



Wylfa Newydd Project

Coastal Processes Monitoring and Mitigation Strategy

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Contents

1	Coastal Processes Monitoring and Mitigation Strategy.....	1
1.1	Background	1
1.2	Step 1: coastal processes monitoring	2
1.3	Step 2: adaptive management mitigation.....	3
2	References	6

List of Tables

Table 2-1	Schedule of references	6
-----------	------------------------------	---

List of Figures

Figure 1-1	Thirteen beach profiles to survey annually during the construction phase (taken from Pye 2018 [RD1])	3
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1 Coastal Processes Monitoring and Mitigation Strategy

1.1 Background

- 1.1.1 This technical note contains Horizon Nuclear Power Wylfa Limited's ("Horizon's") proposed coastal processes monitoring and mitigation strategy (CPMMS).
- 1.1.2 Horizon has agreed through the examination of the Wylfa Newydd DCO Project to undertake a monitoring programme of Esgair Gemlyn commencing in year 1 of construction and to adopt an adaptive management approach to mitigation. This approach is secured in the DCO application with the commitment set out in the Marine Works sub Code of Construction Practice (CoCP) submitted at Deadline 5 (12 February 2019).
- 1.1.3 The CPMMS provides a mechanism by which monitoring will be implemented and mitigation will be available to ensure that impacts are no greater than the residual effects predicted in the DCO application and removes the uncertainty of conclusions.
- 1.1.4 A distinction should be made between surveys (which are used to gather information) and monitoring (which is undertaken in order to validate an assumption or review an effect against a target).
- 1.1.5 Horizon's approach to the CPMMS is:
- to demonstrate a feasible monitoring and mitigation approach;
 - to provide sufficient information to conclude, with the CPMMS implemented, there would be no likely significant effect on Esgair Gemlyn and no effects on site integrity;
 - to provide sufficient information for DCO and Marine Licence consent;
 - to allow development of the CPMMS post DCO consent; and,
 - to allow development and review of the CPMMS measures at defined points as part of an adaptive management approach.
- 1.1.6 The CPMMS will be updated during the construction phase of the Wylfa Newydd DCO Project and it is for this reason that this is an adaptive strategy.
- 1.1.7 At a meeting with Natural Resources Wales (NRW) on 4 February 2019, the principles of a CPMMS were discussed and the strategy below represents the approach to be taken forward by Horizon.

1.2 Step 1: coastal processes monitoring

1.2.1 The key objectives for the monitoring programme are:

- to generate a suitable baseline (without and with the Wylfa Newydd DCO Project);
- to understand the effect of natural variability (e.g. storm events) on Esgair Gemlyn; and,
- to generate a baseline dataset to determine a set of trigger levels for adaptive management mitigation.

1.2.2 Between 2010 and 2018, four morphological surveys have been undertaken on Esgair Gemlyn which provide a valuable baseline dataset to build upon. Surveys consisted of:

- two ground topographic surveys which examined thirteen cross-shore ridge profiles using RTK laser equipment (see Pye 2018, [RD1]); and,
- two LIDAR surveys examining profiles and sediment volumes.

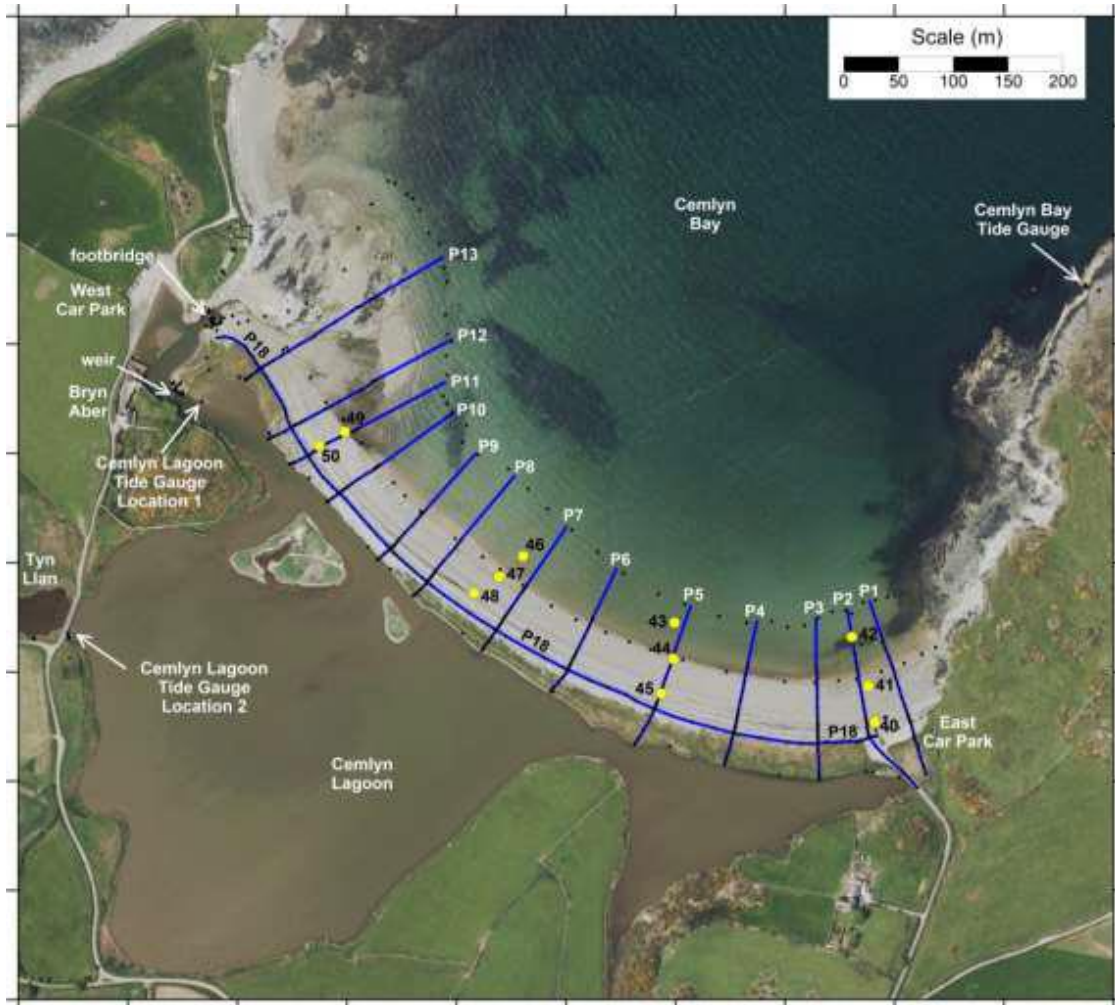
1.2.3 These surveys and other historic work, for example aerial photography, provide a good understanding of temporal trends, storm response and broader scale sediment changes/trends.

1.2.4 The present morphology and volume of Esgair Gemlyn is quantified in terms of the maximum crest elevation, barrier width, gradient (along cross-sectional profiles at 13 locations) and sediment volumes in cells 30m wide along the ridge.

1.2.5 To meet the monitoring objectives, the following coastal processes monitoring measures will be undertaken.

- Annual ground topographic surveys undertaken during the construction phase of the Wylfa Newydd DCO Project. Surveys would replicate the thirteen cross-shore profiles undertaken in 2016 and 2018 (see figure 1.1 and [RD1]) to examine the ridge profile (i.e. crest elevation, width and gradient). Each survey would be standardised to the same seasonal period dictated by the first survey which would commence in year 1 of construction (subsequent surveys would be within a four-week period of the first survey). A total of nine surveys would be undertaken; at least one survey would provide additional data pre-construction of the breakwater; the remaining surveys would be during and post breakwater construction. The need for and frequency of monitoring post construction phase (from year 9) will be reviewed as part of the adaptive management approach.
- Three LIDAR surveys would also be undertaken at years 1, 4, and 8 of the construction phase to examine sediment volume (in addition to profile). The need for and frequency of additional LIDAR surveys post construction (from year 9) will be reviewed as part of the adaptive management approach.

Figure 1-1 Thirteen beach profiles to survey annually during the construction phase (taken from Pye 2018 [RD1])



- 1.2.6 Monitoring data will be reported in an annual report building on successive datasets to examine temporal trends in ridge profile, storm response and broader scale sediment changes/trends against a set of objectives and principles. The annual report will make recommendations on the CPMMS as part of the ongoing adaptive management approach.

1.3 Step 2: adaptive management mitigation

- 1.3.1 The key objective for adaptive management mitigation is:

- to demonstrate commitment to remedial action, in good time, through adaptive management mitigation if trigger levels (i.e. changes outside of natural variation or storm events) are breached.

- 1.3.2 Data from surveys and monitoring will be used to devise a set of trigger levels (either a traffic light system or maximum / minimum approach) where adaptive management mitigation will be implemented. Development of the trigger levels will be undertaken with NRW and may include independent technical advice. Consideration would need to be given to the influence of natural factors (e.g.

storm events and climate changes) and any on-going management practices which may influence the results. Information will be recorded in an updated CPMMS.

- 1.3.3 It is envisaged that trigger levels will be set for each segment or cross-sectional profile shown in figure 1-1. Different levels may be set against different transects and at different positions on the ridge. These segments will be subsequently monitored and reviewed against the trigger levels during construction (as described in step 1) and reported through the annual monitoring reports.
- 1.3.4 In the event of a trigger level being reached, at one or more segments / cross-sectional profiles, mitigation will be agreed with NRW and National Trust (as landowners) and implemented.
- 1.3.5 The nature of change will dictate the adaptive management mitigation adopted. This could include:
 - review monitoring programme and defer intervention;
 - shingle recharge / re-profiling of the ridge with material from offsite; or,
 - mechanical recycling of existing shingle i.e. re-distribution of material from elsewhere on the ridge (i.e. onsite).
- 1.3.6 Mitigation measures will be undertaken within segments or cross-sectional profiles where trigger levels are breached only and in accordance with a set of mitigation principles, such as establishment of a pre-defined / optimal ridge profile, crest height and sediment size / volume. This set of mitigation principles will be recorded in an updated CPMMS and agreed with NRW post DCO consent and prior to construction to minimise the amount of time for mitigation implementation should it be required.
- 1.3.7 Furthermore, during the implementation of the CPMMS Horizon will review annually the availability of suitably sized shingle from external sources to ensure shingle recharge to the optimal segment / cross-sectional profile remains a viable mitigation option.
- 1.3.8 Should shingle recharge be required it is envisaged material of between 20 - 35mm would be required for the main ridge segment replenishment, based on work by National Trust [RD2], which is generally in plentiful supply [see RD3]. Material could be derived from quarried (river gravel) material or 'Marine Won' aggregates. Currently three quarries could supply the required grade of material from within Gwynedd [RD3] and multiple more across Wales.
- 1.3.9 All mitigation measures will require co-operation with regulators and landowners and planning and licencing consents. Where practicable, agreements with landowners and outline consents should be put in place early in the construction programme to minimise the time lag between a breach (should it occur) and mitigation implementation. However, if this was not possible it is envisaged that planning and licencing would be achieved quickly due to the objectives of protecting a key designated site.
- 1.3.10 The implementation of mitigation would need to consider the timing of works in relation to tern presence and a phased approach might need to be implemented to reduce potential adverse impacts on the tern colony in Cemlyn

Lagoon. In addition, consideration would need to be given in the setting of optimum ridge conditions and nature of mitigation in relation to other conservation features and objectives (e.g. of the SAC), for example perennial vegetation on stony banks.

- 1.3.11 An annual review of all monitoring data during construction will be used to identify vulnerable segments of Esgair Gemlyn with biennial or triennial review of trigger levels and mitigation measures. The CPMMS will be updated accordingly through its implementation and cease upon agreement with NRW that it is demonstrated that the impacts from the Wylfa Newydd DCO Project are no greater than the residual not significant effects predicted in the DCO application.

2 References

Table 2-1 Schedule of references

ID	Reference
RD1	Pye, K. and Blott, S. (2018). Cemlyn Bay, Anglesey: Topographic survey and tidal level investigation summary report. EX181118. KPAL External Investigation Report.
RD2	Pye, K. and Blott, S. (2016). Cemlyn, Anglesey: Further geomorphological Assessment. EX20671. KPAL External Investigation Report.
RD3	Directory of Mines and Quarries, (2014), British Geological Survey.