

PINS Ref	EN010049
NSIP	Tidal Lagoon Swansea Bay
Applicant	Tidal Lagoon (Swansea Bay) plc

SUMMARY OF THE CASE OF NATURAL RESOURCES WALES

AT THE ISSUE-SPECIFIC HEARING ON THE DRAFT DCO (31 JULY 2014)

1. This is a summary of the main points made by Natural Resources Wales (“NRW”) at the issue-specific hearings held in relation to the draft development consent order (“DCO”) on 16-18 and 23 September 2014. The Panel will be aware that discussions between the Applicant (“A”) and NRW are continuing on several main issues. An update on the current position will be provided in NRW’s further written representations to be submitted on 7 October 2014. This document is intended only to provide a record of the points made orally at the previous hearing and does not necessarily reflect the updated position on 7 October 2014.

Day 1: 16 September 2014

Agenda Item 5: Effect of the lagoon on coastal processes within Swansea Bay

5.2 Erosion

5.3 Further hydrological modelling

2. An opportunity to provide comments on the representations made by A on this issue at Deadline II (09/07/14) was given: a new Deadline III (05/08/14). However due to the substantial volume of information provided by the Applicant, on this and other issues, NRW did not provide detailed comments on the representations by Deadline III (apart from the Flood Consequence Assessment, and a response on the updated HRA issued to PINS on 12/08/14). By letter to the Inspectorate dated 05/08/14, NRW asked for a reasonable timescale to allow it to provide the Panel with detailed comments. In accordance with a procedural decision by the Panel, NRW will works towards providing a written response on key documents submitted by the Applicant for Deadlines II and III by the new Deadline IV: 07/10/14.

3. In summary, NRW was not satisfied that the coastal processes baseline was predicated on an adequate literature review, as seen in other EIAs carried out by large projects. The need for an adequate literature review was acute in this case given that the project would be is a first of its kind and so unlike any other previous marine/coastal marine NSIP which primarily has consisted of offshore wind and nuclear energy generation schemes.
4. Morphological modelling and assessments undertaken by A for sediment transport (mud and sand) had been subject to very limited assessment. A still suggested that its existing assessment provided enough certainty, but NRW did not agree that the number and type of modelling scenarios tested by the Applicant were adequate for EIA purposes. Of particular concern was:
 - (i) the number and type of mud and sand transport modelling scenarios undertaken;
 - (ii) aspects of project construction (e.g. improvements to the Neath Estuary training walls); and
 - (iii) the absence of any modelling of decommissioning options (e.g. a progressive breakdown of structure).
5. These omissions had, in turn, compromised the Applicant's Expert Geomorphological Assessment as it was based on the same inadequate baseline assessment and inadequate number of modelling scenarios. It is critical that uncertainty with the coastal processes assessment is dealt with by an appropriate mechanism. Further assessment could be done to reduce uncertainty and improve confidence in the predicted impacts of the EIA.

5.4 Potential physical consequences for [various locations]

6. NRW's concerns with the predicted physical impacts of the development are a direct consequence of the omissions in the baseline understanding and the assessment approach adopted by the Applicant. These concerns were outlined within NRW's Written Representations (see Section E1 and Appendix E1.1). Of primary importance is the Expert Geomorphological Analysis (EGA) undertaken to assess potential implications of the project over the medium to long term. This assessment tool is dependent upon the number and type of approaches used, the rigour of analysis undertaken, and the quality of the expert judgement made. NRW's preliminary view, which it will expand upon in its representations for Deadline IV, is that the EGA undertaken by ABPmer (A's lead consultant on the coastal processes assessment) is restricted by the limited baseline understanding, the use of a single

modelling tool, and the restriction to a small number of scenarios. For sensitive receptors (as listed within agenda item 5.4 (i)-(iii)), nearshore and shoreline sediment transport processes and morphological responses have not been presented to enable a greater understanding of the predicted impacts. No figures have been provided which summarise the conceptual understanding of the baseline condition of each of these receptors, or the potential changes which are expected (on the basis of EGA) to occur in the medium and longer terms if the lagoon is constructed. NRW's own consultant on coastal processes has undertaken an independent assessment of possible impacts of the project for Blackpill SSSI and Crymlyn Burrows SSSI, and has outlined potential issues for Kenfig SAC which is reported within our Written Representations (see E1.23- E1.24, pages 52-54, and Appendix E1.1- paragraphs 3.14 – 3.15 pages 14-15 (Figures 27 and 28)).

7. Essentially NRW's concerns with regards to the predicted impacts of the proposal were outstanding at the hearing on 16 September 2014. This presented a significant issue in relation to the AEMP which did not then address the independent assessment of predicted impacts. These issues inter-relate with other topic areas including Terrestrial Ecology and the HRA.

5.5 Mitigation and monitoring

8. A number of questions were previously asked by the Panel with regards to 'Adaptive Management', as documented within section 8 of the Panel's first round of written questions. Responses provided to these questions by interested parties, including NRW, for Deadline II (09/07/14) have been superseded to some extent by the Applicant issuing further iterations of the AEMP at Deadline II and more recently Deadline III (05/08/14). NRW is currently in the process of finalising review of the updated AEMP to determine if previous comments made are addressed or not and if any further comments are required. It will provide detailed commentary on this by 7 October 2014.

Agenda Item 6: European Sites/Habitats Regulations Assessment (HRA)

6.3 Kenfig SAC and issues relating to dredge disposal

9. In summary, on the basis of the HRA as it stood during the last hearings, adverse effects on the integrity of Kenfig SAC could not be ruled out and the monitoring measures detailed in the applicant's shadow HRA and AEMP were not adequate for the purposes of informing the

appropriate assessment. NRW's concerns related to the long-term plan for maintenance dredge disposal plan as set out within the main ES. At the hearing, A suggested that this issue did not need to be dealt with comprehensively within this DCO process given that consent for the maintenance dredging was not sought now, but would be sought in an application for a marine licence in some 20 years' time. NRW expressed concern about this approach from the perspective of appropriate assessment, as hiving off parts of the project that are integral to the project as a whole, runs significant risks in deferring decisions on such aspects to future consenting regimes. The risk for the Appellant is that it will build a 'stranded asset' which has been unable to gain a permission vital to its operation. The risk to the consenting body or regulator is that when consenting this future aspect of the project, the grant of consent will appear as a 'fait accompli' given that the costly infrastructure is already in place.

10. For these reasons, NRW would not be content with any suggestion that the issue of maintenance dredge disposal can be removed entirely from the DCO process, not least because A has also included this aspect of the project from the start, in terms of the ES and shadow HRA. NRW considered that an 'early warning' monitoring and a package of precautionary mitigation measures could be further developed and secured by A to allow a positive appropriate assessment to be recorded in this DCO process, but this will require further work. (A and NRW have been in further discussion about this issue since the hearings. NRW will update its position in its written submissions for Deadline IV).

6.4 Porpoises and HRA

11. There are no European sites featuring harbour porpoise in the marine mammal management unit within which the development site falls. As such, there is no requirement to carry out an HRA for this species.
12. NRW is currently awaiting the conclusion of research commissioned by the Joint Nature Conservation Committee (JNCC) on harbour porpoise distribution and abundance. This will determine whether it is possible to identify areas of persistent high density for harbour porpoise in UK waters that could assist in the identification of SACs for the species. Swansea Bay and the wider area may form an 'area of search' in this process. Once complete, NRW will be in a position to discuss with Welsh Government how to analyse the suitability of Welsh waters for SACs for harbour porpoise.

13. NRW recommends that the developer carry out a thorough assessment of measures to mitigate potential adverse effects on harbour porpoise, to minimise the risk of additional conditions or restrictions that would apply should any harbour porpoise SACs come into place during the lifetime of the project. However, NRW is satisfied that it is not necessary for the Panel to address a hypothetical future issue that is based on a scientific process that is currently confidential and has not yet progressed to site selection.

Day 2: 17 September 2014

Agenda Item 7: Other Protected Sites and Species

7.1 Impacts on marine mammals

14. The main impact on marine mammals is from percussive piling rather than vibro piling. There is the risk of auditory injury from percussive piling leading to hearing damage. It could also cause behavioural disturbance and displacement.
15. A has committed to standard JNCC mitigation protocols (2010) which should be sufficient to reduce disturbance. These include measures such as soft starts, mitigation zones, the use of marine mammal observers, and passive acoustic monitoring. However, there is a lack of clarity on the piling schedule (i.e. location and timing). There is also no information about the procedure for piling during periods of low visibility.
16. NRW thinks collisions are likely, and that they could lead to injury and death. A has assessed the collision risk to marine mammals to be insignificant / minor adverse given the proposed mitigation. However, NRW is not satisfied that the mitigation is sufficiently detailed to enable an assessment of whether it is sufficient to minimize the risk of collision. Given the length of the operation, it is possible that populations of marine mammals will increase (grey seal population is currently increasing), thereby increasing the risk of collision further. There needs to be (i) an adaptive capability in the AEMP to deal with collision and (ii) a commitment to marine mammal monitoring in the DCO.
17. A had not applied for an EPS licence at the time of the hearing, so NRW could not comment further on this.

7.2 Kenfig SSSI & National Nature Reserve

18. NRW was satisfied that neither of these designations raised any issue that was not already being discussed in the context of the Kenfig SAC.

7.3 Blackpill SSSI

19. With respect to ornithology, NRW is concerned about the potential effect of Tidal Lagoon Swansea Bay (TLSB) altering the intertidal habitats within the Blackpill Site of Special Scientific Interest (SSSI). This in turn could affect the qualifying bird features Sanderling (*Calidris alba*) and Ringed Plover (*Charadrius hiaticula*), which rely upon these habitats for feeding.
20. NRW still considers that there is considerable uncertainty about the potential significance and potential change in mud deposition, as no further work has been completed on the coastal process modelling to change our position (see above).
21. A has taken on board NRW's comments about beach nourishment having a potential effect on the Sanderling feature of the SSSI. They suggest that if any beach nourishment is done, then it should be completed in a stepped approach focusing on small areas of beach each year. They also talk about taking sand from the Neath Training Wall so that it contains species which could re-colonize. However it is not clear that the applicant is proposing to use beach nourishment as a mitigation technique for the accretion of mud on to Blackpill SSSI and it is also unclear whether this technique if used could work.
22. In the updated AEMP, the applicant in chapter 5, Coastal Processes, table 5.1 page 29, only mentions beach replenishment in terms of excessive beach erosion but nowhere in this chapter mentions it in terms of mitigation for increased mud in the SSSI. However, in Chapter 10, Coastal birds, table 10.1, page 106 and Chapter 7. Benthic and intertidal ecology, table 7.3, page 50, both tables mention using beach nourishment in response to changes to the intertidal in Blackpill SSSI. This requires clarification.

7.4 Crymlyn Burrows SSSI

23. Crymlyn Burrows SSSI is notified for its sand dune and saltmarsh habitats and has these qualifying plant and invertebrate species features: sea stock (*Matthiola sinuata*), the strandline beetle (*Eurynebria complanata*), field wormwood (*Artemisia campestris*) and assemblages of notable or scarce vascular plants and dune invertebrates.
24. The key points raised in NRW's Written Representations WR regarding access management have been dealt with and/or can be satisfactorily covered through provisions in the DCO, OEMP and AEMP and we continue to engage with applicant on those.
25. Our concerns regarding the "alternative" cable route (Option 2) through Crymlyn Burrows SSSI have been dealt with in part through selection of the other option along Fabian Way Conservation verge. NRW is also satisfied that any outstanding concerns can be addressed through the relevant DCO requirements, in particular A's proposed expansion of Requirement 15, and through addressing our detailed comments on the CEMP and AEMP.
26. NRW's ongoing dissatisfaction with the adequacy of the coastal processes assessment is also relevant to assessing impacts on the Crymlyn Burrows SSSI. NRW has agreed on the predicted accumulation of sand outside the north-eastern corner of the lagoon (and would not consider this undesirable), but A does not appear to have recognised the full extent of the concerns relating to the potential reduction in dynamism of the foreshore and frontal dunes.
27. This underlines the need for appropriate mitigation options to be further considered and incorporated into the AEMP along with an agreed baseline monitoring. It needs to be clear that effective mitigation options are deliverable and secure/enforceable on the SSSI.

7.7 Sabellaria

28. A, by its own admission, accepts that the proposed *Sabellaria alveolata* reef translocation is 'experimental and not proven' (ES & Appendix 8.3, AEMP). NRW is not satisfied that the translocation plan is detailed enough at present, but on basis of what it has seen, it believes that it is unlikely to succeed for the following reasons, in summary:
 - (1) The trial translocation receptor site (West of River Tawe) is likely to be impacted by construction phase.

- (2) It is unlikely that the lagoon wall would be a suitable environment for the survival of *Sabellaria alveolata* reef.
 - (3) *Sabellaria alveolata* reefs settlement typically only occurs where larvae settlement is high and this is combined with availability of suitable habitat. The lagoon wall structure is unlikely to provide such habitat.
 - (4) Removal of *Sabellaria alveolata* reef from the existing environment is likely to destabilise the translocated blocks, and increase the likelihood of it washing away.
29. NRW advises that A should delay the translocation programme until further research is done to understand the specific ecology of all of the *Sabellaria* reefs within Swansea Bay. This should include larval dispersal modelling that tests potential changes in hydrodynamics and larval supply as a result of the development.
30. NRW also considers that A should also explore other engineering solutions related to the profile of the lagoon wall that could provide suitable areas and habitat for *Sabellaria* reef.
31. As to monitoring, the related monitoring plans are not detailed enough to enable a full commentary to be made, but NRW considers that it is not justified to undertake destructive monitoring methodologies when tried and tested alternatives are available for monitoring reef health and biodiversity.
32. Further detailed representations on this issue will be made by Deadline IV.

7.8 Benthic ecology

33. There has been a significant amount of additional information on this issue, mainly in the form of a revised benthic survey report and A's response to NRW's Written Representations. NRW's original concern whether habitats of conservation importance have been identified has been broadly resolved, but four other main concerns are outstanding:
- (1) Linking in to the general discussion about coastal processes, there is an unacceptable level of uncertainty about the long-term effects of the proposed lagoon structure, in particular that it could altering sediment deposition and transportation processes and lead to habitat alteration (e.g. possible changes from sandy to muddy seabed habitats). The coastal process assessments are still inadequate.

- (2) The proposed mitigation and enhancement will not compensate for the likely loss of habitat. In particular, NRW disagrees with the methods used to calculate changes in habitat extent. NRW does not agree that the lagoon walls will provide a benefit, because they will introduce artificial habitat into Swansea Bay. The proper way to look at this is to say that habitat *will* be lost beneath the footprint of the lagoon wall, but then to ask whether this loss is acceptable in the overall context of the potential benefits and impacts of the proposal. This needs to feed into the WFD assessment.
- (3) There is a lack of detail regarding decommissioning options, in particular the lack of consideration of any options other than leaving the majority of the lagoon structure in place.
- (4) Although the revised AEMP does provide more detail compared to the original document, it still requires more work, which NRW notes is ongoing. The key issue is that the questions that the monitoring aims to address need to be much more clearly defined. This should then provide a basis for a robust monitoring programme that answers those questions.

Agenda Item 8: Water Framework Directive (WFD) and Flooding

8.3 Water quality in the lagoon

34. The basis for assessing changing under the WFD must, in accordance with guidance (CIS, 2009) be against the water bodies which are currently in existence. It is necessary to consider the potential impacts of the project on the quality elements of the relevant waterbodies, and any potential deterioration of these quality elements; and also any potential impacts the project may have on the ability of waterbodies to achieve their environmental objectives.
35. A submitted an updated WFD Assessment on 5 August 2014. NRW acknowledge that A has made significant progress in the updated WFD assessment. The updated assessment acknowledges that there is a risk of deterioration to the benthic invertebrate quality element within Swansea Bay due to the hydromorphological changes to the water body brought about by the scheme. It is now also accepted that the scheme is incompatible with the WFD mitigation measures set out for the Swansea Bay water body in the Western Wales River Basin Management Plan. This reflects NRW's view, which means that there must be a derogation

made under Article 4.7 of the WFD for the project to be WFD compliant. NRW will advise the Panel as to its view on whether proper grounds for a derogation can be made out.

36. The WFD assessment still needs further work to ensure that the full extent of potential impacts, in relation to WFD, have been adequately assessed. Discussions are ongoing.

8.4 Flooding

37. Hydraulic modeling undertaken by A shows that the local wave climate within Swansea Bay will be changed by the construction of the lagoon. Under certain storm conditions the lagoon will cause an increase in wave heights along the Mumbles frontage, as a result of waves being reflected off the breakwater structure. Being of a low elevation, parts of Mumbles are considered to be at risk of coastal flooding.

38. A has commissioned an updated Flood Consequence Assessment to investigate the impacts of this increase in wave height, in terms of wave overtopping along the Mumbles seafront. A considers that its analysis suggests the impacts would be negligible and thus can be discounted.

39. NRW has raised concerns about the accuracy of A's analysis and therefore, at the hearing on 17 September 2014, could not agree with A's conclusion that the lagoon would not cause an increase in flood risk to the residents of Mumbles. TAN 15 states there should be no increase in flood risk as a result of a development.

40. Subject to logistical factors, it could *theoretically* be possible to mitigate any increase in flood risk at Mumbles (e.g. improvements to existing coastal defences). Discussions with A at the time of the hearing indicated that A would consider this further.

Day 3: 18 September 2014

Agenda Item 11: Commercial Fishing, Shipping and Navigation

11.1 Commercial fishing

41. NRW notes and welcomes the additional information which A has submitted to date on this issue. NRW's position remains, however, that we are unable to share the confidence in the predicted levels of impact on fish. NRW believes that not enough detail has been provided with regards to how data and references have been used in the assessment and how expert judgment has been made to reach overall conclusions and associated confidence levels.
42. First, the arrangement of turbines and sluices, sluice design and turbine operation has undergone significant changes since submission of the ES. NRW acknowledges the notes submitted by A on additional modelling of STRIKER v.4 for use in variable speed turbines and pumping, and notes submitted to clarify turbine/sluice arrangements. A has sought through these to demonstrate that worst case scenarios have been considered in the ES. In light of the submitted information however, NRW have further concerns and questions pertaining to the design and worst case scenarios, namely:
- (1) Will the sluices will be open on all tides and for what proportion of time? Will pumping will replace opening the sluices? What proportion of time pumping will operate and hence the updated STRIKER v.4 modelling mortality rates (with 73 rpm) would apply? NRW notes the intention to re-run the STRIKER v.4 modelling once Computational Fluid Dynamics (CDF) data are available for the selected turbine design and welcome the offer of sharing the results with NRW.
 - (2) NRW also seeks clarification in relation to whether all turbines will follow the same operational pattern, i.e. have the same rotational speed and operate for the same amount of time, or whether some turbines will be shut off at times. As numbers of turbine encounters vary with location (see section below) preferential operation of for instance westerly turbines, could affect the calculated mortality rates.
 - (3) The basis on which the relative proportion of fish passing through the sluices has been calculated in the modelling and how sluice mortality has been taken into account is unclear.
 - (4) Further clarification as to the number of fish crossing through East/West turbine bank is also necessary (Table 3, Appendix 7.1.2). It would seem to NRW that changing the turbine/sluice configuration would change the number of fish encountering the turbines.
43. Second, NRW does not consider that a holistic approach has been taken when assessing impacts from the project as a whole on fish populations. Throughout the ES there has been an emphasis on direct impacts from fish passage through the turbines as modelling could be

carried out and possible mortality rates assigned. For other possible impacts, there has been little consideration of these due to TLSB believing that no meaningful assessments could be made or that no significant impact is predicted.

44. For each fish species, there has been no attempt to investigate compound impacts as a result of the Tidal Lagoon presence. For example, herring have only been assessed for the spawning stages of >200mm body size with no assessment at all carried out for smaller life stages which are much more abundant in the Bay. The combination of high turbine mortality and loss of spawning grounds within and outside of the Lagoon have not been investigated as a whole with regards to spawning herring either.

45. NRW believes that further assessments could have been done with regards to long-term impacts predicted by coastal process modelling of changes to physical conditions of the Bay, fish population changes as a result of climate change, fishing pressure, cumulative mortality as a result of the turbine impacts and loss or changes in habitat within and outside the lagoon. NRW is therefore unable to agree with the significance and confidence levels for the operational phase impacts such as “Increases in suspended sediment and deposition”, “Habitat modification” etc.

46. Third, NRW has concerns about impacts that cannot or have not been modelled. IBM modelling demonstrates what could happen to a theoretical population of 10,000 fish subjected to different scenarios. Only three basic rules have been used in the model: swim speed, navigational route and navigational ability. The data inputted into the model has been derived from a very limited number of tracking studies, scientific literature and expert opinion. A have assigned residual significance and confidence levels on the basis of the different scenarios with “*Probable*” or “*High*” confidence levels in the majority of cases. However, there are many other parameters that cannot be modelled which have not been taken into account such as:

- Avoidance or attraction to turbines, sluices or wall.
- Predation effects
- Post turbine passage impacts
- Schooling behaviour
- Turbulence from turbines increasing phyto- and zooplankton resulting in increasing attractiveness for foraging fish.

- Other random behaviours not accounted for in the model, such as foraging sea trout or estuarine/coastal populations of European eel.
47. NRW considers that although the IBM and STRIKER v.4 modelling tools are useful in describing potential turbine impacts on fish, there is a wealth of other factors which cannot be modelled or has been only been assessed using expert opinion, which may increase the potential for further negative impacts.
48. Fourth, to aid NRW's understanding of IBM and STRIKER v.4 model validation, calibration and interpretation, NRW has sought clarification on the data used for species other than salmonids, and the evidence behind the use of substitute species. (NRW WR comments on Appendix 9.3 page 4, TLSB meeting minutes from 9th April 2014 section 1.18a). In response, A has submitted Appendix 7.7.1 but NRW is not satisfied that it has sufficiently clarified the use of data and expert opinion as requested. NRW will update the position in its representations for Deadline IV.
49. In summary, NRW consider that the following could be done to increase its confidence in the ES conclusions in relation to the impact on fish:
- (1) Updated IBM and STRIKER v4 modelling with the confirmed turbine/slucice arrangements and other proposal changes.
 - (2) Clarification of turbine/slucice and pumping operation.
 - (3) Life table modelling for herring and sea trout for which a higher level of mortality is expected, especially in light of the suggestion in the revised AEMP that the main mitigation – Acoustic Fish Deterrents (AFD) – is no longer proposed to be installed prior to operation.
 - (4) Further explanations and clarification on how literature data was used within the ES and for shaping expert opinion.
 - (5) Assessment of long term and cumulative effects for fish populations, holistically, with clear explanations for conclusions on impacts.

GWION LEWIS
Landmark Chambers
London

7 October 2014