea bed. This applies for those vessels that utilise anchors to hold station and to provide stability for a working platform. Where anchors (and associated chains) have been inserted into the sea bed (where it is possible to do so) and then removed, there is potential for an indentation to remain, proportional to the dimensions of the object. The worst-case scenario is the use of anchors. There is no intention to use jack-up vessels.

A single anchor would have a footprint of approximately 3 x 5m. The effects of the anchors on waves, tides and sediment transport would be localised since they are small and would only be temporary. Once the construction activities are complete the anchors would be moved on and no permanent effects on physical and sedimentary processes would remain. Hence, the magnitude of effect is negligible.

Decommissioning Impact 1: Changes in Suspended Sediment Concentrations During Device and Hub Removal in the Project and Decommissioning Impact 5: Changes in Suspended Sediment Concentrations Due to Removal of Inter-Array Cable - NRW supports the full removal of all infrastructure from the marine environment, even if this causes a temporary increase in suspended sediment as it is deemed this is more acceptable than a long-lasting legacy of what is essentially marine litter. Although NRW agree that the impact is less than for construction, an appreciation of scale, temporal and spatial extent would be expected

The volume of sediment disturbed and released into the water column would be significantly less than 1,020m^3 per device estimated for the drilling activities during installation. Extraction of each device would take place mostly above the bed and volumetric disturbance of sea bed sediments would be immeasurable. The spatial extent of the effect would be local to each removal activity as the disturbance of sediment at the removal of one device/section of cable would not overlap the disturbance of removal of a subsequent device/section of cable. The temporal scale of device removal is unknown at this stage, but as worst case scenario, it is assumed to take approximately 1.5 times the duration of the construction activities.

Decommissioning Impact 2: Changes in Sea Bed Level (Morphology) due to Device and Hub Removal, Decommissioning Impact 4: Changes in Sea Bed Level Due to Removal of Offshore Cable (including Nearshore and Landfall), Decommissioning Impact 6: Changes in Sea Bed Level Due to Removal of Inter-Array Cable and Decommissioning Impact 7: Changes in Sea Bed Level Due to Indentations in the Sea bed - NRW agrees that these impacts are likely to be negligible.

Noted

Decommissioning Impact 3: Changes in Suspended Sediment Concentrations Due to Removal of Offshore Cable (including Nearshore and Landfall) - NRW requires clarification of the method of installation to be able to assess removal regarding the sand ridge to the north.

The export cable will now bypass the sand ridge/sand wave to the north of South Stack. Hence, the removal of the cable will not require excavation and disturbance of the sea bed will be minimal.

3.2 Conceptual assessment of operational effects on suspended sediment concentrations

Provide a high-level appraisal of the effects on suspended sediment concentrations caused by the changes in tidal current velocities during operation.

Operational changes to ambient suspended sediment concentrations are not typically assessed. The focus was on construction changes where elevated suspended sediment concentrations could occur through disturbance of the sea bed. Also, it is likely that even after installation of the devices, the current velocities would still be high enough to keep the existing sediment in the water column in suspension, and it would not settle. More clarity on suspended sediment concentrations during operation is now available from the results of the new modelling campaign completed by HR Wallingford (2020).

4 Other Issues

4.1 Experience of other schemes

Provide references to existing work on offshore wind farms that supported the conceptual assessment of effects on waves. Reference is made to 'experience of other schemes' or 'previous similar projects' when making a qualitative assessment on impacts but no evidence is provided to support these statements.

At the request of NRW, an assessment of waves (as well as tidal currents and sediment transport) has been completed as part of the new numerical modelling campaign of HR Wallingford (2020). Hence, reference to other schemes will be removed as there will now be a bespoke assessment.

4.2 Climate change

It is unclear how climate change and waves have been accounted for within the ES. Include more discussion of in the ES chapter. NRW would like clarification on the location of the sea level rise indication and believe it would not be too onerous to extrapolate to the entire project lifetime. It is noted that no extreme H++ scenario is characterised. It is also unclear how climate change scenarios have been used within the ES to discuss impacts.

UKCP18 data has been used in the projection of sea-level rise to 2050. Additional data is included below to extend this period to the anticipated project life time of 37 years (2061). An assumption is made that operation will begin in 2024.

The UK Climate Projections (UKCP18) user interface for the model grid cell that covers Holyhead is shown in Figure 4.1. UKCP18 relative sea-level rise estimates use 1990 as their starting year and are based on the IPCC 5th Assessment Report. They are available for low (RCP2.6), medium (RCP4.5) and high (RCP8.5) emissions scenarios and presented by UKCP18 as central estimates of change (50% confidence level, 50%ile) in each scenario with an upper 95% confidence level (95%ile) and a lower 5% confidence level (5%ile).

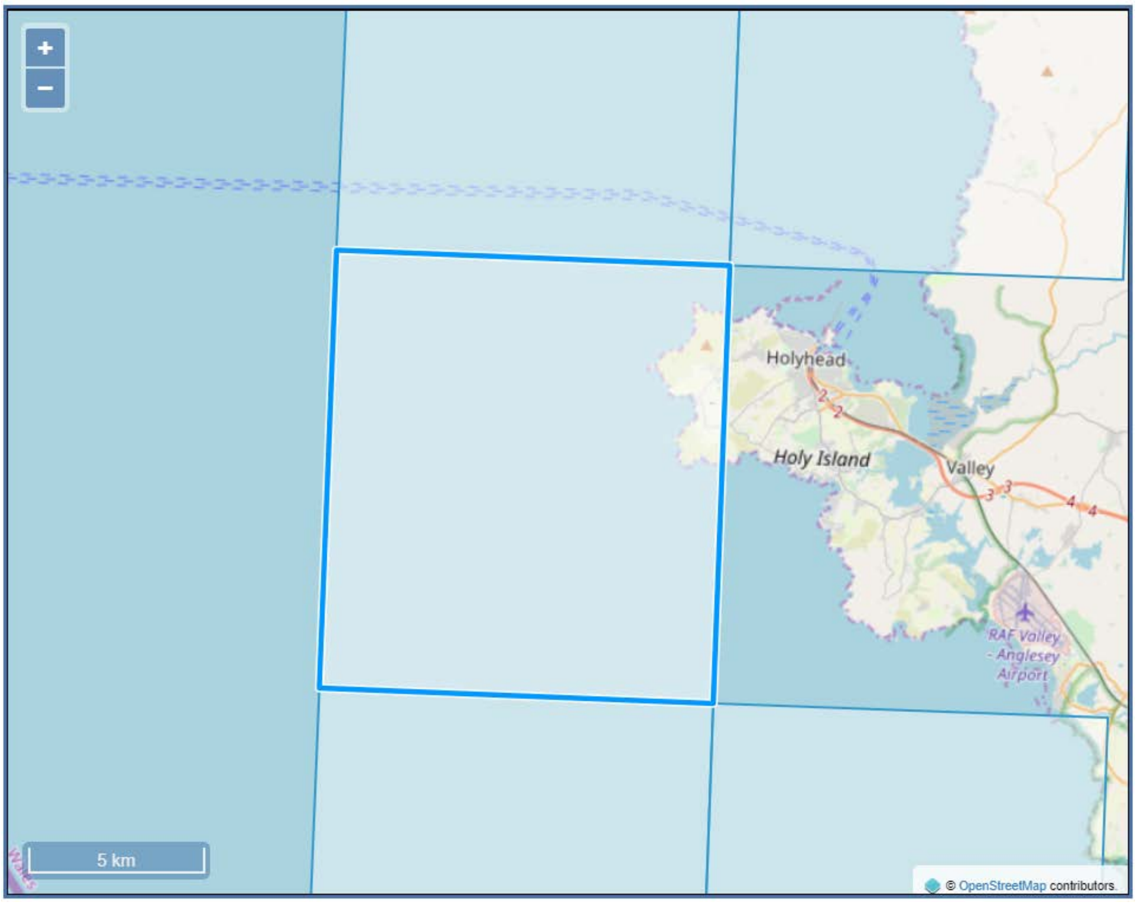


Figure 4.1. UKCP18 model grid used to derive sea-level rise projections for Holyhead

Relative sea-level rise projections using the 50%ile of the medium (RCP4.5) emissions scenario and the 95% of the high (RCP8.5) emissions scenario from the UKCP18 user interface are used in this assessment. Table 4.1 describes changes in relative sea-level at Holyhead using 1990 as the starting year.

Table 4.1. Changes in relative sea level (m) under the 50%ile medium (RCP4.5) and 95%ile high (RCP8.5) emissions scenarios using 1990 as the starting year

Year	Medium emissions 50%ile (m)	High emissions 95%ile (m)
1990	0.0	0.0
2007	0.022	0.036
2010	0.031	0.049
2020	0.064	0.100
2030	0.102	0.162
2040	0.143	0.241
2050	0.189	0.335
2060	0.237	0.444
2070	0.287	0.571
2080	0.337	0.709
2090	0.385	0.862
2100	0.433	1.020

Using 2024 as the baseline for the start of operation, and an assumption that the 34 years of relative sea-level rise between 1990 and 2024 has already taken place, then the projected relative sea-level rises using a 2024 baseline are shown in Table 4.2 and Figure 4.2. Relative sea-level rise in 2061 (lifetime of project) for medium (RCP4.5) emissions 50%ile is estimated to be approximately 0.164m. This equates to an average sea-level rise of 4.4mm/year over 37 years. For high emissions 95%ile, relative sea level rise in 2061 is estimated to be approximately 0.332m. This equates to average sea-level rises of 9.0mm/year over 37 years.

Table 4.2. Changes in relative sea level (m) under the 50%ile medium and 95%ile high emissions scenarios using a 2024 baseline

Year	Medium emissions 50%ile (m)	High emissions 95%ile (m)
2024	0.0	0.0
2030	0.024	0.039
2040	0.065	0.117
2050	0.111	0.211
2060	0.159	0.320
2061	0.164	0.332

2070	0.209	0.447
2080	0.259	0.585
2090	0.307	0.738
2100	0.355	0.898

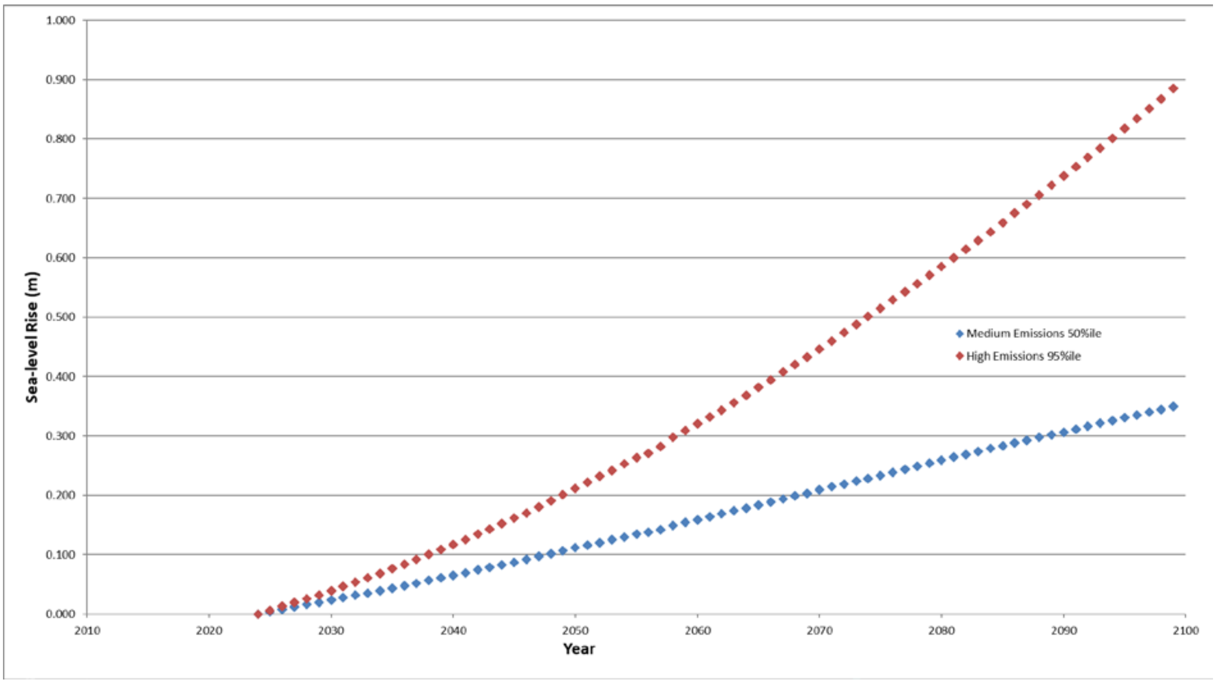


Figure 4.2. Changes in relative sea level (m) under the 50%ile medium and 95%ile high emissions scenario using a 2024 baseline

The extreme scenario is now accounted for in the RCP8.5 95th percentile scenario projection. With respect to the extreme H++, the divergence of future projections up to the design life of the project will be provided and implications discussed. Over the short- to medium-term (i.e. including the lifespan of the development) there is much greater certainty about future climate projections, so issues such as different scenarios and different percentiles used only become pertinent over longer time scales (e.g. over 100 years).

With respect to impacts (the new modelling campaign with sea-level rise included), the latest guidance (UKCP18) on climate change predicts changes in sea-level rise which are a magnitude that will have no effect on the outputs of the hydrodynamic model. Hence, they will not be incorporated in the model. With respect to waves, UKCP18 sets no discernible trend in future wave climate, so there are no plans to incorporate them in the wave model, but a few sensitivity tests could be carried out.

4.3 Near-field and far-field zones of influence

The near field and far field envelopes need further discussion. It is unclear what is the 'near field' and what is the 'far field' when discussing scale of impacts. The near-field and far-field zones have not been quantified or discussed fully. We would expect all sensitive areas within the sediment sub-cell (Dinas Dinlle to Great Orme) to be scoped in to the EIA until evidence could discount effects (as per TAN 14 guidance).

The Dinas Dinlle to Great Orme sediment cell contains Anglesey and so the landfall site. With respect to sensitive areas, Holy Island Coast SSSI / SAC and Anglesey AONB are both scoped in and effects on suspended sediment concentrations, bed levels and bedload sediment transport described in the chapter.

TAN 14 guidance is general guidance for Local Planning Authorities and indicates that sediment cells (Dinas Dinlle to Great Orme in this case) should be the basis of understanding coastal issues for planning purposes accompanied by general statements on what to look for in terms of coastal processes impacts. These elements are covered in the chapter without specific reference to TAN 14.

We have defined near-field and far-field as:

- Near-field: the area within the immediate vicinity (tens or hundreds of metres) of the Project and along the offshore cable corridor; and
- Far-field: the wider area that might also be affected indirectly by the Project (e.g. due to disruption of waves, tidal currents or sediment pathways).

So effectively, anything is far-field that is over about 500m from the cable corridor boundary and the devices at the perimeter of the MDZ. However, a distinction between near- and far- is not really needed because wherever the sensitive areas are relative to the Project, they are assessed accordingly.

Water quality impacts to the east of Holy Island have not been fully considered. The Beddmanarch Bay Shellfish Water (SFW) is a protected area under the Water Framework Directive (WFD) and is within 2km of a development site, but is not included in the ES Volume II, Figure 8-1, nor is it mentioned in Volume I, Chapter 17 of the ES. Holyhead Strait WFD waterbody may be impacted by water quality issues due to works on Holy Island but is not mentioned in the ES Volume I, Chapter 8. Please note that our wider comments on the Water Framework Directive assessment are presented elsewhere in this Annex.

Beddmanarch Bay is east of Holy Island which is many kilometres away in terms of a water connection (Figure 4.3). So, it was excluded based on distance. The numerical modelling is likely to show that there will be no change to physical processes at this location due to the development.

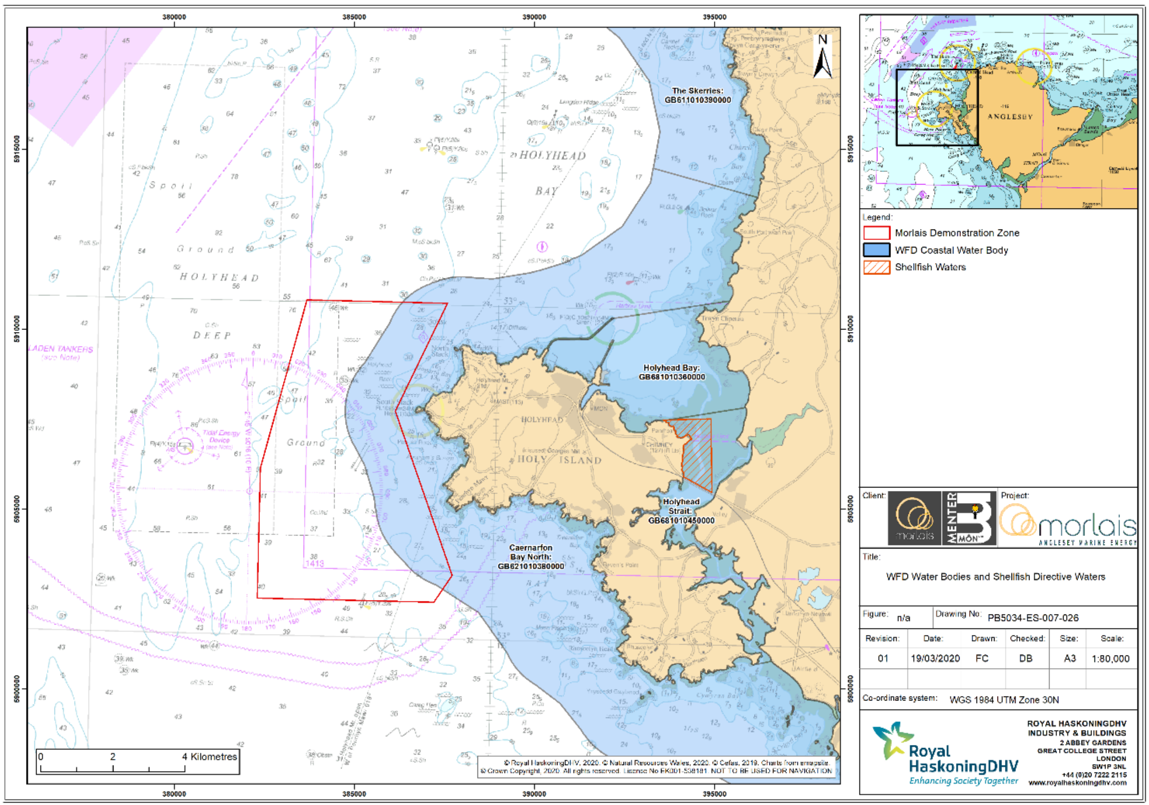


Figure 4.3. WFD water bodies and shellfish directive waters

Figure 7-7: There are SAC and SPA missing from this figure. Provide clarity on Figure 7.7 as to why not all designated sites have been included.

Figure 7.7 shows only the receptors of metocean conditions and coastal processes, not all the designated sites around the coast of Anglesey. These are those receptors that could potentially be impacted by the development from physical/sedimentary processes perspectives.

4.4 Conceptual model

No conceptual model has been produced regarding potential changes and effects. Provide the figure used by Wylfa summarising potential changes to physical / sedimentary processes.

The described geomorphological conceptual model for the area will be brought together in a set of summary figures representing waves, current regime, suspended sediment and bedload sediment transport. These will take a similar form to those produced for Wylfa.

4.5 Cumulative impacts

Chapter 7 does not consider Holyhead port expansion or Wylfa Newydd. All major projects within the sediment sub-cell should be considered.

Holyhead port expansion and Wylfa Newydd were excluded from the cumulative impact assessment based on distance. The new numerical modelling completed by HR Wallingford (2020) confirms that scoping out was correct as they are beyond the zones of influence of physical and sedimentary processes.

5 References

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