HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project
Environmental Statement Addendum

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1 Executive Summary

1.1.1 This report is an Addendum to the Environmental Statement (the 'original Environmental Statement') submitted with the application for development consent for the Wylfa Newydd DCO Project in June 2018. The purpose of the Addendum is to capture and provide a record of the environmental assessment of the Wylfa Newydd DCO Project taking into account updated information on the development that has arisen since the application for development consent was made in June 2018.

1.1.2 This Addendum seeks to address the Planning Inspectorate Advice Note 15 'Drafting Development Consent Orders', which advises that, *"If during the course of an Examination 'environmental information' is provided which affects the findings in the Environmental Statement then applicants should consider if this information should also form part of the certification of the Environmental Statement since it may have been relied upon by the decision maker."*

1.1.3 The Addendum presents an assessment of updates to the application including plans, design principles and mitigation secured in control documents that have been submitted during the course of Examination. These are considered relevant updates in so far as these matters pertain to the contents of an 'Environmental Statement' under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009.

1.1.4 It should be noted that the matters considered here are not new but report on how items submitted throughout the Examination affect the findings of the original Environmental Statement. The updates include the non-material changes to the application (as accepted into Examination) as well as minor modifications to embedded mitigation in plans and design principles that provide betterment and additional mitigation applied to environmental effects developed during engagement with Statutory Parties and Interested Parties.

1.1.5 Where additional information has been obtained since the original Environmental Statement was prepared and submitted into Examination (e.g. new or updated baseline information) this is included in this Addendum along with an assessment of the implications on the outcomes of the EIA.

1.1.6 The updated information has been considered using the original EIA methodology. The effects reported here reflect the beneficial nature of the updates to design and mitigation. This Addendum provides a record of those updates and will be certified as part of the 'Environmental Statement' under Schedule 18 of the Draft DCO. The updates reported do not result in any new or greater significant residual adverse effects.

1.1.7 An earlier version of the Environmental Statement Addendum was submitted at Deadline 6 which this version now supersedes, providing the final version of the Addendum.

2 Introduction

2.1 Purpose

2.1.1 The purpose of this report is to capture and provide a record of the environmental assessment of the Wylfa Newydd DCO Project taking into account the non-material changes to the application (as accepted into Examination, see Section 3.3) and other updated information submitted during the course of Examination.

2.1.2 During the Examination, Horizon has provided updated information in response to requests from the Examining Authority (ExA) during written questions and hearings, and in response to submissions from Statutory Parties and Interested Parties including the Local Impact Report and Written Representations.

2.1.3 For example, this has included updated plans and design principles and provision of updates to the 'control documents' where additional mitigation, or updates to embedded mitigation already proposed within the application, has been included.

2.1.4 Where additional baseline information or data has been submitted in to Examination, this is included in this Addendum along with an assessment of the implications on the outcomes of the Environmental Impact Assessment (EIA).

2.1.5 The reported updates have been reviewed by EIA specialists to consider whether they would lead to an update to the effects reported in the application. The updates considered are summarised in the site specific chapters of this report.

2.1.6 An earlier version of the Addendum was submitted at Deadline 6 (19th February 2019 [REP6-015 – REP6-016]) to allow consideration of matters arising from the First Written Questions, the Issue Specific Hearings in January and updates to control documents submitted at Deadline 5. This version is submitted at Deadline 8 (25th March 2019) to take account of any updated information arising from the Further Written Questions, the Issue Specific Hearings in March 2019 and the non-material changes to the application as accepted into the Examination. It is expected that this will be the final version of the Environmental Statement Addendum.

2.2 Status

2.2.1 The Environmental Statement is a certified document as set out in Schedule 18 of the Development Consent Order [as submitted at Deadline 8 (25 March 2019)]. At the close of Examination, the final Environmental Statement to be certified following grant of the DCO would comprise the original Environmental Statement (as referenced in Schedule 18) and this Environmental Statement Addendum.

2.2.2 Where reports submitted during the course of examination update information contained in the original Environmental Statement, these will be included for

certification with this Addendum. However, to avoid resubmitting existing information into Examination, these are not appended with this submission but will be supplied at the point of certification. The documents identified are:

- Addendum to 2018 Chough Baseline Report [REP3-046];
- Dalar Hir FCA Addendum [REP2-372] and blockage modelling [REP5-056]; and
- Off-site Power Station Facilities - Building M3 Bat Survey Results [REP3-049].

2.2.3 This Environmental Statement Addendum reflects the conclusions based on the updated information and provides an update where changes to the residual significant effects of the Wylfa Newydd DCO Project have arisen.

2.2.4 Where this Addendum considers matters such as additional mitigation or betterment of embedded mitigation in the design, where updates occur, these are of a beneficial nature. In the instance of the non-material changes, the further assessment (and where necessary, mitigation identified) is provided and remains within the envelope of environmental effects identified in the original Environmental Statement.

Consideration of Errata

2.2.5 Appendix A of this Environmental Statement Addendum includes summary tables of errata (related to the Environmental Statement only) identified during the course of the Examination. The errata in Appendix A do not alter the meaning of the documentation submitted but provide a record of clarifications.

2.3 Structure

2.3.1 This report utilises the broad structure of the Environmental Statement submitted with the application for development consent. The chapters in this report provide an addendum to the corresponding Environmental Statement volumes as outlined below.

- Chapter 4 – Project Wide (Environmental Statement Volume C, APP-087 to APP-119)
- Chapter 5 – Wylfa Newydd Development Area (Environmental Statement Volume D, APP-120 to APP-238)
- Chapter 6 – Off-site Power Station Facilities (Environmental Statement Volume E, APP-239 to APP-265)
- Chapter 7 – Park and Ride (Environmental Statement Volume F, APP-266 to APP-303)
- Chapter 8 – A5025 Off-line Highway Improvements (Environmental Statement Volume G, APP-304 to APP-354)
- Chapter 9 – Logistics Centre (Environmental Statement Volume H, APP-355 to APP-383)

- Chapter 10 – Cumulative Effects (Environmental Statement Volume I, APP-384 – APP-397)

2.3.2 Environmental Statement Volumes A [APP-066 to APP-087], B [APP-055 to APP-065] and J [APP-398 to APP-400] are not specifically covered in their own chapter as part of this Environmental Statement Addendum. In general, they cover matters that remain fixed such as methodology or items that represent an earlier phase of the assessment process such as baseline data or EIA Scoping.

2.3.3 In relation to Volume J, for reference to updates to the 'Schedule of Environmental Commitments', please refer to the Final Schedule of Mitigation to be submitted at Deadline 9. Any updates to the residual significant environmental effects included in Volume J are recorded in Chapters 4 to 10 outlined above.

3 Methodology

3.1 Introduction

3.1.1 This section outlines the methodology employed for the Environmental Statement Addendum. The overarching and topic specific methodologies in Environmental Statement Volume A and B remain unchanged and have been applied during the assessment of the updates identified in the following sections to ensure there is consistency between the Environmental Statement and the Environmental Statement Addendum.

3.2 Basis of assessment

3.2.1 The focus of this report is updated information that has been submitted during the course of Examination. However, not all of these updates are of relevance to the environmental assessments. The updates considered can be summarised as follows:

- Development Consent Order including Schedule 1 (Authorised Development), Schedule 2 (Approved Plans) and Schedule 3 (Requirements);
- Updates to the control documents. For example, those that define the embedded, good practice and additional mitigation such as a measure in the Code of Construction Practice or sub-CoCPs or a design principle; and
- Additional information that has developed understanding e.g. updated baseline information that has been submitted during Examination, and through engagement with stakeholders.

3.2.2 This Environmental Statement Addendum does not include consideration of matters that have been merely clarified during the Examination, such as updates to securing mechanisms for mitigation, additional approvals by a statutory body e.g. for a detailed design, or procedural matters for implementing mitigation. This is because such matters do not alter an assessment but provide further certainty on their implementation or procedures for this.

3.2.3 Similarly, where additional detail has been provided on an existing commitment to provide environmental monitoring, this would not alter the conclusions of the assessment. For example, where the number, location and type of air quality and noise monitors has been defined in the Code of Construction Practice documents.

3.2.4 The updates of relevance are summarised in tables in each of the site-specific chapters that follow or where they are part of an overarching document they are provided in Section 3.3 below. The text for any amended or additional mitigation measures has not been repeated in full but appropriate cross-reference provided to avoid unnecessary duplication. Similarly, any references are provided to the location of updated plans or design principles.

3.2.5 Additional topic information, such as development in baseline information or data, is reported under the 'Additional Information' sub-heading where required.

3.2.6 The updates have been considered by qualified EIA professionals familiar with the original assessment and, following the original methodology and/or applying appropriate professional judgement, a conclusion is drawn as to whether the updates amount to an alteration of the assessment and conclusions regarding residual significant effects.

3.2.7 Any updates to residual significant effects experienced by a receptor or receptor group are provided in table format and represent an addendum to the corresponding Environmental Statement volume. Such updates generally provide betterment (e.g. where additional mitigation is applied) or otherwise remain within the envelope of effects identified.

3.3 Updates to the application

Development consent order

3.3.1 The draft DCO was submitted with the application for development consent in June 2018. A number of revisions have been submitted during the Examination and this Addendum is based on that submitted at Deadline 8 (25 March 2019).

Schedule 1 and Schedule 2

3.3.2 Schedule 1 details the 'Authorised development' and Schedule 2 lists the 'Approved Plans' for which development consent has been sought. These were assessed as submitted in June 2018, as described in the EIA methodology in the original Environmental Statement [Volume B, APP-066 to APP-087]. Updates to the description of the Works in Schedule 1 and plans in Schedule 2 are outlined in the applicable site chapter where they are of relevance to the basis of the assessment.

Schedule 3

3.3.3 Schedule 3 sets out a number of Requirements relating to the authorised development. These secure key mitigation and often provide for the submission of further detail following DCO grant at a defined time, in accordance with relevant plans and control documents, for approval by the Isle of Anglesey County Council (IACC), in consultation with the appropriate statutory bodies as appropriate e.g. Natural Resources Wales (NRW).

3.3.4 Updates to the Requirements have not resulted in any changes of relevance to the assessments in the Environmental Statement but provide further certainty or clarity on delivery of mitigation, or otherwise outline the requirement for further detail to be provided post-DCO grant. The embedded, good practice or additional mitigation already considered in the assessment must be complied with in the development of further detail.

3.3.5 For example, the update to Schedule 3 of the DCO of Project-wide requirement PW7 (Wylfa Newydd CoCP and Schemes) and related site specific schemes outlined in the requirements (e.g. WN1) and Schedule 21 serve the function described above. It is important to note that the schemes must be prepared in accordance with the principles of the Wylfa Newydd Code of Construction Practice [as submitted at Deadline 8 (25 March 2019)] and/or relevant sub-CoCPs which have already been taken account of in the assessment of environmental effects. These schemes are required to be submitted to the IACC (in consultation with others as identified) for approval prior to commencement of the Power Station Works to secure approval of details not available at the time of Examination.

3.3.6 The provision of these schemes in accordance with existing principles would not change the assessment of effects.

Control documents

3.3.7 The Schedule 3 requirements provide that the Wylfa Newydd DCO Project will be delivered in compliance with a number of control documents listed as follows. The version of the control documents on which this Environmental Statement Addendum is based are referenced below:

- Code of Construction Practice [as submitted at Deadline 8 (25 March 2019)] and sub-CoCPs;
- Construction Method Statement [as submitted at Deadline 8 (25 March 2019)];
- Code of Operational Practice [as submitted at Deadline 8 (25 March 2019)];
- Design principles within the Design and Access Statement Volumes 1 to 3 [as submitted at Deadline 8 (25 March 2019)];
- Design principles within the Landscape and Habitat Management Strategy Rev 3.0 [as submitted at Deadline 8 (25 March 2019)]; and
- Workforce Management Strategy [as submitted at Deadline 8 (25 March 2019)].

3.3.8 The relevant updates to the control documents are summarised on a site by site basis. Where they are updates relevant to the topics in the project-wide effects assessment, they are detailed in Chapter 4. Assessment of these updates is reported in Chapters 4 to 10 of the Environmental Statement Addendum.

Phasing Strategy

3.3.9 The updates to the Phasing Strategy as submitted at Deadline 8 (25 March 2019) sets triggers for the timing of key embedded mitigation measures that are part of the Wylfa Newydd DCO Project. The purpose of the update is to secure the implementation of this mitigation at an appropriate time to minimise the likely significant environmental effects of the Wylfa Newydd DCO Project and does not have a resultant effect on the assessments.

Requests for Non-Material Change

3.3.10 The Examining Authority issued a procedural decision on 25th February 2019 confirming that each of the five change requests were considered non-material and had been accepted for consideration in examination as part of the application for development consent.

3.3.11 Horizon submitted these change requests during the Examination as follows:

- Change Request 1 – Blasting Strategy (Deadline 1, AS-019)
- Change Request 2 – Marine Vessel Movement (Deadline 1, AS-020)
- Change Request 3 – Worker Shift Patterns (Deadline 4, REP4-011)
- Change Request 4 – HGV Movements (Deadline 4, REP4-013)
- Change Request 5 – Working Hours (Deadline 4, REP4-012)

3.3.12 A 6th request for non-material change has been submitted in relation to the design of the junction of the Dalar Hir Park and Ride facility with the A5/A55, which will be in use during the construction phase of the Wylfa Newydd DCO Project. The non-material change proposed is to remove the internal roundabout at the Park and Ride, and instead to provide a single arm from the existing A5 roundabout at the A5/A55 dumbbell junction (Junction 4). The change is proposed in order to improve junction safety and has the full support of IACC as the local highway authority. No new or different likely significant environmental effects are predicted in relation to the proposed change.

3.3.13 The relevant application documents to which consequential amendments were required as a result of the changes shown in paragraph 3.3.12 and 3.3.13 were identified within each change request. This included a number of documents from the original Environmental Statement. This Environmental Statement Addendum captures those amendments within:

- Chapter 4 (Project-wide effects) in reference to the changes to worker shift patterns, HGV movements and the Park and Ride junction improvement;
- Chapter 5 (Wylfa Newydd Development Area) in reference to the changes to the blasting strategy, marine vessel movements and working hours; and
- Chapter 7 (Park and Ride) in reference to the Park and Ride junction improvement.

3.3.14 These amendments are captured by a number of means. This includes the description of the changes and detailing their relevance to each topic and the associated basis of assessment. The revised assessments for the application are also provided with related results, appendices with model inputs and results (for quality and noise) and updated figures illustrating the findings.

3.3.15 Prior to their submission, each of the above changes have been reviewed and assessed and have not been found to result in any materially new or different likely environmental effects than those reported in the original Environmental

Statement. Each of the change requests are accompanied by an environmental appraisal, comparing the results from the DCO application with updated assessments with consideration of their materiality. For further information on this comparison, reference should be made to the change requests.

Other updates

DCO s.106 Agreement

3.3.16 The DCO s.106 obligations have been discussed and developed with the IACC during the course of the Examination. This Environmental Statement Addendum is based on the revised DCO s.106 agreement.

3.3.17 items proposed and included as mitigation in the original Environmental Statement but for which subsequent development of detail with IACC is ongoing. For example, the Community Impact Fund, Tourism Fund and Emergency Services funding are key items of mitigation for socio-economic effects. These have been developed (and in some cases renamed) in the DCO s.106 agreement but do not change the conclusions of the original Environmental Statement where the mitigation has already been considered.

3.3.18 Further provisions in the DCO s.106 agreement have been developed in relation to a range of environmental topics. Where these are of significance to the assessment of environmental effects at a site level (e.g. providing additional mitigation), these are outlined in the site chapters that follow.

Local Noise Mitigation Strategy (LNMS)

3.3.19 Following feedback during the Statement of Common Ground process with the North Anglesey Councils Partnership and Isle of Anglesey County Council, Horizon has revised the eligibility criteria so that a greater number of buildings will qualify for noise insulation measures.

3.3.20 The reduced threshold levels for construction noise are based on the onset of a medium magnitude of change (which results in a major adverse effect at high sensitivity receptors) under the adopted magnitude scale for long-term construction plant and machinery noise set out in Environmental Statement Chapter D6 – Noise and Vibration [APP-125].

3.3.21 Major adverse road traffic noise effects are reported in chapter C5 [APP-092], and therefore Horizon consider it appropriate to also reduce the qualification criteria for traffic noise levels. Therefore, the LNMS road traffic acoustic criteria have been reduced to 63 dB $L_{A10,18hrs}$ during the daytime. This is 5 dB lower than the original threshold included in the original submission of the Wylfa Newydd CoCP [APP-414] which was based on the Noise Insulation Regulations 1975 (as amended).

3.3.22 In the original submission of the Wylfa Newydd CoCP [APP-414], Figure 8-1 LNMS WNDA Construction Boundary Plan shows all properties that are automatically eligible for the LNMS regardless of noise modelling results. Horizon recognises the importance of Figure 8-1 of the Wylfa Newydd CoCP in demonstrating to stakeholders which properties are automatically eligible

for the LNMS, so has updated this figure in line with the change in acoustic criteria and the predicted extent of eligibility. This revised figure is included in the Wylfa Newydd CoCP [as submitted at Deadline 8 (25 March 2019)].

3.3.23 Horizon has also decided to offer additional measures as part of the LNMS, beyond those included in Section 8.3 of the Wylfa Newydd CoCP (Revision 2.0), as submitted at Deadline 2 (4 December 2018) [REP2-031] where there would be a clear benefit in reducing noise arising as a consequence of the Wylfa Newydd DCO Project. These new measures included in the Wylfa Newydd CoCP [as submitted on 25th March 2019] are as follows:

- Noise attenuating fences
- Re-glazing of conservatories

3.3.24 These additional measures will be made available on a case-by-case basis only and would be subject to a survey. Further information on the updated LNMS can be found in the Local Noise Mitigation Companion Guide [REP3-051] submitted at Deadline 3.

3.3.25 It is noted that the revisions described above are of a beneficial nature, however, the Environmental Statement Chapter D6 Noise and vibration [APP-125] methodology does not rely upon the measures in the LNMS to reduce the reported residual effects at noise sensitive receptors.

4 Project-wide effects assessment

4.1 Introduction

4.1.1 Tables 4-1 to 4-6 outline the updates that have occurred at a project-wide level since the application for development consent that are of relevance to the ES Volume C [APP-087 to APP-119]. A review of these updates has been undertaken by EIA specialists across all topics assessed in the original ES and the following sections provide an update to those assessments.

4.1.2 It has been concluded that the updates are not applicable to the assessment for the following topics, Traffic on Air Quality; Waste and Materials and Combined Topic Effects.

4.1.3 Worker shift patterns have been updated within the Request for a Non-Material Change: Worker Shift Pattern Changes [REP4-011]. This update is shown in the Main Power Station Site Sub-CoCP, Table 4-3 [as submitted at Deadline 8 (25 March 2019)]. The update is summarised here in Table 4-1.

Table 4-1 Update to Worker Shift Patterns

Shift	Primary shift start/end times/durations		
	DCO application	Proposed change (Years 1-3)	Proposed change (Year 3 onwards)
Day	07:00-17:00 07:30-17:30 08:00-18:00 (i.e. 10-hour shifts)	07:00-17:30 07:30-18:00 - (i.e. 10.5-hour shifts)	07:00-17:30 07:30-18:00 08:00-18:30 (i.e. 10.5-hour shifts)
Night	16:30-03:00 17:00-03:30 17:30-04:00 (i.e.10.5-hour shifts)	19:30-06:00 - - (i.e.10.5-hour shifts)	19:30-05:30 20:00-06:00 - (i.e.10-hour shifts)

4.1.4 Further updates regarding the worker shift patterns are shown in Table 4-2

Table 4-2 Further information on the update to Worker Shift Patterns

Section Reference	Relevant updates arising since submission	Relevant topics
Main Power Station Site Sub- CoCP [as submitted at Deadline 8 (25 March 2019)]		
Section 4.3	As operations on site will continue around the primary shift patterns, a minority of staff will not follow the primary shift pattern. Examples include catering, security, cleaning and some specialist construction operational staff.	Traffic and Transport Traffic on Public Access and Recreation Traffic on Nosie and Vibration

4.1.5 HGV numbers and delivery windows have been updated within the Request for a Non-Material Change: Heavy Goods Vehicles Delivery Window Changes [DL7 REF]. This update is shown in the Wylfa Newydd CoCP, Table 5-1 [as submitted at Deadline 8 (25 March 2019)]. The change is summarised here in Table 4-3.

Table 4-3 Update to HGV numbers and delivery windows

Parameter	DCO application	Proposed change
Weekday delivery periods (daytime)	5 days per week (07:00 – 19:00)	No change
Weekday delivery period (evening)	n/a	5 days per week (19:00 – 23:00) with a limit of 20 HGV movements in each direction
Saturday delivery period	n/a	Saturday deliveries (08:00 – 13:00) with a limit of 50 HGV movements in each direction

4.1.6 Further updates regarding the HGV numbers and delivery windows are shown in Table 4-4.

Table 4-4 Further information on the update to HGV numbers and delivery windows

Section Reference	Relevant updates arising since submission	Relevant topics
Wylfa Newydd CoCP [as submitted at Deadline 8 (25 March 2019)]		
Table 8-3	To qualify for the additional mitigation under the LNMS, a property must be within the LNMS Construction Boundary Plan area as well as fitting other eligibility criteria. For a property outside the LNMS Construction Boundary Plan area they must meet new criteria compared to the original submission of certain acoustic qualification criteria as shown in Table 8-3 of the Wylfa Newydd CoCP.	Traffic on Noise and Vibration
Paragraph 8.3.13 bullet 1	Traffic noise levels during the construction or operation of the Wylfa Newydd DCO Project are predicted to exceed 63dB $L_{A10\ 18\ hr}$, previously this was presented at 68 dB $L_{A10\ 18\ hr}$.	Traffic on Noise and Vibration

4.2 Socio-economic effects

Table 4-5 Updates relevant to the assessment of socio-economic effects

Section Reference	Relevant updates arising since submission
DCO s.106 agreement	
DCO s.106 agreement– Schedule 3 – Tourism	The Visitor Centre is now defined and a commitment to providing it is secured through the DCO s.106 agreement. "Visitor Centre" means the permanent visitor centre associated with the Wylfa Newydd DCO Project to be located in the vicinity of the Wylfa Newydd Development Area which will include: main exhibition space including room for an audio-visual element; a Café with food preparation facilities; a multipurpose stakeholder room; education facilities; visitor centre staff facilities/offices and small meeting room; an outside play area; restrooms; and car parking. The DCO s.106 agreement provides detail on how this commitment will be secured. This is an updated commitment to provide a Visitor Centre and detail on what will be included developed since the application.

Relevant updates

4.2.1 Additional information is now available on the implementation of a permanent Visitor Centre. A commitment to providing the Visitor Centre is now included in the DCO s.106 agreement which requires Horizon to apply for planning permission (within three months of Wylfa Newydd DCO Project implementation) and, subject to certain permissions detailed in the DCO s.106 agreement, implement a permanent Visitor Centre (with a target for opening of two years following grant of planning permission).

Revised assessments

4.2.2 The Visitor Centre is now defined and a commitment to providing it is secured through the DCO s.106 agreement. The additional information available on the facilities to be provided in the Visitor Centre, and the commitment to a defined timeline for construction has a beneficial effect on the socio-economic assessment, especially in relation to tourism. However, the new information is not of sufficient scale to affect the significance of residual effects within the assessment. Therefore, the significance of residual effects remains as presented in chapter C1 [APP-088].

4.3 Traffic and transport effects

Table 4-6 Updates relevant to the assessment of traffic and transport effects

Section Reference	Relevant updates arising since submission
DCO [as submitted at Deadline 8 (25 March 2019)]	
Work No. 1L and Requirement WN16 – Operational Parking	Amendment to car parking space provision from a maximum of 700 permanent spaces to 500 permanent spaces and 200 temporary spaces in the Power Station Site southern car park.
Work No. 1N and Requirement WN16 – Operational Parking	Amendment to car parking space provision from 200 permanent spaces and 650 overspill spaces to 800 temporary spaces in the Power Station Site northern car park.
Requirement WN16 – Operational Parking	Clarification that the 200 spaces at the simulator and training car park are permanent.
Requirement PR5 - Operational car and cycle parking	Amendment to confirm that the 1,900 parking spaces provided are for cars but exclude spaces for minibuses or motorcycles.
Wylfa Newydd Code of Construction Practice [as submitted at Deadline 8 (25 March 2019)]	
Section 5.6	Construction vehicle routes (if appropriate), including construction workers sticking to 'A' class roads, and subsequently avoiding 'B' class roads, 'C' class roads, and unclassified roads, wherever practicable (to avoid causing

Section Reference	Relevant updates arising since submission
	unnecessary nuisance and disturbance to local communities).
Section 5.8	Before the opening of the A5025 Off-Line Highway Improvement Works, Horizon commit to limiting the number of HGV deliveries so as not to exceed a maximum of 22 HGV deliveries (44 movements) per hour, 113 HGV deliveries (226 movements) per day, and 2,500 HGV deliveries (5,000 movements) each way (location: A5025 at Valley) per month.
Section 5.10	Commitment to manage, monitor and regulate the availability of car parking spaces to reflect the number of workers on the Project.
Plans, Sections and Drawings 2.11 – Park and Ride [as submitted at Deadline 8 (25 March 2019)]	
WN0902-HZDCO-ADV-DRG-00041-00043 Rev 3.0	Design levels for the car park and spine road have been raised to at least 16.45m AOD requiring additional material deliveries to the site.
WN0902--HZDCO ADV DRG-00036 Rev 3.0	Revision of the access arrangements at the Park and Ride, whereby the primary change is the removal of the access roundabout and revisions to the associated highways around the access. The additional leg provided on the north edge of the existing 70m ICD roundabout has been designed in accordance with DMRB TD16 standards. The land previously occupied by the deleted roundabout that is not part of the revised road layout will be incorporated into the soft landscape. The existing carriageway has been widened in the vicinity of the roundabout to provide a short length (around 30m) of two-lane approach, while minimising the impact on existing features.

Relevant updates

4.3.1 The updates to the application of relevance to traffic and transport are those arising from the Requests for Non-Material Change for the changes to worker shift patterns and HGV numbers and delivery windows. These are further outlined in Tables 4-1 to 4-4.

Revised assessments – Revisions to Requirement WN16 and PR5

4.3.2 Revisions to Requirement WN16 and PR5 provide alignment of the information on parking provision contained in the DCO with that assessed in the Transport Assessment. Changes to the Wylfa Newydd Code of Construction Practice [as submitted at Deadline 8 (25 March 2019)] reflect updates to commitments consistent with the existing Integrated Traffic and Transport Strategy [APP-107] assessed in chapter C2 of the original ES.

4.3.3 The updates listed in Table 4-2 provide consistency between a number of DCO documents but are not drivers of travel demand. Travel demand for construction workers is determined by the number of workers in each assessment year, the times at which they travel, and the way that they travel (mode share). These have not changed, which means that total traffic does not change and the assessment parameters for traffic effects remain unchanged.

4.3.4 Because there are no changes to the assessment parameters for Traffic and Transport effects there is no change to significant residual effects in chapter C2 of the original ES.

Revised assessments - Park and Ride Facility

4.3.5 The updates to the level of the Park and Ride Facility at Dalar Hir require additional material to be delivered to the site by construction vehicles. These additional construction vehicles have the potential to affect traffic flows on the road network used to access the Park and Ride Facility at Dalar Hir. However, as shown below, the number of additional construction vehicles is relatively low and the traffic impacts are within those already assessed in the DCO application.

4.3.6 The additional material is assumed to be delivered to the Park and Ride Facility within the first 12 months of the construction programme of the Wylfa Newydd DCO Project. Approximately 9,600 cubic metres of material is expected to be required and this is to be delivered by construction vehicles, with 20 cubic metres of material delivered in each load. This means that 480 construction deliveries of material are required in total over 12 months.

4.3.7 This in turn means that 40 deliveries are required each month and with approximately 22 working days per month this means that approximately two deliveries are required each working day.

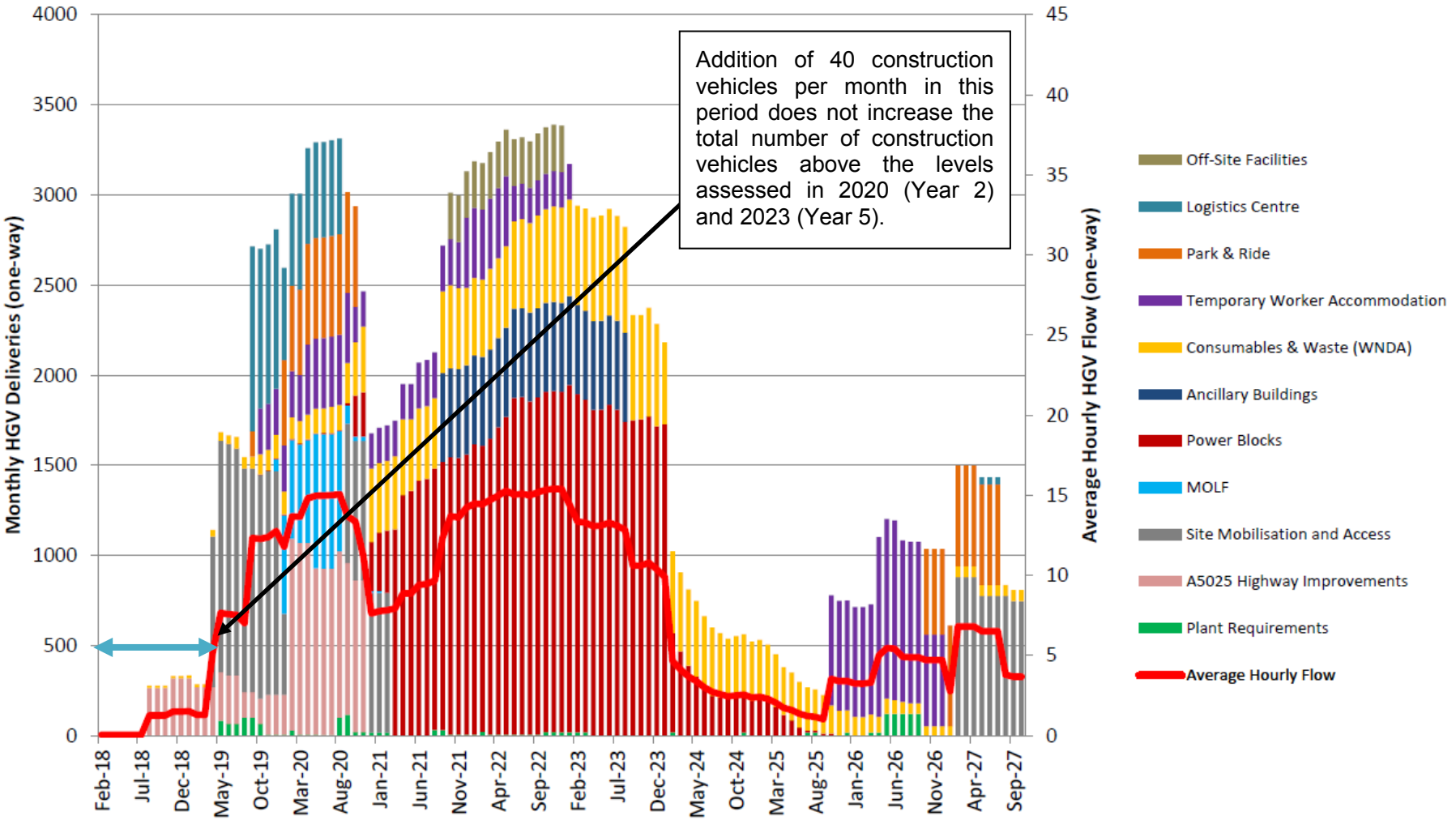
4.3.8 These deliveries would be expected to travel to the Park and Ride Facility via the A55 and Junction 4 of the A55 as per the controls provided in the Wylfa Newydd Code of Construction Practice.

4.3.9 Figure 7-2 of the DCO TA Appendix F Integrated Traffic and Transport Strategy [APP-107] shows the profile of HGV movements along the A55 during the duration of the Wylfa Newydd DCO Project. This figure is repeated overleaf as Figure 4-1 for ease of reference.

4.3.10 The figure has been annotated to show the period when the additional deliveries to the Park and Ride Facility are to be made. The figure shows that adding a further 40 deliveries per month during the first year of the construction programme would mean that the total number of construction vehicle deliveries using the A55 would still be considerably less than the total number of construction vehicle deliveries already assessed as part of the DCO Transport Assessment [APP-101] in 2020 (Year 2 - early-years) and 2023 (Year 5 - peak construction year). This means that the potential traffic impacts of the additional deliveries of top soil to the Park and Ride Facility are less than the assessed traffic impacts presented in chapter 11 of the DCO Transport Assessment [APP-101]. This includes traffic impacts on the operation of the A55 (and the Britannia Bridge) and the operation of Junction 4 of the A55.This analysis shows that the inclusion of the additional construction vehicle movements associated with the delivery of top soil to the Park and Ride Facility does not change the conclusions presented in the DCO Transport Assessment [APP-101] or in chapter C2 Traffic and Transport [APP-089] of the Environmental Statement for the Wylfa Newydd DCO Project and no further mitigation or restrictions are required.

4.3.11 The change to the access arrangements at the Park and Ride (as described in Table 7-1) will not affect the traffic and transport assessment presented in the original Environmental Statement. The original design was for a four arm roundabout which fed in to a secondary access roundabout while the revised access would be reliant on a single five arm roundabout. This change from four arm to five arm has the potential to affect the performance of the junction, however, due to the low traffic volumes the change is likely to be negligible.

Figure 4-1 Monthly HGV deliveries on A55 (annotation of Figure 7-2 from [APP-107])



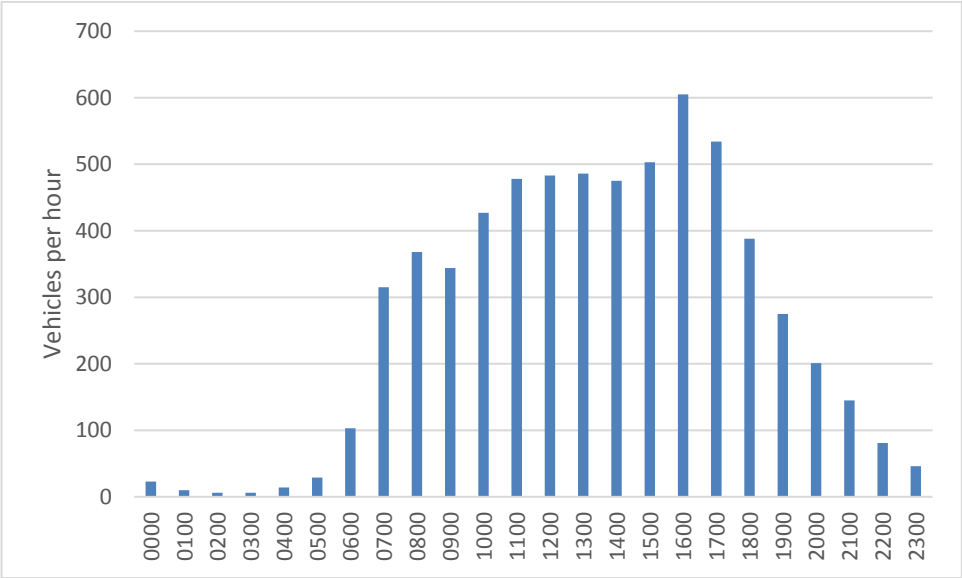
Revised assessments – HGV delivery window

4.3.12 The potential transport impact of the changes to the HGV delivery window is described in following sections.

Weekday evening (19:00 – 23:00)

4.3.13 Additional traffic will be generated in the weekday evening period (19:00-23:00) as a result of the change to HGV delivery windows. Figure 4-2 shows the current traffic volumes on the A5025 in Llanfachraeth (without the Wylfa Newydd DCO Project), represented by an Automatic Traffic Counter count on the A5025, and shows the low levels of traffic between 19:00-23:00. These hours are therefore considered off-peak and no modelling was included in the DCO Transport Assessment (APP-101) which assesses this time period. The DCO Transport Assessment (APP-101) provides a wide range of traffic data and the survey data presented in Figure 2-1 has been used as it is based on a survey which covers all hours of the day and is on the construction route to the Wylfa Newydd Development Area. This site has a reference number 95 and details of this and other traffic surveys are provided in Appendix D of the DCO Transport Assessment (APP-105).

Figure 4-2 Weekday average two-way hourly traffic flow – A5025, Llanfachraeth (Junction reference 95); August – September 2015.



4.3.14 Therefore, given the relatively low numbers of vehicles expected on the road network during this off-peak time, the change associated with the introduction of an HGV delivery window in the evening is small (20 HGV movements in each direction per evening which is equivalent on average to an additional five HGV movements in each direction per hour). For example, Figure 2-1 shows that the two-way traffic flow from 20:00 to 21:00 is approximately 200 vehicles per hour and hence an increase by an average of five HGV movements in each direction (and hence an average two-way increase of 10 HGVs per hour) is a 5% increase in traffic flows. This means that the change does not affect the outcome of the assessment currently presented in chapter C2 [APP-089] and the DCO Transport Assessment (APP-101) of the Environmental Statement.

4.3.15 Allowing for the movement of HGVs during the evening period (19:00-23:00) will mean that fewer HGV movements are required during the day (07:00-19:00) as the total number of daily HGV movements is not changing. This means that traffic impacts during the day will be lower than that stated in the submitted DCO Transport Assessment (APP-101).

Saturday (08:00 – 13:00)

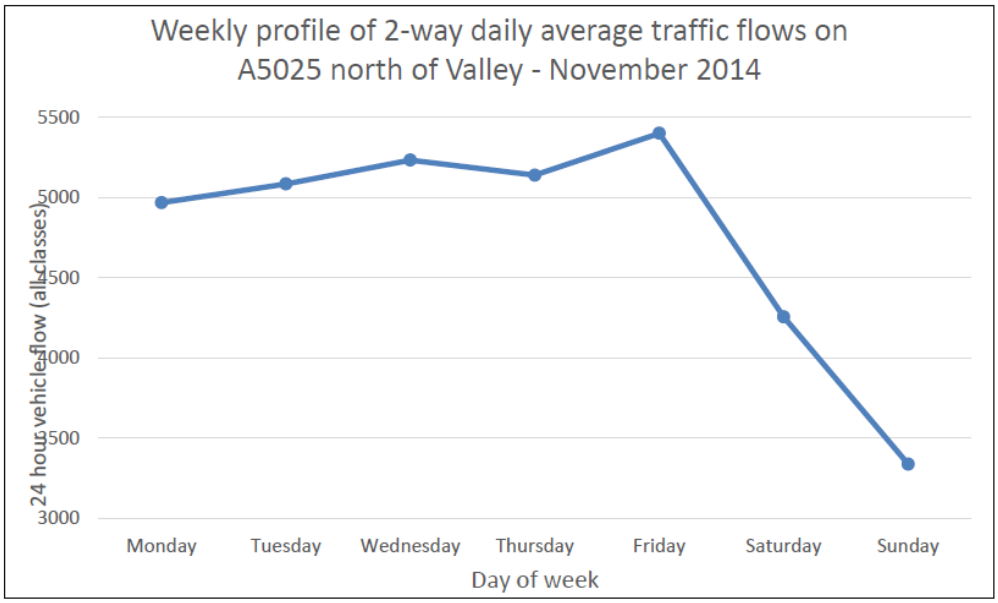
4.3.16 As a result of the proposed change to the HGV delivery windows, additional traffic will be generated in the weekend period on Saturdays in the hours between 08:00 and 13:00.

4.3.17 The variation of traffic flows across a week on the A5025 north of Valley was presented in figure 5-2 of Appendix L of the DCO Transport Assessment (APP-113). This figure is repeated as Figure 4-3 below.

4.3.18 Figure 4-3 shows that flows on a Saturday are approximately 4,250 vehicles per day compared to between 5,000 and 5,500 vehicles per day on a weekday

i.e. flows on a Saturday are approximately 20% lower than traffic flows on a typical weekday.

Figure 4-3 Traffic flow profile over a week on the A5025 – November 2014



4.3.19 This difference meant that Saturdays were considered off-peak and no modelling was included in the DCO Transport Assessment (APP-101) to assess Saturdays, except for the Junctions 9 ARCADY modelling undertaken for Junction 2 of the A55. This modelling was undertaken for the period 12:00 and 13:00 as the area around Junction 2 is predominantly retail and leisure, thus Saturday lunchtimes are considered to be a peak time for this particular junction. Full details of the modelling undertaken at Junction 2 for the DCO application are contained in Appendix H of the DCO Transport Assessment (APP-109).

4.3.20 The ARCADY models for Junction 2 of the A55 were updated to include on average an additional 10 HGV movements per hour travelling from the A55 westbound to the Logistics Centre and to the A55 eastbound from the Logistics Centre as a result of the change described in section 4.1 above. The value of 10 HGVs per hour on average is based on the daily worst case movement on a Saturday of 50 HGV movements in each direction being divided evenly across each of the five hours of operation.

4.3.21 No capacity issues were identified as a result of the additional HGV movements on Saturdays at Junction 2.

4.3.22 The lower traffic flows on a Saturday compared to a weekday mean that the change associated with an HGV delivery window on a Saturday is small and does not affect the outcome of the assessment currently presented in chapter C2 (APP-089) and the DCO Transport Assessment (APP-101) of the Environmental Statement.

Conclusion

4.3.23 The change in traffic flows associated with the HGV delivery windows on weekday evenings plus Saturday mornings is small and does not affect the outcome of the assessment presented in chapter C2 [APP-089] and the DCO Transport Assessment (APP-101). Therefore, there are no new or different likely significant environmental effects than those reported in the DCO application.

Revised assessments – Worker Shift Patterns

4.3.24 The potential transport impact of the change to the worker shift patterns is described in following sections.

Traffic and transport

4.3.25 The effects of the change to shift patterns on the traffic and transport assessment (chapter C2, APP-089) and the DCO Transport Assessment (APP-101) are presented below. This includes effects on the road network near the Britannia Bridge and other junctions across Anglesey.

Britannia Bridge and surrounding highway network

4.3.26 The VISSIM model for the Britannia Bridge and surrounding highway network, described in the DCO Transport Assessment (APP-101), assesses the change in journey times in 2023 associated with Wylfa Newydd DCO Project related traffic. Full results of the VISSIM model network are provided in appendix I of the DCO Transport Assessment (APP-110).

4.3.27 The VISSIM was re-run to include the change to shift patterns and incorporate both Wylfa Newydd DCO Project traffic, traffic associated with the National Grid's North West Connection project and minor adjustments to some input parameters. The changes to the DCO Transport Assessment VISSIM as a result of the change in shift patterns are summarised below in Table 4-7.

Table 4-7 Changes in journey times (seconds per vehicle) across Britannia Bridge due to the change to construction worker shift patterns.

Location	AM Peak			PM Peak		
	06:00-07:00	07:00-08:00	08:00-09:00	15:00-16:00	16:00-17:00	17:00-18:00
Britannia Bridge Westbound						
Journey time with Wylfa Newydd Project traffic (VISSIM + National Grid traffic)	108	114	187	120	135	361
Journey time with Wylfa Newydd Project traffic resulting from the change to shift patterns	108	114	190	120	129	351

Location	AM Peak			PM Peak		
	06:00-07:00	07:00-08:00	08:00-09:00	15:00-16:00	16:00-17:00	17:00-18:00
(VISSIM + National Grid traffic)						
Change due to the change to shift patterns	0	0	+3	0	-6	-10
Britannia Bridge Eastbound						
Journey time with Wylfa Newydd Project traffic (VISSIM + National Grid traffic)	124	137	355	124	126	128
Journey time with Wylfa Newydd Project traffic resulting from the change to shift patterns (VISSIM + National Grid traffic)	124	137	366	124	126	130
Change due to the change to shift patterns	0	0	+11	0	0	+2

4.3.28 The change to shift patterns result in minor increases in journey times across the bridge in the AM peak compared to the DCO Transport Assessment (APP-101). This is mainly in the eastbound direction and due to the end of the night shift being closer to the AM peak hour (08:00-09:00); thus, construction worker traffic travelling nearer the start of the AM peak hour has a knock-on effect on background traffic into the AM peak hour.

4.3.29 The change to shift patterns decrease journey times across the bridge in the PM peak westbound direction compared to the DCO Transport Assessment (APP-101). This is due to the start of the night shift being later; thus, construction worker traffic travelling after the PM peak hour has no knock-on effect to background traffic into the PM peak hour.

4.3.30 Overall the change to the shift patterns are modelled to have broadly neutral impact across the peak periods in the peak construction year (2023) compared to the DCO Transport Assessment (APP-101) with some directions and time periods experiencing small increases in delays per vehicle and some directions and time periods experiencing small reductions in delays per vehicle.

4.3.31 Impacts in 2020 are expected to be lower than in 2023 due to the lower background traffic flows and the lower number of construction workers travelling to and from the Wylfa Newydd Project each day.

4.3.32 This analysis shows that the change to worker shift patterns is small and does not affect the outcome of the VISSIM assessment currently presented in the DCO Transport Assessment (APP-101) or the Environmental Statement.

Other Junctions

4.3.33 Thirty-eight junctions were assessed using a Stage 1 assessment as described in the DCO Transport Assessment (APP-101) to examine impacts related to Wylfa Newydd DCO Project traffic during the standard AM (08:00-09:00) and PM (17:00-18:00) peak hours.

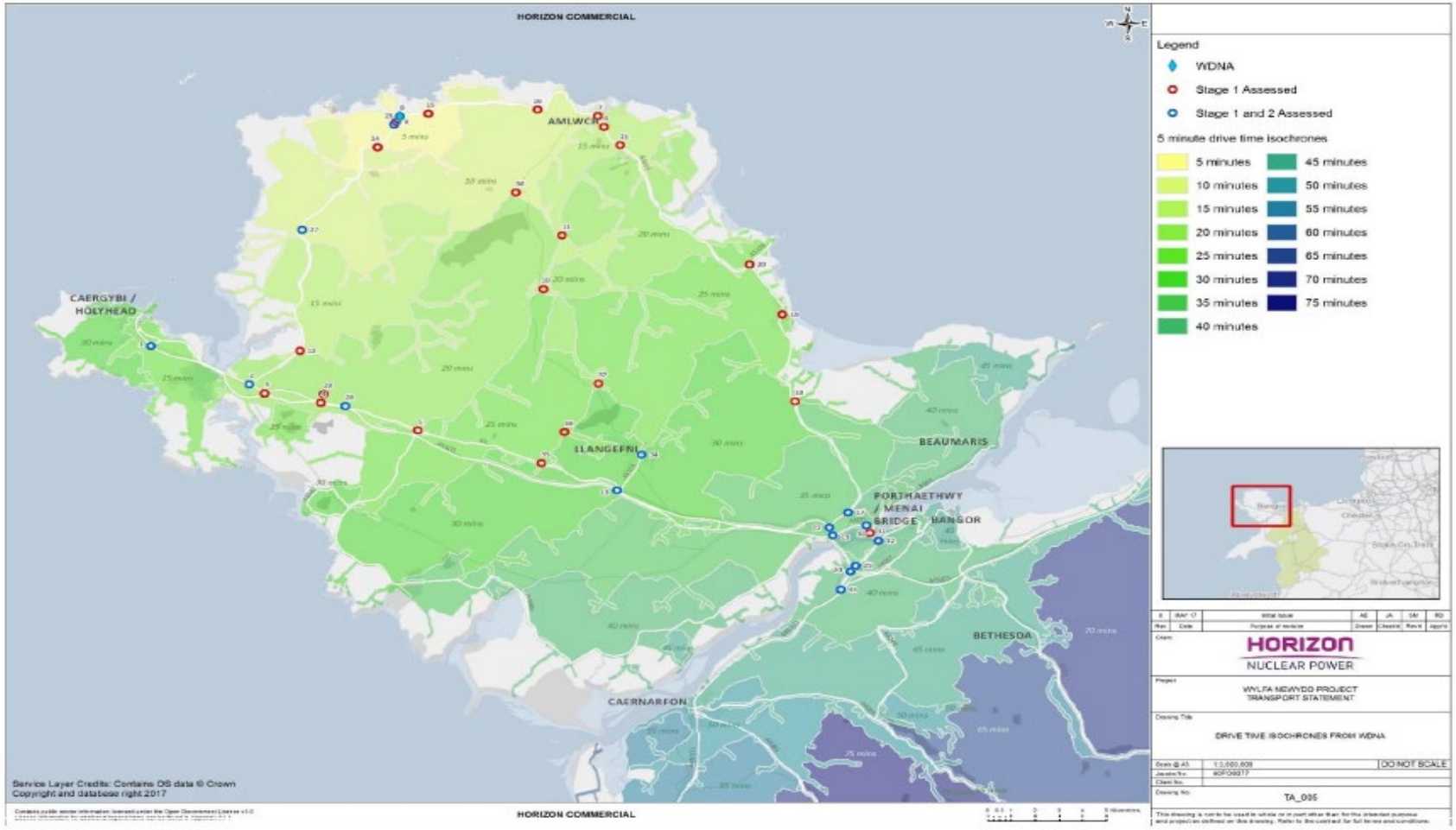
4.3.34 Of these 38 junctions, 11 were deemed at or close to capacity, or were entirely new junctions as a result of the development proposals and were thus subject to further detailed assessment referred to as a Stage 2 assessment. This Stage 2 assessment included the use of junction modelling software such as Junctions 9.

4.3.35 Full details of the Stage 1 and Stage 2 assessments undertaken on the 38 junctions are provided in chapter 9, chapter 11 and appendix H of the DCO Transport Assessment (APP-109).

4.3.36 The analysis presented in the DCO application has been reviewed to determine the potential traffic impact of the change to worker shift patterns in 2020 and 2023.

4.3.37 For reference, the locations of the 38 assessed junctions are presented in Figure 4-4. This figure also shows the typical journey time from each junction to the Wylfa Newydd Development Area as this is an important aspect of the assessment.

Figure 4-4 Location of assessed junctions and their journey time from the Wylfa Newydd Development Area



Traffic impact in 2020

4.3.38 The change to shift timings in 2020 from three to two day shift staggers and from three night shift staggers to one night shift will result in higher concentrations of workers travelling in a shorter space of time. The assessment is made in 2020 to reflect the years used in the DCO application as described in paragraph **Error! Reference source not found.** of this document and in paragraphs 10.1.5 to 10.1.7 of the DCO Transport Assessment (APP-101).

4.3.39 Paragraphs 4.3.41 and 4.3.49 below summarise the traffic impacts of the change to shift patterns for the 2020 day shift and night shift.

2020 Day shift

4.3.40 The main change to the 2020 day shift patterns submitted in the DCO Transport Assessment [APP-101] is that the 08:00-18:00 shift has been removed, meaning that the two remaining shifts will include 50% more workers than the previous three shift stagger scenario.

4.3.41 Allowing one hour for workers to travel across Anglesey to the Wylfa Newydd Development Area before the shift start times means that all traffic would clear the junctions assessed in the DCO Transport Assessment [APP-101] outside of the assessed AM peak hour (08:00-09:00).

4.3.42 Similarly, allowing one hour for workers to travel across Anglesey from the Wylfa Newydd Development Area after the shift end times means that most traffic would pass through junctions assessed in the DCO Transport Assessment (APP-101) after the assessed PM peak hour (17:00-18:00).

4.3.43 The only exception would be workers finishing the 17:30 shift who would leave the Wylfa Newydd Development Area at approximately 17:50 (it is assumed that the time taken for shift sign-out, walk to the daily car park and leave the Wylfa Newydd Development Area is 20 mins) and pass through junctions within a 10-minute drive time of the Wylfa Newydd Development Area before 18:00.

4.3.44 Assessed junctions that fall within a 10-minute drive time of the Wylfa Newydd Development Area are listed in Table 4-8 below. This table also shows whether they were assessed at a Stage 1 or Stage 2 level in the DCO Transport Assessment (APP-101), and the maximum expected ratio of flow to capacity for each junction across each scenario (with or without development) in all years assessed (2016, 2020, 2023) as presented in appendix H of the Transport Assessment (APP-109).

Table 4-8 Junctions within 10-minute drive of the Wylfa Newydd Development Area, assessment level to which they were assessed in the DCO Transport Assessment and the maximum ratio of flow to capacity across each scenario (with or without development) in all years assessed (2016, 2020, 2023)

Junction reference number	Junction description	Stage 1 assessment	Stage 2 assessment	Maximum ratio of flow to capacity
8	Existing Power Station access/A0525	✓	✓	84%
9	Cromlech Terrace/Cemlyn Road/A5025	✓		14%
14	Minor Road Tregele/A5025	✓		2%
15	Ffordd Y Felin/High Street/A5025	✓		16%
16	Road to Rhosgoch/A5025	✓		4%
26	Proposed WNDA access/A5025	✓	✓	63%
27	Proposed MEEG Access	✓	✓	0%
38	Priority Junction west of Rhosgoch	✓		21%

4.3.45 It can be seen from Table 4-8 that apart from the Existing Power Station access/A0525 junction (Junction Reference Number 8), no other junction is approaching capacity in any assessment scenario or year. Therefore, it is not expected that additional traffic related to the change in worker shift patterns passing through the above junctions in the 10-minute period between 17:50-18:00 would make any material difference to the results of the peak hour assessments undertaken in the DCO Transport Assessment (APP-101), with the exception of the Existing Power Station access/A0525. Given this access is used by vehicles travelling to and from the Wylfa Newydd Development Area any potential additional delays would be experienced by workers travelling to and from the Wylfa Newydd Development Area and not by members of the general public and consequently this is considered acceptable.

2020 Night shift

4.3.46 The change to night shift timings in 2020 is from three night shift staggers in the DCO application to one single night shift starting at 19:30 and finishing at 06:00.

4.3.47 Allowing one hour for workers to travel across Anglesey to/from the Wylfa Newydd Development Area before/after the shift start/end time means that all traffic would clear the junctions assessed in the DCO Transport Assessment (APP-101) outside of the assessed AM and PM peak hours (08:00-09:00 and 17:00-18:00).

4.3.48 This offers an improvement on the DCO application in traffic terms as the analysis presented in the DCO Transport Assessment (APP-101) included workers travelling during the peak hour through the junctions assessed on Anglesey before the start of the third stagger of the night shift at 17:30, i.e. they would be on the network between 16:30-17:30.

Traffic impact in 2023

4.3.49 The change for shift timings in 2023 has no detrimental impacts to the junctions assessed in the DCO Transport Assessment (APP-101). This is due to the fact that the change would not affect the day shift start times and the day shift end times move further away from the PM peak hour. The night shift start and end times also move further away from the AM and PM peak periods.

4.3.50 This means that impacts are likely to be only positive to the performance of junctions compared to those submitted in the DCO Transport Assessment (APP-101) for the 2023 peak construction year.

Impact on road safety

4.3.51 The change to shift timings helps reduce vehicle movements on the road network during times when pupils are travelling to and from school. In 2020, for the day shift all workers need to commence work by 07:30 rather than by 08:00 as in the DCO application. For the night shift in 2020 and 2023, shifts start in the early evening (19:30 or 20:00) rather than in late afternoon (16:30 to 17:30) as in the DCO application. This means the potential for conflicts between vehicles travelling to the Wylfa Newydd DCO Project and vehicles associated with travel to and from local schools is reduced.

Summary

4.3.52 The change to worker shift patterns does cause changes with some directions and time periods experiencing small increases in delays per vehicle and some directions and time periods experiencing small reductions in delays per vehicle compared to the DCO Transport Assessment (APP-101).

4.3.53 Overall, the updated traffic assessment of Britannia Bridge shows that the change does not cause any new or different likely significant environmental effects than those reported in the Environmental Statement.

4.3.54 Similarly, the change to worker shift patterns is expected to have no overall detrimental impact on the junctions assessed in the DCO Transport

Assessment (APP-101), and in some cases would improve the junction performance at certain junctions at certain times of the day owing to some of the proposed shift start/end times being further away from the AM and PM peak hours of travel on the local highway network when compared to the analysis presented in the DCO application. Overall, the updated traffic assessment of other junctions shows that the change does not cause any new or different likely significant environmental effects than those reported in the Environmental Statement.

4.4 Traffic on public access and recreation

Relevant updates

4.4.1 The updates to the application of relevance to traffic on public access and recreation are those arising from the Requests for Non-Material Change for the changes to worker shift patterns and HGV numbers and delivery windows. These are further outlined in Tables 4-1 to 4-4.

Revised assessments – HGV delivery window

4.4.2 The proposed changes to HGVs delivery windows would extend the periods during which there would be adverse effects on onshore recreation and active travel. When weekday evenings and/or Saturday deliveries occur, there would be an expected decrease of HGV numbers during weekdays 07:00 to 19:00 as a result of the HGV profiles not changing. Combined with existing embedded mitigation measures already secured in the DCO application, and the limits imposed for weekday evenings and Saturday as part of the proposed change, there would be no new or different likely significant environmental effects predicted and presented in chapter C3 [APP-090] of the Environmental Statement. Further detail can be found starting at paragraph 2.5.13 in Request for Non-Material Change (RfNMC) no.5 HGV Delivery Window [REP4-013].

Revised assessments – Worker Shift Patterns

4.4.3 The change to construction worker shift patterns is not anticipated to lead to any net increase or decrease in the number of vehicles entering or exiting the Park and Ride or using the A5025 to access the Wylfa Newydd Development Area. However, it would lead to minor changes to the peak flows, which would increase as a result of a reduction in the number of shifts.

4.4.4 Therefore, the change in construction worker shift patterns would not result in new or different likely significant environmental effects than those reported in chapter C3 [APP-090] of the Environmental Statement.

4.5 Traffic on noise and vibration

Relevant updates

4.5.1 The updates to the application of relevance to traffic on noise and vibration are those arising from the Requests for Non-Material Change for the changes to worker shift patterns and HGV numbers and delivery windows. These are further outlined in Tables 4-1 to 4-4.

Revised assessments – HGV delivery window

4.5.2 The traffic modelling described in chapter C2 [APP-089] of the Environmental Statement is based upon annual average weekly total construction HGV traffic operating on the local and wider road network between 07:00 and 19:00 on weekdays. Some of the outputs from this traffic modelling are used as inputs to the noise and vibration assessment as reported in chapter C5 [APP-092] of the Environmental Statement. The assessment of the change has been undertaken using the same methodology as the assessment in chapter C5 [APP-092] of the Environmental Statement. With this in mind, the information for the methodology of which this assessment has been undertaken can be found in chapter B6 [APP-071] of the Environmental Statement.

4.5.3 To investigate the potential effects from a change in HGV delivery windows, further noise modelling was conducted and additional noise and vibration assessments undertaken.

4.5.4 For weekdays, the noise modelling was based on the same annual average number of HGVs during weekdays as used in the DCO assessments, but with the additional constraint that 20 HGV movements in each direction would occur in the evening period between 19:00 and 23:00. For Saturday mornings, noise modelling was based on a maximum of 50 HGV movements in each direction between the hours of 08:00 and 13:00; this results in a conservative assessment as a result of using a maximum rather than an annual average value.

4.5.5 The changes relate to the construction phase only. As the proposed A5025 Off-line Highways Improvements will not be completed when HGV deliveries first start, two scenarios have been reassessed; these are the existing A5025 route in 2020 (the early years without bypass and with On-Line Highway Improvements which include sections of pavement reconstruction and widening, and sections of new surface dressing) and the A5025 in 2023 with the completed Off-line Highways Improvements. The 2023 scenario also represents the peak construction traffic year.

4.5.6 For each situation the following four periods are considered; this allows the effects of the delivery periods to be assessed both individually and cumulatively. The DCO application scenario is included and form the benchmark against which changes to effects are established:

- DCO application - Weekday (07:00 to 19:00), assessed using the daytime road traffic noise assessment criteria set out in the Environmental Statement chapter C5 [APP-092]. These criteria include

the change in the daytime noise level in the short-term using the $L_{A10,18h}$ noise metric, and whether the free-field noise level exceeds a value of 50 dB $L_{Aeq,16h}$ which is the threshold below which the World Health Organization Guidelines for Community Noise [RD1] consider that the majority of the adult population will be protected from becoming moderately annoyed.

- Period 1 – Weekday + Weekday Evening (19:00 to 23:00), using DCO average annual HGV numbers with the additional constraint of 20 HGV movements in each direction in the weekday evening period. The effects of this period are determined by considering the change in noise levels over the 19:00 to 23:00 period using the $L_{A10,4h}$ noise metric and whether a value of 50 dB $L_{Aeq,16h}$ is exceeded over the period 07:00-23:00
- Period 2 – Weekday + Saturday (08:00 to 13:00), using a maximum of 50 HGV movements in each direction to ensure that the worst-case effects during the Saturday (08:00 to 13:00) period are identified. The effects of this period are determined by considering the change in noise levels over the 08:00 to 13:00 period using the $L_{A10,5h}$ noise metric and whether a value of 50 dB $L_{Aeq,16h}$ is exceeded over the period 07:00-23:00.
- Period 3 – Weekday + Weekday Evening (19:00 to 23:00) + Saturday (08:00 to 13:00), which represents the worst case cumulative situation arising from Period 1 (evenings) and Period 2 (Saturday mornings) in combination at each receptor.

The paragraphs below provide a summary of the effects from the changes.

Residential receptors

4.5.7 The predicted noise levels at residential properties for the DCO and Period 1 (both on-line and off-line) scenarios are shown in Appendix C-A.

4.5.8 Table 4-9 and Table 4-10 provide a comparative summary of the overall balance of significant adverse effects at residential receptors as detailed in chapter C5 [APP-092] of the Environmental Statement, and for each Period for the proposed change to HGV delivery windows. The results are presented for the day effects at each receptor since this is where the variation in effects arises due to the additional HGV scenarios in relation to the DCO application. Table 4-9 and Table 4-10 present the balance of worst case effects (by offsetting adverse effects with beneficial effects) and shows the total number of significant adverse effects at residential receptors with the given scenario and in the absence of any mitigation.

Table 4-9 Summary of significant effects pre-mitigation at residential receptors for the 2020 without bypass assessment year.

	Adverse	Beneficial	Balance	Change in balance	Percentage change
DCO ES	273	0	273	-	-
Period 1 (DCO + Weekday evening)	285	0	285	+12	+4%
Period 2 (DCO + Saturday)	277	0	277	+4	+1%
Period 3 (DCO + Weekday evening + Saturday)	289	0	289	+16	+6%

4.5.9 In 2020 prior to the bypass completion there would be significant adverse effects at 12 additional residential receptors during the day with the HGV movements extending into the weekday evening (Period 1) compared to the DCO application. The overall balance increases by four significant adverse effects when considering the DCO application plus HGV movements on Saturday mornings only (Period 2). This indicates that conducting 20 HGV movements in each direction on the weekday evening would have greater effects compared with 50 HGV movements in each direction during Saturday mornings. This is due to one of the assessment criteria which is a test against the 50 dB $L_{Aeq,16h}$ threshold which is calculated over the whole daytime period (07:00 to 23:00) and which is exceeded at a greater number of properties on weekdays than on Saturdays as average traffic flows (including all vehicles, not just HGVs) are higher on weekdays than Saturdays.

4.5.10 Examining the combined effects, if deliveries occur on weekday evenings and on Saturday mornings (Period 3), there would be, pre-mitigation, significant adverse effects at 289 properties compared to 273 properties in the DCO application, an increase of 16 properties.

Table 4-10 Summary of significant effects pre-mitigation at residential receptors for the 2023 with bypass assessment year.

	Adverse	Beneficial	Balance	Change in balance	Percentage change
DCO ES	152	26	126	-	-
Period 1 (DCO + Weekday evening)	166	26	140	+14	+11%

	Adverse	Beneficial	Balance	Change in balance	Percentage change
Period 2 (DCO + Saturday)	154	26	128	+2	+2%
Period 3 (DCO + Weekday evening + Saturday)	167	26	141	+15	+12%

4.5.11 In the peak construction year there would be significant adverse effects at 14 additional residential receptors during the day with the HGV movements extending into the weekday evening (Period 1) compared to the DCO application. The overall balance would increase by two significant adverse effects when considering the DCO application plus HGV movements on Saturday mornings only (Period 2). This demonstrates that the introduction of 20 HGV movements in each direction on the weekday evenings would have greater effects compared with the introduction of 50 HGV movements in each direction during Saturday mornings. This is due to one of the assessment criteria which is stated as an absolute noise level over the whole daytime period (07:00 to 23:00) being met at a greater number of properties during weekdays than on Saturdays.

4.5.12 Examining the combined effects, if HGVs are operated on weekday evenings and on Saturday mornings (Period 3), there would be, pre-mitigation, a significant adverse balance of effects at 141 properties compared to 126 properties in the DCO application, an increase of 15 properties.

4.5.13 When considering the cumulative effects for both 2020 and 2023 it has been derived that for the DCO application there would be 307 significant adverse effects. Broken down by delivery period with the change this would be:

- 321 for Period 1;
- 312 for Period 2; and,
- 325 for Period 3.

4.5.14 This demonstrates that there would be an increase in significant adverse effects of 18 properties when compared to the DCO application.

4.5.15 The additional mitigation applied in the DCO application for the cumulative effects for both 2020 and 2023 resulted in 103 properties being eligible for noise insulation. Using the same DCO criteria for the change results in the following eligibility:

- 104 for Period 1;
- 108 for Period 2; and,
- 109 for Period 3.

4.5.16 This demonstrates that there would only be a maximum increase in properties qualifying for noise insulation of six properties when compared to the DCO application.

Non-residential receptors

4.5.17 Chapter C5 [APP-092] of the Environmental Statement identified two potential significant adverse effects. These were investigated further and were deemed to be not significant [see APP-092]. A similar two stage process has been undertaken here, with potential significant adverse effects identified and reported in Table 4-11.

4.5.18 In chapter C5 [APP-092] of the Environmental Statement the assessment criteria were exceeded at a number of PRoWs, but these were not assessed to be significant due to the relatively short duration that users of the PRoWs would be subject to road traffic noise effects while traversing the walking routes towards and away from the roads. In addition, a single significant beneficial effect was identified at the Llanfachraeth Play Area.

4.5.19 Table 4-11 presents a summary of the numbers of non-residential receptors expected to experience potential significant effects for each assessment period in the absence of any mitigation. This table includes all PRoWs presented in the DCO application where the threshold for the onset of a significant effect was expected to be exceeded (but later excluded due to the short duration of exposure for users).

Table 4-11 Potentially significant adverse effects for each period for the change to HGV delivery windows for non-residential receptors

Period	Number of potentially significant adverse effects, with potentially significant beneficial effects shown in parentheses				
	Educational	Places of Worship	Commercial	Industrial	Other
DCO ES	0 (0)	0 (0)	0 (0)	0 (0)	2 (2)
Period 1 (DCO + Weekday evening)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0)
Period 2 (DCO + Saturday)	1* (0)	0 (0)	0 (0)	0 (0)	16 (2)
Period 3 (DCO + Weekday evening + Saturday)	1* (0)	0 (0)	0 (0)	0 (0)	16 (2)

* Noise levels at Rhyd Y Llan school in Llanfaethlu exceed the potential onset of significant effects on Saturday mornings, but the school is typically not open at this time.

4.5.20 Table 4-11 shows for the weekday evenings (Period 1), there would potentially be significant adverse effects at two 'other' receptors. Both of these are PRoWs and, as set out in the DCO application, the noise effects at these are not assessed to be significant. It is noted that in the 2023 assessment there would be significant beneficial effects at two 'other' receptors (Llanfachraeth Play Area and a PRoW adjacent to Section 7 (Cefn Coch)) but these benefits would not occur until after the A5025 Off-Line Highway Improvements have

been completed; as they are not present in both the 2020 and 2023 assessments they have been omitted from the table.

4.5.21 With Saturday morning deliveries (Period 2) there would potentially be a significant adverse effect at one school, significant adverse effects at 'other' receptors, and significant beneficial effects at two 'other' receptors. Considering the potential adverse effects in detail:

- Schools are typically not open on Saturday mornings, and any potential effects would only be until the A5025 Off-Line Highway Improvements are completed; therefore, no adverse effect is concluded for this receptor.
- Fifteen (15) of the 'other' receptors are PRoWs, and as set out in the DCO application the noise effects at these are not assessed to be significant; this is due to the relatively short duration that users would be subject to road traffic noise effects while traversing the PRoWs. It is also noted that these would only be affected after the A5025 Off-Line Highway Improvements are completed.
- The remaining 'other' receptor is Dronwy Caravan Park, which operates from 1 March to 31 January each year. The Saturday day-time free-field noise level at this receptor is expected to increase by 3dB from 38dB $L_{Aeq,16h}$ to 41dB $L_{Aeq,16h}$. The DCO application does not set out minimum thresholds for significance at caravan parks, but in relation to new buildings, BS 8233: 2014 [RD2] suggests that for steady external noise sources, during the day, an internal noise level of 35 dB $L_{Aeq,16h}$ is appropriate for resting conditions within living rooms and bedrooms. While it is not possible to be precise regarding the sound insulation offered by different caravan constructions, research by Napier University [RD3] suggests that a partially open window will provide 12-18 dB(A) reduction in road traffic noise from the outside to inside. It is reasonable to assume that the sound insulation performance of a caravan would not be worse than that of a partially open window, and therefore internal daytime noise levels within caravans will remain below 35 dB $L_{Aeq,16h}$. In relation to the outdoors space within the caravan park, the noise levels will remain within the range at which the World Health Organization Guidelines for Community noise [RD1] consider the majority of the adult population will be protected from becoming moderately annoyed. In summary, no adverse effects are expected within or outside caravans as a result of the proposed change in HGV delivery times, and therefore it is concluded that no significant adverse effects will occur at this receptor.

4.5.22 In Period 3, which is the worst-case combination of weekday evening and Saturday morning deliveries, the number of potential significant adverse effects at non-residential receptors would increase from two to 17 when compared with the DCO application, while the number of significant beneficial effects would decrease to zero as no benefits would exist in both the 2020 and

2023 assessments. The potentially significant effects are as detailed above for Period 1 and 2 and, after detailed consideration of the situation at each receptor, there will be no new or different likely significant effects expected to occur as a result of the combined changes to HGV delivery times on non-residential receptors.

Groundborne and airborne vibration

4.5.23 The change does not introduce new types of vehicles or effect the delivery profile stated in the DCO application and therefore instantaneous peak particle velocity vibration and airborne vibration would not be expected to change with an extension of the HGV delivery window. As such the assessments made in chapter C5 [APP-092] of the DCO application on vibration remain the same.

Mitigation arising from the change

Additional mitigation secured in the DCO application

4.5.24 The use of low noise road surface secured in the Design and Access Statement – volume 3 [as submitted at Deadline 8 (25 March 2019)] of the DCO application would reduce some of the effects arising from the change.

4.5.25 In consideration of the benefits of this it should also be noted that the guidance within the Design Manual for Roads and Bridges [RD4] states that below the speed of 75km/h a low noise surface only delivers a reduction of 1dB(A)[1] (compared with a reduction of 3.5dB(A) for speed above 75km/h). Recent work which has been presented at a 2018 Institute of Acoustics (IOA) conference suggests that the noise reduction from a low noise surface does not suddenly reduce from 3.5dB(A) to 1dB(A), and it is in fact a gradual drop-off. The paper presented provides a method to quantify this reduction for speeds less than 75km/h. With several locations along the A5025 having speeds between 60km/h and 65km/h, the paper suggests the potential benefit in terms of noise reduction at such locations could be greater than the 1dB(A) which has been assumed within the Environmental Statement calculations. It is therefore possible that this assessment underestimates the beneficial effects of Low Noise Surfaces, and this should be borne in mind when considering the value of this mitigation.

4.5.26 The implementation of a LNMS [REP3-050] for the Wylfa Newydd Project, which is secured in the Wylfa Newydd CoCP [as submitted at Deadline 8 (25 March 2019)], will also provide reduced effects arising from the change. Eligibility for noise insulation under the LNMS [REP3-050] as set out in section 8.3 of the Wylfa Newydd CoCP [as submitted at Deadline 8 (25 March 2019)] is based on multiple criteria, including whether the predicted weekday daytime noise level at properties exceeds 68 dB $L_{A10,18\ hours}$.

[1] "A-weighting" refers to the noise level that represents the human ear's response to sound. The dB(A) unit is internationally accepted and has been found to correspond well with people's subjective reaction to noise.

4.5.27 When considering the cumulative effects of both 2020 and 2023, there would be six properties additional qualifying for noise insulation when compared to the DCO application as presented in paragraph 4.5.16.

Enhanced mitigation for the change

4.5.28 With the potential for a small increase in significant adverse effects during the construction period, a number of options for enhanced mitigation have been considered:

- a reduction in speed limit on part or all of the A5025;
- lowering the daytime threshold of eligibility for the LNMS contained within the Wylfa Newydd CoCP [as submitted at Deadline 8 (25 March 2019)] from 68 dB $L_{A10,18h}$ to 63 dB $L_{A10,18h}$; and,
- direct deliveries to site rather than the current position which requires all deliveries to be routed through the Logistics Centre.

4.5.29 A reduction in speed will cause a reduction in noise, and so there is the possibility to use this measure as noise mitigation. Potential benefits could be up to a 1dB reduction in noise for every 10km/h reduction in speed. However, it is considered that such a mitigation measure is likely to be unpopular and could potentially cause delays to those using the A5025, which would include the Wylfa Newydd DCO Project construction traffic. This measure for enhanced noise mitigation is therefore not proposed for further consideration.

4.5.30 Given the increase in significant adverse noise effects at up to 18 properties as a result of this change, and as a result of the number of significant effects identified in the DCO application, feedback through Relevant Representations and ongoing Statement of Common Ground discussions, Horizon will extend the commitments made in the LNMS set out in section 8.1 of the Wylfa Newydd CoCP [as submitted at Deadline 8 (25 March 2019)] irrespective of this change. This would involve reducing the noise threshold at which properties would be eligible for noise insulation (secondary glazing and acoustic ventilation) from road traffic noise by 5 dB from 68 dB $L_{A10,18h}$ to 63 dB $L_{A10,18h}$. Doing this will result in an additional 50 properties being potentially eligible for noise insulation in the cumulative situation when the Period 3 extended operating hours for HGVs in the cumulative 2020 and 2023 situation is considered (159 properties potentially eligible compared to 109 in the DCO application).

Conclusion

4.5.31 The findings of the revised noise assessment show that the change to the HGV delivery window would slightly increase the overall number of significant adverse effects pre-mitigation compared to those reported in chapter C5 [APP-092] of the Environmental Statement for residential and non-residual receptors. As a result of this and the number of significant effect in the DCO application, enhanced mitigation which will be secured through an update to the Wylfa Newydd CoCP [as submitted at Deadline 8 (25 March 2019)] is proposed. While these measures will not alter external noise levels upon which the assessment methodology and the residual effects in the

Environmental Statement are based, these measures will reduce the internal noise levels and provide noise attenuated ventilation to eligible buildings. Therefore, it is concluded that the proposals avoid significant adverse impacts on health and quality of life from noise in accordance with the Overarching National Policy Statement for Energy (EN-1).

Revised assessments – Worker Shift Patterns

4.5.32 Chapter C2 [APP-089] of the Environmental Statement presents the results of the traffic modelling undertaken for a Reference Case (without the Wylfa Newydd DCO Project) and for the following scenarios with the Wylfa Newydd DCO Project:

- 2020 with the A5025 Off-line Highway Improvements operational;
- 2020 without the A5025 Off-line Highway Improvements operational;
- 2023 (peak construction); and
- 2033 (peak operation).

4.5.33 Chapter C5 [APP-092] of the Environmental Statement uses the outputs of the traffic modelling presented in chapter C2 [APP-089] of the Environmental Statement to assess the potential effects of day-time and night-time road traffic noise related to the construction phase.

4.5.34 To determine the significance of the change to shift patterns, a sensitivity study has been conducted which compares the road traffic noise emissions of segments of road resulting from the updated shift patterns to those with the shift patterns as presented in the DCO application. The noise emissions both in the DCO application and in the sensitivity study have been calculated using the mathematical relationships presented within the Department of Transport Welsh Office '*Calculation of Road Traffic Noise*' (CRTN) [RD5] and consider the following variables:

- the traffic flow;
- the speed of the traffic;
- the composition of the traffic; and
- the road surface.

4.5.35 The resulting noise emission applies at a reference distance of 10m from the nearside carriageway edge. The sensitivity study noise emissions at 10m from each road segment have been calculated for the day-time period (06:00-00:00) and also the night-time period (23:00-07:00), which are consistent with the periods adopted in the DCO application.

4.5.36 To fully explore the potential road traffic noise effects arising from the Wylfa Newydd DCO Project, the DCO application considered several scenarios at differing points in time during the construction and operational phases. However, because the changes to shift patterns are related to the construction phase, only the construction scenarios have been considered in the sensitivity study:

- Year 2 (or 2020) – without bypasses;
- Year 2 (or 2020) – with bypasses; and
- Year 5 (or 2023) – peak construction year, with bypasses.

4.5.37 Four road segments (often referred to as 'links' in the context of traffic modelling) have been selected for the sensitivity study as they are deemed representative of three receptor groupings where there were high numbers of adverse significant effects across the entire A5025 route reported in chapter C5 [APP-092] of the Environmental Statement. The road segments that have been considered in this sensitivity study are detailed in Table 4-12 below.

Table 4-12 Road segments selected for the noise sensitivity study which reflects the change to shift patterns

Link ID	Road	Link Description
A5025_90	A5025	Llanfaethlu to Chapel St (Llanfaethlu to Speed Limit Change 1)
A5025_101	A5025	Chapel St to Llanrhyddlad (Speed Limit Change 1 to Llanrhyddlad)
A5025_BY2_20 (for the Without bypasses scenario)	A5025	Llanfachraeth (S) to Llanfachraeth (N) (Via Bypass)
A5025_40 (for the With bypasses scenario)	A5025	Minffordd to Lon Y Felin

4.5.38 The results of the sensitivity study are presented in terms of the change in noise emissions at the reference distance of 10m from the nearside carriageway edge for each road segment in each scenario. As these road segments are the primary source of noise in the locations considered, any increase or decrease in noise emissions from the road traffic will cause a corresponding increase or decrease in road traffic noise level at nearby properties; therefore, this sensitivity study does not assess effects at each individual receptor.

4.5.39 Table 4-13 below shows the road traffic noise emissions at a reference distance of 10m calculated for day-time and night-time for the shift patterns detailed in the DCO application and the new shift patterns; the difference in the basic noise levels between the new patterns and those submitted in the DCO application is also shown.

4.5.40 Day-time calculations are based on the 18-hour AAWT traffic flows with a correction to account for the percentage of Heavy Goods Vehicle and Public Service Vehicle flows. Night-time calculations are based on the annual average hourly night-time Light Goods Vehicle, Public Service Vehicle and Heavy Goods Vehicle flows.

Table 4-13 Basic noise levels and noise change between the new shift patterns and those submitted in the DCO application. dB = decibel;

Scenario	Road Segment	Basic noise levels – DCO application, LAeq,T[1] (dB)		Basic noise levels – Proposed Shift Patterns LAeq,T (dB)		Basic noise levels Difference (dB)	
		Day	Night	Day	Night	Day	Night
2020 - Project (Without Bypasses)	A5025_90	67.2	65.2	67.2	65.6	0.0	0.3
	A5025_101	69.8	68.9	69.8	69.2	0.0	0.3
	A5025_40	67.9	65.8	67.9	66.1	0.0	0.3
2020 - Project (With Bypasses)	A5025_90	67.2	65.2	67.2	65.6	0.0	0.3
	A5025_101	69.8	68.9	69.8	69.2	0.0	0.3
	A5025_BY2_20	69.9	68.5	69.9	68.9	0.0	0.4
2023 - Project (With Bypasses)	A5025_90	67.8	66.0	67.9	66.0	0.0	0.0
	A5025_101	70.5	69.7	70.5	69.7	0.0	0.0
	A5025_BY2_20	70.7	69.3	70.7	69.3	0.0	0.0

4.5.41 As can be seen in Table 4-13 there are no calculated noise changes between the new shift patterns and those submitted in the DCO application for any scenario or road segment when considering the day-time assessment period. This suggests that the changes in road traffic flows to the day-time period across all assessment scenarios are likely to be minimal and will not change the conclusions of the noise assessment reported for day-time effects in chapter C5 [APP-092] of the Environmental Statement.

4.5.42 Table 4-13 shows that for the night-time period, the change to shift patterns results in a small increase of between 0.3dB to 0.4dB L_{A10} across the first two assessment scenarios (2020 - both with and without bypasses). For the final assessment scenario (2023 with bypasses), there is no change resulting from the change. The increase in noise level for the first two scenarios can be attributed to small increases in traffic flow during this night-time period.

Summary

4.5.43 Assessment of the change shows a noise change of +0.3dB to +0.4dB during the night-time period with no change to day-time basic noise levels.

[1] The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "T" represents the time period to which the noise level relates. For example, LAeq 1 hr is the LAeq level determined over a period of one hour.

4.5.44 To put a noise change of 0.4dB into context, the minimum change in noise level that a trained ear can detect in controlled listening environments is generally taken to be 1.0dB. For long term changes in noise levels in uncontrolled environments, most people can only distinguish differences of 3dB or more.

4.5.45 As the likely noise change at the road segments assessed would be below 1.0dB, it is considered that any increases in worker traffic noise as a consequence of the change would not be perceptible and the conclusions of the noise assessment in chapter C5 [APP-092] of the Environmental Statement are unlikely to change materially. Therefore, there would be no new or different likely significant environmental effects than those reported in the Environmental Statement.

4.6 Residual effects summary

4.6.1 Table 4-14 presents a summary of where residual effects have been updated compared to Volume C of the original Environmental Statement.

Table 4-14 Summary of residual effects for the Project-wide effects

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
Traffic on noise and vibration								
The below residual effects consider the worst magnitude of change in the Period 3 situation (extended delivery hours during weekday evenings and Saturday mornings) at each receptor for both 2020 and 2023.								
Properties in Caergeiliog (South of A55)	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 113 properties	Minor adverse effects at 113 properties.	Offers of noise insulation to occupants of eligible properties, to provide means reducing internal noise levels.	Negligible adverse change at 113 properties	Minor adverse effects at 113 properties.
Properties along Section 7 (Cefn Coch)	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 12 properties, small adverse change at 9 properties, medium adverse	Minor adverse effects at 12 properties, moderate adverse effects at 9 properties, major adverse		Negligible adverse change at 12 properties, small adverse change at 9 properties, medium adverse	Minor adverse effects at 12 properties, moderate adverse effects at 9 properties, major adverse

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
				change at 5 properties	effects at 5 properties	Measure would control indoor noise levels only, and hence would not reduce the significant effects assessed. However, these measures will reduce the internal noise levels and provide noise attenuated ventilation to eligible buildings,	change at 5 properties	effects at 5 properties
Properties in east Llanfachraeth	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 14 properties, small adverse change at 1 property	Minor adverse effects at 14 properties, moderate adverse effects at 1 property		Negligible adverse change at 14 properties, small adverse change at 1 property	Minor adverse effects at 14 properties, moderate adverse effects at 1 property
Properties in Holyhead	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 358 properties	Minor adverse effects at 358 properties		Negligible adverse change at 358 properties	Minor adverse effects at 358 properties
Properties in Kingsland	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 396 properties, small adverse change at 12	Minor adverse effects at 396 properties, moderate adverse effects at 12 properties,		Negligible adverse change at 396 properties, small adverse change at 12	Minor adverse effects at 396 properties, moderate adverse effects at 12 properties,

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
				properties, medium adverse change at 1 property	major adverse effects at 1 property	and therefore it is concluded that the proposals avoid significant adverse impacts on health and quality of life from noise in accordance with the Overarching National Policy Statement for Energy (EN-1).	properties, medium adverse change at 1 property	major adverse effects at 1 property
Properties in Kingsland	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 93 properties, small adverse change at 26 properties, medium adverse change at 14 properties, large adverse change at 2 properties	Minor adverse effects at 93 properties, moderate adverse effects at 26 properties, major adverse effects at 16 properties		Negligible adverse change at 93 properties, small adverse change at 26 properties, medium adverse change at 14 properties, large adverse change at 2 properties	Minor adverse effects at 93 properties, moderate adverse effects at 26 properties, major adverse effects at 16 properties

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
Properties in Llanfihangel-yn-Nhywyn	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 51 properties	Minor adverse effects at 51 properties		Negligible adverse change at 51 properties	Minor adverse effects at 51 properties
Properties in Llangynghenedl	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 13 properties, small adverse change at 18 properties, medium adverse change at 7 properties	Minor adverse effects at 13 properties, moderate adverse effects at 18 properties, major adverse effects at 7 properties		Negligible adverse change at 13 properties, small adverse change at 18 properties, medium adverse change at 7 properties	Minor adverse effects at 13 properties, moderate adverse effects at 18 properties, major adverse effects at 7 properties
Properties in Llanrhyddlad	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 31 properties, small	Minor adverse effects at 31 properties, moderate adverse		Negligible adverse change at 31 properties, small	Minor adverse effects at 31 properties, moderate adverse

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
				adverse change at 29 properties	effects at 29 properties		adverse change at 29 properties	effects at 29 properties
Properties north of Trearddur Bay	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 16 properties	Minor adverse effects at 16 properties		Negligible adverse change at 16 properties	Minor adverse effects at 16 properties
Outlying properties east of Llanaethlu	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 8 properties	Minor adverse effects at 8 outlying properties		Negligible adverse change at 8 properties	Minor adverse effects at 8 outlying properties
Outlying properties at Llanfihangel-yn-Nhywyn	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 35 properties	Minor adverse effects at 35 outlying properties		Negligible adverse change at 35 properties	Minor adverse effects at 35 outlying properties
Properties in Receptor Group E	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 12 properties,	Minor adverse effects at 12 properties, moderate		Negligible adverse change at 12 properties,	Minor adverse effects at 12 properties, moderate

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
				small adverse change at 5 properties, medium adverse change at 3 properties	adverse effects at 5 properties, major adverse effects at 3 properties		small adverse change at 5 properties, medium adverse change at 3 properties	adverse effects at 5 properties, major adverse effects at 3 properties
Outlying properties north of Llanaethlu	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 1 property, medium adverse change at 4 properties	Minor adverse effects at 1 outlying properties, major adverse effects at 4 outlying properties		Negligible adverse change at 1 property, medium adverse change at 4 properties	Minor adverse effects at 1 outlying property, major adverse effects at 4 outlying properties
Outlying properties north of Llanfachraeth	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 7 properties, small adverse change at 3 properties,	Minor adverse effects at 7 outlying properties, moderate adverse effects at 3		Negligible adverse change at 7 properties, small adverse change at 3 properties,	Minor adverse effects at 7 outlying properties, moderate adverse effects at 3

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
				medium adverse change at 4 properties	outlying properties, major adverse effects at 4 outlying properties		medium adverse change at 4 properties	outlying properties, major adverse effects at 4 outlying properties
Properties in Receptor Group C	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 20 properties	Minor adverse effects at 20 properties		Negligible adverse change at 20 properties	Minor adverse effects at 20 properties
Outlying properties north of Valley	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 5 properties, small adverse change at 8 properties	Minor adverse effects at 5 outlying properties, moderate adverse effects at 8 outlying properties		Negligible adverse change at 5 properties, small adverse change at 8 properties	Minor adverse effects at 5 outlying properties, moderate adverse effects at 8 outlying properties
Outlying properties	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 3	Minor adverse effects at 3		Negligible adverse change at 3	Minor adverse effects at 3

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
south of Llanaethlu				properties, small adverse change at 1 property, medium adverse change at 7 properties	outlying properties, moderate adverse effects at 1 outlying property, major adverse effects at 7 outlying properties		properties, small adverse change at 1 property, medium adverse change at 7 properties	outlying properties, moderate adverse effects at 1 outlying property, major adverse effects at 7 outlying properties
Outlying properties south of Llanrhyddlad	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 5 properties, small adverse change at 6 properties	Minor adverse effects at 5 outlying properties, moderate adverse effects at 6 outlying properties		Negligible adverse change at 5 properties, small adverse change at 6 properties	Minor adverse effects at 5 outlying properties, moderate adverse effects at 6 outlying properties
Outlying properties south of Valley	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at	Minor adverse effects at 16		Negligible adverse change at	Minor adverse effects at 16

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
				16 properties	outlying properties		16 properties	outlying properties
Properties at the Old Power Station	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 2 properties	Minor adverse effects at 2 properties		Negligible adverse change at 2 properties	Minor adverse effects at 2 properties
Properties at the Penros Industrial Estate	High	Increases in road traffic noise	Temporary adverse	No change	No effects		No change	No effects
Properties in Receptor Group F	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 49 properties, small adverse change at 26 properties	Minor adverse effects at 49 properties, moderate adverse effects at 26 properties		Negligible adverse change at 49 properties, small adverse change at 26 properties	Minor adverse effects at 49 properties, moderate adverse effects at 26 properties
Properties at Valley	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 553	Minor adverse effects at 553		Negligible adverse change at 553	Minor adverse effects at 553

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
				properties, small adverse change at 3 properties	properties, moderate adverse effects at 3 properties		properties, small adverse change at 3 properties	properties, moderate adverse effects at 3 properties
Properties in west Llanfachraeth	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 74 properties, small adverse change at 119 properties, large adverse change at 2 properties	Minor adverse effects at 74 properties, moderate adverse effects at 119 properties, major adverse effects at 2 properties		Negligible adverse change at 74 properties, small adverse change at 119 properties, large adverse change at 2 properties	Minor adverse effects at 74 properties, moderate adverse effects at 119 properties, major adverse effects at 2 properties
Properties in Receptor Group A	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 4 properties	Minor adverse effects at 4 properties		Negligible adverse change at 4 properties	Minor adverse effects at 4 properties

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
Properties in Receptor Group G	High	Increases in road traffic noise	Temporary adverse	Negligible adverse change at 1 property	Minor adverse effects at 1 property		Negligible adverse change at 1 property	Minor adverse effects at 1 property

4.7 References

Table 4-15 Schedule of references

ID	Reference
RD1	World Health Organization. (WHO) Guidelines for Community Noise 1999. [Online] Available from: http://whqlibdoc.who.int/hq/1999/a68672.pdf
RD2	British Standards Institute. 2014. British Standard BS 8233: 2014: Guidance on Sound Insulation and Noise Reduction for Buildings. Available from: https://shop.bsigroup.com/ProductDetail/?pid=000000000030241579
RD3	Tim Waters-Fuller and Daniel Lurcock, NANR116: 'Open/closed window research' sound insulation through ventilated domestic windows. Edinburgh, UK: The Building Performance Centre, Napier University, 2007. Available from: https://www.napier.ac.uk/~/media/worktribe/output-246785/twfrepnanr116pdf.pdf
RD4	Highways Agency. 2006. Design Manual for Roads and Bridges Vol 7 Pavement Design and Maintenance Section 2 Part 1 Traffic Assessment (HD24/06) [Online] Available from: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol7/section2/hd2406.pdf
RD5	Department for Transport and the Welsh Office. 1988. *Calculation of Road Traffic Noise* [Online] Available from: http://www.programmeofficers.co.uk/Cuadrilla/CoreDocuments/CD31/CD31.24.pdf

5 Wylfa Newydd Development Area

5.1 Introduction

Site-specific updates

5.1.1 Table 5-1 outlines the updates that have occurred in relation to the Wylfa Newydd Development Area since the application for development consent that are of relevance to the Environmental Statement. A review of these updates has been undertaken by EIA specialists across all topics assessed in the original Environmental Statement and the following sections provide an update to those assessments. It has been concluded that the updates are not applicable to the assessment for the following topics, Soils and Geology; Socio-economics and Radiological Effects.

5.1.2 Where necessary, additional information of relevance to the assessment is discussed in the topic specific sections of this chapter.

Table 5-1 Updates at the Wylfa Newydd Development Area

Section Reference	Relevant updates arising since submission	Relevant topics
DCO [as submitted at Deadline 8 (25 March 2019)]		
Schedule 3, Requirement WN1	Measures to mitigate the effects on heritage assets will be secured through inclusion in an Archaeological Mitigation Scheme which has been made a requirement of the DCO. See also Main Site sub-CoCP, Section 12.1 in this table.	Cultural Heritage
Plans, Sections and Drawings 2.6.1 Wylfa Newydd Development Area and Power Station Site Plans [REP5-013]		
WN0902-HZDCO-LFM-DRG-00005 Rev 3.0	Amendments to the illustrative 'Reference Point 5 – Operation' plan which has been amended to reflect the changes to reinstatement in the form of increased biodiverse habitat provision including wildlife ponds as provided for in the updated LHMS design principles (see LHMS section below).	Terrestrial and Freshwater Ecology Landscape and Visual Cultural Heritage
WN0902-HZDCO-OHW-DRG-00063	A dual use path for cyclists and pedestrians would be provided all the way between the junction of Nanner Road and the A5025 and the Existing Power Station Access Road junction. The	Public Access and Recreation

Section Reference	Relevant updates arising since submission	Relevant topics
	drawings have been updated to reflect this amendment.	
Plans, Sections and Drawings 2.4 Rights of Way – All DCO Sites [as submitted at Deadline 8 (25 March 2019)]		
WN0902-HZDCO-ROW-DRG-00030 (Off-line Section 9) WN0902-HZDCO-ROW-DRG-00021 - 23 WN0902-HZDCO-ROW-DRG-00026 - 28	A dual use path for cyclists and pedestrians would be provided all the way between the junction of Nanner Road and the A5025 and the Existing Power Station Access Road junction. The drawings have been updated to reflect this amendment.	Public Access and Recreation
WN0902-HZDCO-ROW-DRG-00026	The proposed route of the Wales Coast Path during operation has been amended on the illustrative plan to reduce the length of the diversion.	Public Access and Recreation
Main Power Station Site Sub- CoCP [as submitted at Deadline 8 (25 March 2019)]		
Table 4-1 and section 8.2	Extension to the time frame within which blasting for the Main Construction works is permitted, from: • Monday to Friday between 10.00 and 16.00, and Saturday between 10.00 and 13.00; to • Monday to Friday 09:00 – 19:00 (November to February inclusive) • Monday to Friday 09:00 – the earlier of dusk or 19:00 (March to September inclusive) • Saturday 08:00 – 13:00	Noise and Vibration Terrestrial and Freshwater Ecology Marine Environment Combined Topic Effects
Table 4-1	The proposed working hours have been extended for specified activities of Main Construction	Air quality Noise and vibration

Section Reference	Relevant updates arising since submission	Relevant topics
	into the evening (up to 22:00 for site grading and for other activities to 24 hours) and are included in full in Table 4-1 of the Main Power Station Site sub-CoCP [as submitted at Deadline 8 (25 March 2019)]. The full details of the original proposed working hours are found in the original Main Power Station Site sub-CoCP [APP-415].	Terrestrial and Freshwater Ecology Cultural Heritage Lighting Marine Environment Combined Topic Effects Cumulative Effects (see Chapter 10)
Section 4.2	Main power island laydown area, behind Mound B, will allow for remote switching of lighting in zones within the laydown area when access is required to a specific zone during darkness Variable lighting levels for the Wylfa Newydd Development Area car park (during construction) will be applied. These are new commitments that were not included in the original sub-CoCP.	Landscape and Visual Cultural Heritage
Section 7.5	90% of Non-road Mobile Machinery to meet EU stage IV emissions (EC Directive (97/68/EC), 10% of NRMM to meet stage IIIB emissions. Relevant marine vessels undertaking marine works to comply with International Maritime Organisation (IMO) MARPOL Annex VI Tier III oxides of nitrogen (NOx) emissions standards. This proportion of plant of higher standards was not quantified in the original sub-CoCP. NRMM were assumed to comply with the Stage IIIB EU NRMM emission	Air quality Terrestrial and Freshwater Ecology Cultural Heritage

Section Reference	Relevant updates arising since submission	Relevant topics
	standards (EC Directive 97/68/EC) in the original Environmental Statement.	
Section 8.2	95% of blasting events in any six-month period conducted between 18.00-19.00 on weekdays (Monday to Friday) will not exceed the appropriate maximum satisfactory magnitude of 4.5 mms^{-1} as recommended in BS 6472-2: 2008.	Noise and Vibration
Section 10.4	Appropriate groundwater monitoring will be undertaken to determine if there is an effect on Tre'r Gof Site of Special Scientific Interest (SSSI). If this monitoring identifies an effect on the qualifying groundwater dependent terrestrial ecosystems, further additional mitigation could include: • Controlling water loss from the site to avoid drying and oxidation of the peat body • Construction methods to reduce groundwater ingress to cooling water tunnel e.g. grouting of major inflow fractures • Groundwater recharge Monitoring and mitigation will be integrated with wider adaptive water management within the Tre'r Gof catchment. This is a new commitment that was not included in the original sub-CoCP.	Surface Water and Groundwater
Section 12.1	Measures to mitigate the effects on heritage assets will be secured through inclusion in an Archaeological Mitigation Scheme which will be made a requirement of the DCO. The Archaeological	Cultural Heritage

Section Reference	Relevant updates arising since submission	Relevant topics
	Mitigation Scheme will include a Written Scheme of Investigation and will be submitted to and approved by IACC, in consultation with Cadw, prior to the commencement of the Power Station Works. This is an update to the commitments in the original sub-CoCP. See also related item under DCO in this table.	
Table 12-1	Level 4 historic building survey for Felin Gafnan Corn Mill (Grade II* Listed Building, Asset 137), Mill House at Felin Gafnan (Grade II* Listed Building, Asset 144), Corn-drying House at Felin Gafnan (Grade II Listed Building, Asset 141). This is a new commitment that was not included in the original sub-CoCP.	Cultural Heritage
Marine Works Sub- CoCP [as submitted at Deadline 8 (25 March 2019)]		
Table 4-1 and Section 8.3	Extension to the time frame within which blasting for the Main Construction works is permitted, from: • Monday to Friday between 10.00 and 16.00, and Saturday between 10.00 and 13.00; to • Monday to Friday 09:00 – 19:00 (November to February inclusive) • Monday to Friday 09:00 – the earlier of dusk or 19:00 (March to September inclusive) • Saturday 08:00 – 13:00	Noise and Vibration Terrestrial and Freshwater Ecology Marine Environment Combined Topic Effects
Section 5.2	Daily vessel movements will not exceed a maximum of 16 movements per 24-hour period	Shipping and Navigation Air Quality

Section Reference	Relevant updates arising since submission	Relevant topics
	(eight vessels accessing the available berths per day). This was previously 4 vessel movements per day.	Noise and Vibration Terrestrial and Freshwater Ecology Marine Environment Combined Topic Effects Cumulative Effects (see Chapter 10)
Section 11.2	Further proposals have been detailed for around the shoreline protection and restoration of the intertidal zone which will be implemented following removal of the temporary causeway. This includes: - aim to return topography of the substrate including gradient and structural heterogeneity - replacement of 15 rockpools	Marine Environment
Section 11.3	Ecological enhancement of marine works including: - 90 precast vertical rockpools will be installed at various heights on the MOLF wall (initial installations will be immediately following construction of the MOLF, with final installations occurring at the end of Main Construction); - Areas of rock armour (including the leeward face of the western breakwater, and any rock revetment) will be seeded with natural rock won from the site, where practicable (alternatively,	Marine Environment Landscape and Visual Cultural Heritage

Section Reference	Relevant updates arising since submission	Relevant topics
	imported material akin to natural rock will be used); - 10 x pre-cast rockpools installed in rock armour on western breakwater; - Ecological enhancement of 16m3 precast concrete units on the breakwaters, to include textured surfaces; - Retaining surface roughness within the dredged area to promote recolonisation; - Seeding or transplanting marine kelp in subtidal areas; - Ecological monitoring programme and adaptive management as required This expands on and provides additional commitments that were not included in the original sub-CoCP.	
Section 11.5	Coastal geomorphology monitoring programme and adaptive management approach. Horizon will agree details with NRW through the marine licence but the monitoring programme will include: - Annual topographic surveys during the construction phase of the Wylfa Newydd DCO Project to monitor the topography of Esgair Gemlyn. Relevant data collected through the construction phase will be used to inform future monitoring and management. This is a new commitment that was not included in the original sub-CoCP.	Marine Environment

Section Reference	Relevant updates arising since submission	Relevant topics
Construction Method Statement (CMS) [REP5-018]		
Section 4.1	The cooling water tunnels will be lined post-construction within the Tre'r Gof catchment such that there will be no ingress or loss of water from the tunnel. This is a new commitment that was not included in the original CMS.	Surface Water and Groundwater
Landscape and Habitat Management Strategy (LHMS) [as submitted at Deadline 8 (25 March 2019)]		
Section 4.1 and 5.4	Design principle requiring detailed drainage design to ensure there is no increase in flow from the WNDA to Cemaes Stream. This would include consideration of increased infiltration, minimising catchment area increase from landform changes, reducing flow path slopes and further attenuation if necessary. This is a new design principle that was not included in the original LHMS.	Surface Water and Groundwater Landscape and Visual
Section 6.5	Increase in provision of biodiverse habitat areas during reinstatement where previously agricultural land use was proposed. This totals approximately 40ha and includes increases in coarse-sward species-rich grassland, close-sward species-rich grassland, marshy wet grassland and fen, and woodland trees and scrub. Nine wildlife ponds will also be provided. This is a change from the provision of sympathetically agricultural grassland included in the original LHMS.	Landscape and Visual Cultural Heritage Terrestrial and Freshwater Ecology
Section 4.1	During construction, the outer face of the landscape mound	Landscape and Visual

Section Reference	Relevant updates arising since submission	Relevant topics
	opposite Tregele shall be no steeper than 1:2, except for a short section (approximately 100 metres in length) to the west and south of Tregele Services where the slope will need to be steeper to facilitate utility routing. The steeper mound slope will also be designed to facilitate native planting, including shrubs and small trees. This is an update to the original LHMS principles.	Cultural Heritage
DCO s.106 agreement		
Schedule 3, Section 6	The Visitor Centre is now defined and a commitment to providing it is secured through the DCO s.106 agreement. "Visitor Centre" means the permanent visitor centre associated with the Wylfa Newydd DCO Project to be located in the vicinity of the Wylfa Newydd Development Area which will include: main exhibition space including room for an audio-visual element; a Café with food preparation facilities; a multipurpose stakeholder room; education facilities; visitor centre staff facilities/offices and small meeting room; an outside play area; restrooms; and car parking. The DCO s.106 agreement provides detail on how this commitment will be secured. This is an updated commitment to provide a Visitor Centre and detail on what will be included developed since the application.	Public Rights of Way Cultural Heritage

Ecological Compensation Sites

5.1.3 The proposal for the three Ecological Compensation Sites are set out in Environmental Statement Volume D - WNDA Development App D9-24 - SSSI

Compensation Strategy – Vol II document, a revised version of which has been submitted into Examination at Deadline 6 (19 February 2019). Since submission of the application for development consent, soil surveys and the collection of hydrological data at the Cors Gwawr and Cae Canol-dydd sites have taken place, the hydrological monitoring work being part of a minimum 12 month programme. The scope of these surveys have been designed in discussion with NRW, the data being used to refine the overall scheme designs to maximise the extent of rich-fen habitat creation possible at these two sites.

5.1.4 The third site, Ty Du, is distinct as rich-fen creation is not proposed there; instead the existing mire habitats present will be managed to increase their quality. No additional information is therefore provided on Ty Du other than that presented in the application for development consent.

5.1.5 Discussions with NRW over the preliminary findings of the soil and hydrological monitoring information concluded that the data collected to date provides positive evidence that the two compensation sites can be managed to develop the target habitat (rich-fen), although the amount of habitat creation possible is still uncertain.

5.1.6 The objective of ongoing hydrological monitoring work is to gather data to inform and give confidence in the compensation proposal, to refine the understanding of the site and to develop the detailed design of the proposal. Given the complexity of natural wetland ecosystems there will be residual uncertainty in the design outcome. Habitat creation and enhancement works would therefore integrate a phased approach within the adaptive management of construction works. Within a given phase of habitat creation or enhancement works, multiple methods aimed to establish target hydroecological regimes or vegetation could be employed.

5.1.7 In the first instance, works would aim to create habitat through minimal intervention techniques, such as removal of field drains. More intensive methods such as topsoil stripping would be used where there is strong evidence from the hydrological monitoring that a minimalist approach would not achieve the target conditions.

5.1.8 The response of vegetation, water tables or other relevant factors to the works would be assessed against targets to identify the most successful approaches. This trial and refinement approach will allow lessons learnt to be carried forward to later phases to maximise the success of the habitat creation works.

5.1.9 The SSSI Compensation Strategy – Vol II document has been updated to take account of the initial data collection and interpretation, and discussions over a phased habitat creation approach. This is included as Appendix D9-24-A to this Environmental Statement Addendum, and comprises:

- Updated SSSI Compensation Strategy – Vol II report
- Further soil investigation reports for the two sites
- Hydrological monitoring reports for the two sites

5.1.10 Whilst it is anticipated that the information collected to date, and the refined phased approach to habitat creation, will allow works to be undertaken with minimal effect on the local environment, it is not yet possible to draw any revised conclusions relating to this. The assessment of effects from these works presented in Environmental Statement Volume D - WNDA Development App D1-2 - Ecological Compensation Sites: Assessment of Environmental Effects [APP-137] therefore remains unchanged and presents a likely worst case scenario.

5.1.11 Following grant of the DCO, Schedule 3 Requirements ECS4 and ECS2 would allow further refinement of details following further hydrological data collection.

5.2 Public access and recreation

Relevant updates

5.2.1 The additional commitments in the DCO s.106 agreement which relate to the provision of the Visitor Centre are of relevance to the assessment of effects on Public Access and Recreation.

5.2.2 Horizon's target of opening the Visitor Centre within two years of grant of permission (for the Visitor Centre) would mean that the Visitor Centre and associated facilities would be available to the public both during construction and operational phases of the Power Station.

5.2.3 It is intended the Visitor Centre would be accessible either directly from the Wales Coast Path (WCP) or from other sections of the public right of way network.

5.2.4 The proposed route of the Wales Coast Path during operation has also been amended in consultation with IACC, this update is shown on the updated Rights of Way Plans as detailed in Table 5-1.

5.2.5 A dual use path for cyclists and pedestrians would be provided all the way between the junction of Nanner Road and the A5025 and the Existing Power Station Access Road junction. This is shown on the updated Rights of Way and Power Station Access Road drawings referred to in Table 5-1. The elements of this scheme outside the Order Limits will be delivered through the A5025 Online Highway Improvements TCPA permission.

Revised assessments

5.2.6 The provision of the Visitor Centre would provide additional mitigation with benefits to walkers and improvements to the recreational amenity of the route. However, due to the remaining impacts and resultant effects from the DCO Project on the Wales Coast Path during construction and operation the residual effects would remain unchanged.

5.2.7 The assessment of effects on on-shore recreation during construction and operation would also remain unchanged. However, the provision of the Visitor Centre, which would potentially be linked to the cycle link spur along the A5025

from the Copper Trail (NCN Route 566), would improve the recreational amenity of that cycle route as toilet and café facilities would be available.

5.2.8 The effect of the updated route for the Wales Coast Path in operation is to reduce the length of the diversion by approximately 1km. However, due to the overall increase in distance, even with this amended route, the effect would remain major adverse.

5.2.9 The additional length of dual use path would result in cyclists on the Copper Trail (NCN 566) having the option as to whether they cross the A5025 at Bwlch or chose instead to continue to route through Tregele. A diversion to include Tregele would be longer than the existing routeThe assessment of effects on the Copper Trail remains unchanged as the official diversion would remain the same.

5.2.10 The additional stretch of dual use path would result in cyclists and people with limited mobility being able to access routes between the headland at Porth yr Ogof, Fisherman's Car Park and Visitor Centre, such as is proposed, should it be located close to the Power Station Access Road. The provision of the surfaced dual use path would also mean that there is a surfaced route for pedestrians from Cemaes to the proposed Visitor Centre, which would utilise the existing footway between Cemaes and the Existing Power Station Access Road. This provision would further mitigate the adverse effects of the Wylfa Newydd DCO Project during construction, though this would remain major adverse for the WCP and moderate adverse for other PRoW. It would also further enhance the PRoW network during operation, this would remain moderate beneficial.

5.3 Air quality

Relevant updates

5.3.1 The improvements in non-road mobile machinery (NRMM) plant emissions standards and reduced NOx emissions from marine vessels/plant as summarised in Table 5-1 are relevant to the assessment of air quality effects.

5.3.2 The relevant updates to the application arising from the Requests for Non-Material Change are the increase to the upper daily limit of marine vessel movements and extension of working hours for specified Main Construction activities into the evening or 24 hour working. These are further outlined in Table 5-1.

Additional topic information

5.3.3 With regard to NOx and nitrogen dioxide (NO2) concentrations and nitrogen and acid deposition, the Air Quality Mitigation Quantification Report [REP3-052] presents the quantified residual effects of the Wylfa Newydd DCO Project at the time of application (June 2018) with the additional mitigation of reducing NOx emissions from NRMM and marine vessels as referred to in Table 5-1. For the predicted concentrations of carbon monoxide (CO), particulate matter (PM10 and PM2.5) and sulphur dioxide (SO2), Chapter D5 [APP-124] presents the quantified residual effects of the Wylfa Newydd DCO Project at

the time of application (June 2018) (these were not altered by the additional mitigation to reduce NOx emissions discussed above). The assessment that follows supersedes these documents (following acceptance of the Requests for Non-Material Change and their inclusion as part of the DCO application) and reflects:

- The additional mitigation (more stringent NRMM and marine vessel emission standards) specified in Section 7.5 of the Main Power Station Site sub-CoCP [as submitted at Deadline 8 (25 March 2019)]; and
- The Project with the changes to the upper daily limit of marine vessels and amended working hours (see Table 5-1 for further detail).

5.3.4 The assessment presented below reflects the position as presented previously in 'Request for Non-Material Change 4 – Working Hours' [REP4-012]. Appendix D5-A and D5-2-A of this Addendum present results as changed for chapter D5 – Air Quality [APP-124] and updated modelling scenarios and input data (including a summary of the updated plant schedule), air quality modelling results and related dispersion isopleths in Appendix D5-2 [APP-140], respectively.

5.3.5 Figures D5-7 to D5-10 have been amended to show updated NO_2 concentrations at receptors during construction as well as those provided previously during Examination in the Air Quality Mitigation Quantification Report (Figures 1-4 [REP3-052]). These are provided in Appendix D-A to this Addendum (Environmental Statement Wylfa Newydd Development Area Development Figure Booklet – Volume D) and supersedes Figures D5-7 to D5-10 in the original figure booklet [APP-237].

5.3.6 Amendments to the indicative haul routes on which the air quality modelling has been based are included in Figure D5-5 in Appendix D-A, replacing Figure D5-5 in the original figure booklet [APP-237].

Revised assessments

5.3.7 The following presents the findings of the assessment scenario as updated (see paragraph 5.3.3) for human receptor locations in relation to NO_2. Taking into account the additional mitigation outlined in paragraph 5.3.3 above, the effects described for CO, PM_{10}, $PM_{2.5}$ and SO_2 at human receptors in year 2 do not change from those presented in Chapter D5 [APP-124] (CO, PM_{10}, $PM_{2.5}$) and the Air Quality Mitigation Quantification Report [REP3-052] (SO_2) These remain negligible adverse and concentrations are well within the relevant Air Quality Objectives (AQOs) and Environment Assessment Levels (EALs). The same applies to year 5. Therefore, CO, PM_{10}, $PM_{2.5}$ and SO_2 are not considered further for human receptors and the significance of the effects for these pollutants remain unchanged from that in Chapter D5 [APP-124] and the Air Quality Mitigation Quantification Report [REP3-052] and are not significant. The full results are presented in Appendix D5-A of this Addednum. The focus of the assessment presented in this chapter is on the predicted concentrations of NO_2

Human receptor locations

5.3.8 The predicted changes in annual mean concentrations of NO_2 for the year 2 peak earthworks and Marine Works scenario are reported in Table 5-2 for the key human receptor locations. The predicted total one-hour mean NO_2 (99.8^{th} percentile of one-hour mean) concentrations for year 2 are reported in Table 5-3. The annual mean and one-hour mean NO_2 concentrations for the year 5 peak construction scenario are set out in Table 5-4 and Table 5-5, respectively.

5.3.9 The following results amend the results presented in the original DCO application chapter D5 [APP-124], Tables D5-8 to D5-13 in relation to NO_2 and the quantified results presented in the Air Quality Mitigation Quantification Report [REP3-052], Tables 2-1 to 2-6

Table 5-2 Year 2 peak earthworks and Marine Works scenario – predicted annual mean NO_2 concentrations at key human receptors

Receptor	Year 2 baseline	Year 2 peak earthworks and Marine Works	Magnitude of change as percentage of AQO value [1,2]
	NO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	NO_2 (AQO = 40$\mu g/m^3$)
R1	5.1	≤7.2	+≤5% (n)
R2	5.1	≤8.0	+≤7% (s)
R3	5.1	≤6.5	+≤3% (n)
R4	10.4	≤11.9	+≤4% (n)
R5	6.9	≤10.0	+≤8% (s)
R6	8.4	≤12.5	+≤10% (s)
R7	6.1	≤11.5	+≤14% (m)
R8	5.1	≤6.3	+≤3% (n)
R9	4.8	≤6.3	+≤4% (n)
R10	4.4	≤7.5	+≤8% (s)
R11	4.4	≤5.6	+≤3% (n)
R12	4.3	≤5.6	+≤3% (n)
R13	4.1	≤6.8	+≤7% (s)
R14	4.4	≤8.7	+≤11% (m)
R15	4.4	≤10.2	+≤15% (m)
R16	4.4	≤5.3	+≤2% (n)
R17	4.4	≤5.1	+≤2% (n)

Note 1: Impact magnitude rounded to whole numbers and reported as a percentage of the respective AQO value.

Note 2: Effect descriptors at individual receptors in parentheses as per table B5-15 of chapter B5 Air quality [APP-070]: 'n' is negligible, 's' is small, 'm' is medium and 'l' is large.

Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case.

Table 5-3 Year 2 peak earthworks and Marine Works scenario – predicted short-term NO_2 concentrations at key human receptors

Receptor	Year 2 baseline	Year 2 peak earthworks and Marine Works	Magnitude of change as percentage of AQO value [1,2]
	NO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	NO_2 (AQO = 200$\mu g/m^3$)
R1	10.3	≤30.9	+≤10% (n)
R2	10.3	≤34.5	+≤12% (s)
R3	10.3	≤27.8	+≤9% (n)
R4	20.7	≤39.5	+≤9% (n)
R5	13.8	≤41.2	+≤14% (s)
R6	16.7	≤55.8	+≤20% (s)
R7	12.2	≤57.4	+≤23% (m)
R8	10.3	≤26.7	+≤8% (n)
R9	9.7	≤31.5	+≤11% (s)
R10	8.8	≤37.6	+≤14% (s)
R11	8.8	≤27.1	+≤9% (n)
R12	8.5	≤30.8	+≤11% (s)
R13	8.3	≤38.1	+≤15% (s)
R14	8.8	≤44.3	+≤18% (s)
R15	8.8	≤57.4	+≤24% (m)
R16	8.9	≤22.4	+≤7% (n)
R17	8.9	≤20.7	+≤6% (n)
R18	9.0	≤66.4	+≤29% (m)
R19	9.0	≤149.1	+≤70% (l)
R20	13.5	≤69.4	+≤28% (m)
R22	13.5	≤111.0	+≤49% (m)
R25	8.8	≤83.4	+≤37% (m)

Note 1: Impact magnitude rounded to whole numbers and reported as a percentage of the respective AQO value.

Note 2: Effect descriptors at individual receptors in parentheses as per table B5-16 of chapter B5 Air quality [APP-070]: ‘n’ is negligible, ‘s’ is small, ‘m’ is medium and ‘l’ is large.

Note: “≤” is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case.

Table 5-4 Year 5 peak construction scenario – predicted annual mean NO_2 concentrations at key human receptors

Receptor	Year 5 baseline	Year 5 peak construction	Magnitude of change as percentage of AQO value [1,2]
	NO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	NO_2 (AQO = 40$\mu g/m^3$)
R1	5.1	≤5.8	+≤2% (n)
R2	5.1	≤5.9	+≤2% (n)
R3	5.1	≤5.7	+≤1% (n)
R4	9.7	≤10.3	+≤2% (n)
R5	6.6	≤8.0	+≤4% (n)
R6	7.8	≤9.7	+≤5% (n)
R7	5.8	≤8.0	+≤5% (n)
R8	5.0	≤5.7	+≤2% (n)
R9	4.8	≤5.7	+≤2% (n)
R10	4.4	≤8.2	+≤10% (s)
R11	4.4	≤5.4	+≤2% (n)
R12	4.3	≤5.1	+≤2% (n)
R13	4.1	≤5.5	+≤3% (n)
R14	4.4	≤7.4	+≤8% (s)
R15	4.4	≤6.9	+≤6% (s)
R16	4.4	≤4.8	+≤1% (n)
R17	4.4	≤4.7	+≤1% (n)

Note 1: Impact magnitude rounded to whole numbers and reported as a percentage of the respective AQO value.

Note 2: Effect descriptors at individual receptors in parentheses as per table B5-15 of chapter B5 Air quality [APP-070)]: 'n' is negligible, 's' is small, 'm' is medium and 'l' is large.

Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case.

Table 5-5 Year 5 peak construction scenario – predicted short-term NO_2 concentrations at key human receptors

Receptor	Year 5 baseline	Year 5 peak construction	Magnitude of change as percentage of AQO value [1,2]
	NO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	NO_2 (AQO = 200$\mu g/m^3$)
R1	10.3	≤17.6	+≤4% (n)
R2	10.3	≤18.2	+≤4% (n)
R3	10.3	≤16.8	+≤3% (n)
R4	19.4	≤26.7	+≤4% (n)
R5	13.1	≤27.0	+≤7% (n)
R6	15.6	≤30.5	+≤7% (n)
R7	11.6	≤27.3	+≤8% (n)
R8	9.9	≤19.9	+≤5% (n)
R9	9.7	≤19.4	+≤5% (n)
R10	8.8	≤32.5	+≤12% (s)
R11	8.8	≤20.5	+≤6% (n)
R12	8.5	≤19.3	+≤5% (n)
R13	8.3	≤22.3	+≤7% (n)
R14	8.8	≤28.4	+≤10% (n)
R15	8.8	≤29.1	+≤10% (n)
R16	8.9	≤14.9	+≤3% (n)
R17	8.9	≤14.4	+≤3% (n)
R18	9.0	≤33.6	+≤12% (s)
R19	9.0	≤32.7	+≤12% (s)
R20	13.5	≤45.0	+≤16% (s)
R22	13.5	≤62.8	+≤25% (m)
R25	8.8	≤35.2	+≤13% (s)

Note 1: Impact magnitude rounded to whole numbers and reported as a percentage of the respective AQO value.

Note 2: Effect descriptors at individual receptors in parentheses as per table B5-16 of chapter B5 Air quality [APP-070]: 'n' is negligible, 's' is small, 'm' is medium and 'l' is large.

Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case.

5.3.10 Table 5-6 provides a summary of the number of human receptors experiencing the predicted effects throughout the study area defined in Figure D5-1 of Volume D figure booklet [APP-237].

Table 5-6 Number of human receptors experiencing predicted effects from emissions to air from the construction plant, machinery and marine vessels for the year 2 and year 5 assessment scenarios

Averaging period and receptor type	Effect descriptor	Number of receptors experiencing predicted effects In Year 2	Number of receptors experiencing predicted effects In Year 5
Annual mean NO_2 – long term receptors	Large	0	0
	Medium	≤3	≤1
	Small	≤64	≤3
	Negligible	≤1,160	≤1,224
One-hour mean NO_2 (99.8th percentile) – long-term receptors	Large	≤0	≤0
	Medium	≤2	≤0
	Small	≤91	≤2
	Negligible	≤1,134	≤1,226
One-hour mean NO_2 (99.8th percentile) – short-term receptors	Large	≤2	≤0
	Medium	≤41	≤7
	Small	≤128	≤30
	Negligible	≤256	≤390

5.3.11 In Year 2 and Year 5, the majority of air quality effects for NO_2 would be considered negligible with a small number of effects predicted to be in the small and medium category. The effect of the Wylfa Newydd DCO Project is concluded to be not significant with regard to NO_2 concentrations at human receptors. The summary of residual effects for air quality remains as per Table D5-47 of chapter D5 [APP-124].

Ecological and cultural heritage receptor locations

5.3.12 A number of ecological receptors were identified in the terrestrial and freshwater ecology chapter (chapter D9) [APP-128] of the Environmental Statement where further consideration was required due to the predicted changes in NOx concentrations and nitrogen and acid deposition (the criteria for identifying when further consideration is required are set out in chapter B5 [APP-070], of the Environmental Statement, paragraphs 5.4.146 to 5.4.149). With the additional mitigation already specified in section 7 of the Main Power Station Site sub-CoCP [as submitted at Deadline 8 (25 March 2019)], the number of ecological receptors above the relevant criteria and requiring further consideration reduces to two sites:

- Cae Gwyn SSSI (year 2 for nitrogen deposition only); and

- Tre'r Gof SSSI (year 2 and year 5 for both nitrogen and acid deposition).

5.3.13 Where appropriate, the assessment of changes in NOx concentrations and nitrogen and acid deposition were also considered at Cestyll Gardens which is a cultural heritage receptor (see chapter D11 [APP-130] of the Environmental Statement). As for the ecological receptors, the application of the additional mitigation reduced NOx concentrations to below the criteria requiring further mitigation. Nitrogen and acid deposition continued to require further consideration (in the absence of specific critical loads).

5.3.14 The effect of the predicted annual mean and 24-hour mean NOx concentrations for year 2 would not lead to any of the ecological receptors requiring further consideration as part of the terrestrial and freshwater ecology assessment (i.e. the increases are relatively small and do not result in any receptors requiring further consideration for NOx). The same also applies for Tre'r Gof SSSI for year 5. For completeness, a summary of the maximum predicted annual mean and 24-hour mean NOx concentrations at key ecological receptors is presented for year 2 and year 5 in Table 5-7 to Table 5-14.

5.3.15 A summary of the maximum predicted nitrogen and acid deposition at ecological receptors for year 2 is shown in **Error! Reference source not found.** and Table 5-12; and for year 5 this is shown in Table 5-13 and Table 5-14. These tables show only those receptors which were above the relevant criteria and/or considered further following the revised assessment of the quantified residual effects as applicable to the DCO or as a result of the changes to working hours and upper daily limit for marine vessels (i.e. Cae Gwyn SSSI, Tre'r Gof SSSI and Cestyll Garden). Even though it is screened out from further consideration, Cemlyn Bay SAC/SSSI has been included in these tables as requested by NRW.

5.3.16 The results show there are no predicted NOx concentrations at Cestyll Gardens which are above the criteria for requiring further consideration within the cultural heritage assessment and the effects remain negligible as reported in chapter D11 [APP-130] of the Environmental Statement. Further consideration of this receptor is required for year 2 and year 5 with regard to nitrogen and acid deposition (see **Error! Reference source not found.**, to Table 5-14).

Table 5-7 Year 2 peak earthworks and Marine Works – magnitude of annual mean NOx concentration changes at key ecological receptors

Ecological receptor		
	Change as a percentage of AQO	Total concentration as a percentage of AQO
Cae Gwyn SSSI	+≤7%	≤27%
Cemlyn Bay SAC/SSSI	+≤14%	≤32%
Tre'r Gof SSSI	+≤34%	≤64%
Cestyll Gardens	+≤49%	≤68%
AQO = air quality objective (i.e. the annual mean AQO of 30µg/m^3)).		

Ecological receptor		
	Change as a percentage of AQO	Total concentration as a percentage of AQO
Values shown with asterisks in brackets denote results which are above the criteria for requiring further consideration in the terrestrial and freshwater ecology assessment (or require consideration as part of the cultural heritage assessment (Cestyll Gardens)). Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case		

Table 5-8 Year 2 peak earthworks and Marine Works – magnitude of maximum 24-hour mean NOx concentration changes at key ecological receptors

Ecological receptor		
	Change as a percentage of EAL	Total concentration as a percentage of EAL
Cae Gwyn SSSI	+≤29%	≤44%
Cemlyn Bay SAC/SSSI	+≤23%	≤29%
Tre'r Gof SSSI	+≤75%	≤98%
Cestyll Gardens	+≤51%	≤56%
[1] EAL = environmental assessment level (i.e. the maximum 24-hour mean EAL of 200µg/m^3 or 75µg/m^3)). Values shown with asterisks in brackets denote results which are above the criteria for requiring further consideration in the terrestrial and freshwater ecology assessment (or require consideration as part of the cultural heritage assessment (Cestyll Gardens)) Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case.		

Table 5-9 Year 5 peak construction – magnitude of annual mean NOx concentration changes at key ecological receptors

Ecological receptor		
	Change as a percentage of AQO	Total concentration as a percentage of AQO
Cae Gwyn SSSI	+≤5%	≤24%
Cemlyn Bay SAC/SSSI	+≤6%	≤24%
Tre'r Gof SSSI	+≤19%	≤49%
Cestyll Gardens	+≤17%	≤36%
[1] AQO = air quality objective (i.e. the annual mean AQO of 30µg/m^3)). Values shown with asterisks in brackets denote results which are above the criteria for requiring further consideration in the terrestrial and freshwater ecology assessment (or require consideration as part of the cultural heritage assessment (Cestyll Gardens)).		

Ecological receptor		
	Change as a percentage of AQO	Total concentration as a percentage of AQO
Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case.		

Table 5-10 Year 5 peak construction – magnitude of maximum 24-hour mean NOx concentration changes at key ecological receptors

Ecological receptor		
	Change as a percentage of EAL	Total concentration as a percentage of EAL
Cae Gwyn SSSI	+≤17%	≤32%
Cemlyn Bay SAC/SSSI	+≤9%	≤14%
Tre'r Gof SSSI	+≤39%	≤63%
Cestyll Gardens	+≤16%	≤21%

[1] EAL = environmental assessment level (i.e. the maximum 24-hour mean EAL of 200µg/m^3 or 75µg/m^3)).

Values shown with asterisks in brackets denote results which are above the criteria for requiring further consideration in the terrestrial and freshwater ecology assessment (or require consideration as part of the cultural heritage assessment (Cestyll Gardens)).

Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case

Table 5-11 Year 2 peak earthworks and Marine Works – magnitude of annual mean nitrogen deposition rate changes at key ecological receptors

Ecological receptor		
	Change as a percentage of CL	Total deposition as a percentage of CL
Cae Gwyn SSSI	+≤2% (*)	≤102% (*)
Cemlyn Bay SAC/SSSI	+≤2%	≤52%
Tre'r Gof SSSI	+≤10% (*)	≤141% (*)
Cestyll Gardens (short vegetation)[2]	+≤1.5 (*)	≤11.4 (*)
Cestyll Gardens (tall vegetation)[2]	+≤3.0 (*)	≤18.9 (*)

[1] CL = critical load (i.e. the environmental criteria for nitrogen or acid deposition).

[2] Cestyll Gardens – values shown are the nitrogen deposition rates in kgN/ha/year as no critical load available.

Values shown with asterisks in brackets denote results which are above the criteria for requiring further consideration in the terrestrial and freshwater ecology assessment (or require consideration as part of the cultural heritage assessment (Cestyll Gardens)).

Ecological receptor		
	Change as a percentage of CL	Total deposition as a percentage of CL
Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case.		

Table 5-12 Year 2 peak earthworks and Marine Works – magnitude of annual mean acid deposition rate changes at key ecological receptors

Ecological receptor		
	Change as a percentage of CL [1]	Total deposition as a percentage of CL [1]
Cae Gwyn SSSI	+≤2% (*)	≤86% (*)
Cemlyn Bay SAC/SSSI[2]	Not sensitive	
Tre'r Gof SSSI	+≤7% (*)	≤97% (*)
Cestyll Gardens (short vegetation)[3]	+≤0.13 (*)	≤0.98 (*)
Cestyll Gardens (tall vegetation) [3]	+≤0.26 (*)	≤1.58 (*)
[1] CL = critical load (i.e. the environmental criteria for nitrogen or acid deposition). The Centre for Ecology and Hydrology (CEH) advised that the vegetation within Cemlyn Bay SAC is not sensitive to acid deposition. The CEH report was submitted as Appendix G of the sHRA part 2 [APP-051]. [3] Cestyll Gardens – values shown are the acid deposition rates in keq/ha/year as no critical load available. Values shown with asterisks in brackets denote results which are above the criteria for requiring further consideration in the terrestrial and freshwater ecology assessment (or require consideration as part of the cultural heritage assessment (Cestyll Gardens)). Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case.		

Table 5-13 Year 5 peak Power Station construction – magnitude of annual mean nitrogen deposition rate changes at key ecological receptors

Ecological receptor		
	Change as a percentage of CL	Total deposition as a percentage of CL
Cae Gwyn SSSI	+≤2% (*)	≤101% (*)
Cemlyn Bay SAC/SSSI	+≤1%	≤51%
Tre'r Gof SSSI	+≤6% (*)	≤136% (*)
Cestyll Gardens (short vegetation)[2]	+≤0.5 (*)	≤10.5 (*)

Ecological receptor		
	Change as a percentage of CL	Total deposition as a percentage of CL
Cestyll Gardens (tall vegetation) [2]	+≤1.0 (*)	≤17.0 (*)

[1] CL = critical load (i.e. the environmental criteria for nitrogen or acid deposition).

[2] Cestyll Gardens – values shown are the nitrogen deposition rates in kgN/ha/year as no critical load available.

Values shown with asterisks in brackets denote results which are above the criteria for requiring further consideration in the terrestrial and freshwater ecology assessment (or require consideration as part of the cultural heritage assessment (Cestyll Gardens)).

Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case.

Table 5-14 Year 5 peak Power Station construction – magnitude of annual mean acid deposition rate changes at key ecological receptors

Ecological receptor		
	Change as a percentage of CL[1]	Total deposition as a percentage of CL[1]
Cae Gwyn SSSI	+≤3% (*)	≤87% (*)
Cemlyn Bay SAC/SSSI[2]	Not sensitive	
Tre'r Gof SSSI	+≤8% (*)	≤97% (*)
Cestyll Gardens (short vegetation)[3]	+≤0.12 (*)	≤0.97 (*)
Cestyll Gardens (tall vegetation) [3]	+≤0.25 (*)	≤1.57 (*)

[1] CL = critical load (i.e. the environmental criteria for nitrogen or acid deposition).

The Centre for Ecology and Hydrology (CEH) advised that the vegetation within Cemlyn Bay SAC is not sensitive to acid deposition. The CEH report was submitted as Appendix G of the sHRA part 2 [APP-051].

[3] Cestyll Gardens – values shown are the acid deposition rates in keq/ha/year as no critical load available.

Values shown with asterisks in brackets denote results which are above the criteria for requiring further consideration in the terrestrial and freshwater ecology assessment (or require consideration as part of the cultural heritage assessment (Cestyll Gardens)).

Note: "≤" is used to denote that the results are equal to or less than based on conservative modelling, demonstrating worst case.

5.3.17 Based on the results presented in the preceding tables, a conclusion of a non-significant effect can be concluded with regard to NOx concentrations at all ecological receptors.

5.3.18 The significance of the changes to nitrogen and acid deposition at Cae Gwyn SSSI and Tre'r Gof SSSI as a result of the proposed change is considered in

the terrestrial and freshwater ecology assessment in Section 5.6. The effect on Cestyll Gardens in terms of cultural heritage is considered in Section 5.8.

5.4 Noise and Vibration

Relevant updates

5.4.1 The updates to the application of relevance to noise and vibration are those arising from the Requests for Non-Material Change for the extension to blasting timeframes, the upper daily limit of marine vessel movements and extension of working hours for specified Main Construction activities into the evening or 24 hour working. These are further outlined in Table 5-1.

Revised assessments

5.4.2 The Main Power Station Site sub-CoCP stipulates that blasting activities will comply with vibration threshold values set out in the noise and vibration management strategy (section 8 of the Main Power Station Site sub-CoCP [as submitted at Deadline 8 (25 March 2019)]. The vibration threshold values are consistent with those recommended in BS 6472-2 [RD1].

5.4.3 There is no increase in the number of blasts which would be required, and the blasting vibration limits remain unaltered. The total number of hours per day during which blasting could be undertaken will remain consistent with the recommendations in BS 6472-2 [RD1], albeit with the start and end times of the weekday period both shifted one hour later than recommended by BS 6472-2 to reflect shift patterns.

5.4.4 All blasting will continue to be subject to the noise and vibration control measures (including monitoring) set out in section 8 of the Main Power Station Site sub-CoCP to reduce potential disturbance effects to human and ecological receptors. These control measures include strict adherence to BS6472-2 [RD1] which sets satisfactory vibration magnitudes for residential receptors, offices and workshops. All blasting methods would therefore be designed to comply with the vibration threshold values set out in BS6472-2 to prevent undue disturbance at residential dwellings, education facilities, bat roosts and barn owl roosts.

5.4.5 However, following consultation responses from IACC, and in accordance with guidance in BS6472-2:2008, Horizon will commit to achieving a vibration level of 4.5mm/s PPV outside residences for 95% of blasts (in any six-month period) during the period 18.00-19.00 as referenced under the Main Power Station Site Sub-CoCP in Table 5-1.

5.4.6 Given the information presented in paragraphs 5.4.2 to 5.4.4, there would be no change to the noise and vibration assessment, in particular effects to human and ecological receptors due to disturbance from air overpressure (including audible noise from blasting) and disturbance from vibrations. The conclusions presented in Environmental Statement Volume D6 [APP-125] remain as reported.

5.4.7 The change to working hours does not alter the vibration assessment, which is related to the separation distance between construction activities and receptors, and the type of construction equipment to be used and is therefore not considered further.

5.4.8 The construction noise modelling and assessments are affected by the change in working hours and were undertaken incorporating:

- Changes in working hours and the related amendments to indicative haul routes;
- Changes to the upper daily limit of vessels; and
- An amended indicative plant schedule, including
    - a reduction in plant numbers associated with soft ground grading;
    - a reduction in the duration of the soft ground grading activities within construction zones 6, 7, 8 and 9, which reduces overlap with the start of the Unit 1 and Unit 2 deep excavation in hard rock;
    - reduction in bulk earthworks plant associated with the month 19-21; and
    - bringing forward the tunnelling and outfall works in the programme to start in month 1 rather than month 10.

5.4.9 The two new circular haul routes (HR-B1 and HR-B2) for dumper trucks have been introduced for the soft ground grading within construction zone 9. These will be used to collect and transport much of the bulk material required to construct Mound B early in the programme. Associated plant to load the dumper trucks has also been included in this area. Mound B runs beside the A5025 and provides noise attenuation for residential receptors in Tregele. This increases earthworks activity near Tregele during the first year of the plant schedule, but the resulting Mound B will reduce noise levels in Tregele for the remainder of the construction period. Figure D6-2 in Appendix D-A of this Addendum illustrates the amended routes and replaces Figure D6-2 of the Environmental Statement Volume D Figure Booklet [APP-237].

5.4.10 A summary of the updated plant schedule is provided in Appendix D1-A of this Addendum. A number of amendments to the indicative plant list/schedule have been made on the basis of the noise modelling to better reflect the early construction programme. Therefore, additional noise models are presented for months 7-9 and 10-12 of the construction programme. The results from these models are included in this assessment, and therefore the results of this noise assessment are based on six points in the construction programme rather than the four in the original Environmental Statement chapter D6 [APP-125]. These are summarised as follows:

- Months 7 – 9:
- Months 10 – 12:

- Months 19 – 21:
- Months 31 – 33:
- Months 58 – 60:
- Months 100 – 102:

5.4.11 The assessment is based on the highest daytime, evening and night-time noise levels calculated at each receptor from any of these six points in time. The noise model inputs are provided in Appendix D1-A.

5.4.12 The predicted free field $L_{Aeq,1\text{-hour}}$ noise levels at residential properties for the day, evening and night time in each of the six points in the construction programme are shown in Appendix D-A, Figure 1 to 18 and the associated figure sheets.

5.4.13 Table 5-15 summarises the number of significant noise effects, before additional mitigation is applied, at residential receptors presented in chapter D6 [APP-125] of the Environmental Statement.

Table 5-15 Number of significant noise effects, in the absence of additional mitigation, at residential receptors identified in chapter D6 [APP-125] of the Environmental Statement

Magnitude of Change	Significance of Effect	Number of properties
Large	Major significance	15
Medium	Major significance	227
Small	Moderate significance	956
Negligible	Minor significance	23

5.4.14 In total, there would be 1198 residential receptors at which moderate or major adverse significant effects may occur. Table 5-20 summarises the residual significant effects following application of additional mitigation.

5.4.15 With regard to non-residential receptors, the following changes in significant construction noise effects occur:

- One hotel would experience a beneficial change from a major adverse effect to a moderate adverse effect; and
- Two additional commercial buildings at which a moderate adverse effect rather than a negligible adverse effect is predicted.

5.4.16 There would be no change in effects at any schools, places of worship, community buildings or offices to those presented in chapter D6 [APP-125].

5.5 Surface water and groundwater

Surface Water

Relevant updates

5.5.1 The revised Landscape and Habitat Management Strategy [as submitted at Deadline 8 (25 March 2019)] now includes a construction phase design principle requiring the drainage system to be designed to ensure that there is no increase in flow from the WNDA to Cemaes Stream.

5.5.2 This requirement was discussed and agreed in principle at a meeting with Natural Resources Wales on 14th September 2018 as an outcome that was indicative of no impact on flood risk to receptors on Cemaes Stream.

Additional topic information

5.5.3 The above is further reinforced by a technical note submitted in response to actions set in an Issue Specific Hearing on 11th January 2019, which confirms that there will be no increase in flow from the WNDA to Cemaes Stream, and also to the Afon Cafnan and to the Nant Cemlyn. The further assessment in this technical note is provided in Appendix D8-A of this Addendum.

Revised assessments

5.5.4 The updates above result in a beneficial change to the assessment. Environmental Statement Volume D - WNDA Development D8 - Surface water and groundwater [APP-127] and the Environmental Statement Volume D - WNDA Development App D8-4 - Flood Consequence Assessment (Part 1 of 8) [APP-150] both identified that the drainage design presented in Environmental Statement Volume D - WNDA Development App D8-8 - Summary of preliminary design for construction surface water drainage [APP-167] would be developed at the detailed design stage to avoid any increase in flood risk.

5.5.5 Appendix D8-A demonstrates that the current preliminary drainage design presented in Appendix D8-8 [APP-167] will result in no increase in flow to Cemaes Stream, Afon Cafnan and Nant Cemlyn, and indeed under many scenarios there will be a small reduction in runoff rates. Consequently, the conclusions of the assessment presented in Chapter D8 will change from a magnitude of Small to Medium (Adverse) to one of Negligible to Small (Beneficial) and the residual effect following implementation of the preliminary drainage strategy would be negligible to minor beneficial during construction and operation. This is reflected in Table 5-2.

5.5.6 The addition of the additional construction phase design principle secures the mitigation to ensure there is no significant effect. As a result, the summary of residual effects presented in D8 [APP-127] does not change further.

Groundwater

Additional topic information

5.5.7 The conceptual model understanding of groundwater behaviour in the Tre'r Gof catchment has been broadened since the application for development consent. This is based on further groundwater monitoring undertaken and results in alignment of the interpretation with Natural Resources Wales and takes uncertainty in interpretation into account. These matters have been discussed with NRW during meetings including those for the Statement of Common Ground and are reflected in the updated SoCG submitted at Deadline 6 [REP6-047].

5.5.8 The original findings were presented in Groundwater Baseline Report (Environmental Statement Volume D, Appendix D8-3 [APP-147 to 149]) and the Tre'r Gof Hydroecological assessment (Environmental Statement Volume D, Appendix D8-5 [APP-158]). These appendices have been updated with two change logs that are Appendix D8-3-A and D8-5-A of this Addendum.

5.5.9 The conceptual model revision confirms that deeper seated bedrock aquifers and superficial aquifers form a continuous groundwater body. This is reflected in a revised set of groundwater contours, Figure 6.1 and 6.2, presented in Appendix D8-3-A to this Addendum.

5.5.10 The conceptual model revision acknowledges that even though the flow of deeper-seated groundwater emerging at or near to Tre'r Gof SSSI is only a very small component of the water balance, this may be important to the functioning of groundwater dependent terrestrial ecosystems (GWDTE) at Tre'r Gof SSSI.

Revised assessments

5.5.11 Following the revisions to the conceptual model described above, a full change log is presented in Appendix D8-A to this Addendum for Environmental Statement Volume D, WNDA Development - D8 - Surface Water and Groundwater [APP-127]. The following summarises the revisions to the assessment:

- Clarification that the groundwater model assessed the effect of dewatering of the deep excavation and not dewatering of the cooling water tunnels;
- Review of the influence of construction dewatering activities associated with deep excavations and the cooling water tunnels in view of the broadened interpretation and limitations of the groundwater model;
- Details embedded mitigation for the cooling water tunnels which will be lined post construction as secured in the Construction Method Statement [REP5-018] and reflected in Table 5-1; and
- Details additional mitigation secured within the revised Main Power Station Site sub-CoCP Section 10.4 [as submitted at Deadline 8 (25 March 2019)] and reflected in Table 5-1.

5.5.12 The potential effect on groundwater levels and flows in the vicinity of Tre'r Gof SSSI from construction dewatering of the main excavation and the cooling water tunnels would change from minor (as reported in 8.5.53 to 8.5.56 of D8) to moderate adverse prior to the application of the mitigation referenced above and in Table 5-1. With the updated and secured embedded and additional mitigation, the revised residual assessment would be minor adverse. This has been reflected in Table 5-2. This does not have an effect on the conclusions of the Terrestrial and Freshwater Ecology assessment Environmental Statement Volume D [APP-128]

5.6 Terrestrial and freshwater ecology

Relevant updates

5.6.1 The Landscape and Habitat Management Strategy [as submitted at Deadline 8 (25 March 2019)] provisions have been updated such that upon reinstatement there will be an increase of approximately 40ha of land managed with the principal objective of maximising its biodiversity value which was originally proposed for agricultural grassland. In addition, there is provision of nine wildlife ponds. Further detail is provided in Table 5-1 and also Figure 6-19 and Figure 6-21 to 6-23 of the updated LHMS and Fig 6-13 and 6-14 for the wildlife ponds.

5.6.2 The improvements in NRMM plant emissions standards and reduced NOx emissions from marine vessels/plant as summarised in Table 5-1 are relevant to the assessment of air quality effects on ecological receptors.

5.6.3 The updates to the application arising from the Requests for Non-Material Change of relevance are the extension to blasting timeframes, the upper daily limit of marine vessel movements and extension of working hours for specified Main Construction activities into the evening or 24 hour working. These are further outlined in Table 5-1.

Additional topic information

5.6.4 Horizon undertook additional chough survey work during 2018 and has begun habitat management on Wylfa Head as mitigation reported in chapter D9 of the original Environmental Statement [APP-128]. The surveys show an increased use of Wylfa Head and a decrease in use of the area where the Site Campus would be located by choughs.

5.6.5 The survey results and assessment of change in use of Wylfa Head and the area of the Site Campus since the start of the habitat management on Wylfa Head is provided in the Addendum to 2018 Chough Baseline Report [REP3-046].

5.6.6 Following field surveys, factual ecological reports were produced for the three SSSI compensation sites: Cae Canol-dydd; Cors Gwawr; and, Ty du. These reports form Appendix D1-2-A, and supplement the baseline information available for each site, as presented in the Ecological Compensation Sites: Assessment of Environmental Effects [APP-137].

Revised assessments

5.6.7 The provision of an additional nine ponds, which will be managed for biodiversity throughout the operational life of the power station, is an additional beneficial detail for the embedded mitigation measure of reinstatement, but is not of a scale that would change the level of significance for residual effects on ecological receptors. There would therefore be no change to the residual significant effects assessed in chapter D9 of the original Environmental Statement.

5.6.8 The increase in provision of 40ha of habitat managed with the principal objective of maximising biodiversity value adds to the magnitude of this mitigation measure. It is considered that the provision of this additional mitigation will result in a net gain in biodiversity within the WNDA in the long-term, compared to the existing predominantly agricultural landscape of the WNDA. This strengthens the conclusion presented in paragraph 9.7.20 of chapter D9 [APP-128] that the provisions of the LHMS have the potential to result in net biodiversity gain which would preserve and possibly enhance the conservation status of ecological receptors present.

5.6.9 There would therefore be no change to the residual significant effects assessed in chapter D9 of the original Environmental Statement.

5.6.10 The survey results from the chough survey in 2018 demonstrates that the area of the Site Campus is not of significant importance to foraging chough and that the ongoing mitigation proposed to mitigate loss of chough habitat (enhanced habitat management of Wylfa Head for the benefit of foraging chough) is beginning to be successful. Combined, these findings add additional detail to the assessment in the original Environmental Statement on the effects of habitat loss and evidence to confirm the effectiveness of proposed mitigation. However, as some habitat within the core foraging area will still be lost and success of the mitigation was assumed in the assessment, the new information does not change the level of significance for residual effects on chough. There would therefore be no change to the residual significant effects assessed in chapter D9 of the original Environmental Statement.

5.6.11 The assessment of effects on ecological receptors presented in Ecological Compensation Sites: Assessment of Environmental Effects [APP-137] concludes that, with the implementation of embedded and good practice mitigation measures, there would be no residual minor, moderate or major adverse effects as a result of the proposals.

5.6.12 The factual ecological reports presented in Appendix D1-2-A provide additional detail on the baseline for receptors identified in APP-137 but do not add new receptors into this assessment. It is considered that the embedded and good practice mitigation presented remains appropriate and robust and the conclusions regarding residual effects provided within APP-137 remain as presented.

Noise and vibration related effects

5.6.13 With regards the extension to blasting hours, the change does not permit any additional blasting to occur after dusk during the spring/summer months in order to ensure that there are no new or different likely significant effects on terrestrial receptors such as bats, otters and other crepuscular species. Irrespective of the time of day blasting would occur, mitigation measures have been outlined in the Main Power Station Site sub-CoCP [as submitted at Deadline 8 (25 March 2019)] which would control effects to both human and ecological receptors. As noted in section 5.4 these mitigation measures include application of the vibration levels set out in BS6472-2 [RD1]. The extension of blasting hours is therefore not considered to alter the assessment of disturbance effects outlined in chapter D9 [APP-128] of the Environmental Statement.

Reptiles, notable mammals, breeding birds and over-wintering birds

5.6.14 During Works No. 12 (site preparation and clearance works), reptiles and notable mammals would be moved from site into adjacent retained habitat or bespoke receptor sites which link into the wider landscape. The removal of terrestrial habitat would also result in breeding and over-wintering birds no longer being able to use the Main Site for nesting or shelter, and foraging opportunities would be altered. As a result of this habitat loss, these bird species are predicted to use habitats adjacent to the Main Site. Adjacent habitats would be affected by noise disturbance which would occur for longer periods as a result of the change to working hours. Species using these habitats would habituate to the level of noise disturbance and distribute accordingly within the suitable habitat available. The availability of suitable habitat is not considered to be a constraint on these species.

5.6.15 The change to working hours is therefore not considered likely to result in a change in the assessment for reptiles, notable mammals, breeding birds or over-wintering birds and the results remain as presented within chapter D9 [APP-128] of the Environmental Statement.

5.6.16 Although not identified as a distinct receptor within chapter D9 [APP-128] of the Environmental Statement, barn owls were considered in relation to disturbance at known roost sites within the Wylfa Newydd Development Area. Roosts at Cafnan Farm, Caerdegog Isaf Farm, and Mynydd Ithel Farm were modelled as part of the noise assessment presented in chapter D6 [APP-125] of the Environmental Statement, with peak noise levels predicted as 79dB $L_{Aeq,1\text{-hour}}$[2] (Cafnan Farm); 65dB $L_{Aeq,1\text{-hour}}$ (Caerdegog Isaf Farm); and 63dB $L_{Aeq,1\text{-hour}}$ (Mynydd Ithel Farm).Noise modelling undertaken based on the change to working hours predicted these peak noise levels will either remain as presented in the DCO Environmental Statement, or slightly reduce

[2] The sound level of a steady sound having the same energy as a fluctuating sound over a 1-hour time period. It is possible to consider this level as the ambient noise encompassing all noise at a given time (in this case 1 hour). LAeq is considered the best general-purpose index for environmental noise.

following the mitigation measures presented in the noise and vibration section above: 69dB $L_{Aeq,1\text{-}hour}$ (Cafnan Farm); 65dB $L_{Aeq,1\text{-}hour}$ (Caerdegog Isaf Farm); and 59dB $L_{Aeq,1\text{-}hour}$ (Mynydd Ithel Farm).

5.6.17 This supports the conclusion that the change to working hours is therefore not considered likely to result in a change in the assessment for breeding birds as it is presented within chapter D9 [APP-128] of the Environmental Statement.

Chough

5.6.18 Table 5-16 below details the changes to peak predicted noise levels at chough nest sites as a result of the change to working hours. Peak noise levels affecting chough at historic nest locations within the Existing Power Station (nest locations A and B), and on Wylfa Head (nest locations C and D), are not considered to change significantly compared to those reported in the DCO Environmental Statement.

Table 5-16 Peak predicted noise levels at chough nest sites

Nest location	Peak predicted noise level
A	72dB LAeq,1-hour
B	77dB LAeq,1-hour
C	60dB LAeq,1-hour
D	64dB LAeq,1-hour

5.6.19 Peak noise levels within core chough foraging areas are also not predicted to exceed the 85dB $L_{Aeq,1\text{-}hour}$ assessed within chapter D9 [APP-128] of the Environmental Statement.

5.6.20 The timing and duration of noise disturbance to chough are as important in determining the potential effect of the disturbance. Chough are considered to be generally resilient to disturbance as long as the disturbing factors are regular and present prior to breeding attempts or occur later in the breeding season. However, new disturbance events during the very early stages of the breeding season can cause birds to desert the nest site for the season [RD2].

5.6.21 Good practice mitigation already committed to in the DCO application and enforced by the Environmental Clerk of Works on site, would seek to ensure construction noise would not start at the critical nest establishment stage and would be at levels that chough have habituated to.

5.6.22 Given the minor changes predicted to the peak noise levels detailed within the Environmental Statement, and the good practice mitigation already committed to in the DCO application, the change to working hours is therefore not considered likely to lead to a change in the assessment for chough as it is presented in chapter D9 [APP-128] of the Environmental Statement.

Bats

5.6.23 The assessment of noise disturbance to bats detailed within chapter D9 [APP-128] of the Environmental Statement, considers the Main Construction periods as avoiding the more sensitive periods when bats would be emerging or re-entering roosts. With the changed working hours, noise levels are predicted to decrease. The maximum level at the Tyn-y-Maes bat barn described in chapter D9 [APP-128] of the Environmental Statement was 75dB $L_{Aeq,1\text{-hour}}$, with the predicted peak at this location being 71.4dB $L_{Aeq,1\text{-hour}}$. Lighting levels at retained bat roosts are also not predicted to increase (see Environmental Lighting Impact Assessment section below).

5.6.24 Good practice mitigation has already been committed to in the DCO application, in the form of providing a 10m hard buffer around retained bat roosts within which screening would be provided and no construction activity would occur. Additional mitigation, also already committed to in the DCO application, in the form of bat boxes erected in retained habitats to provide alternative roost locations would also offset the potential for abandonment of roosts due to disturbance.

5.6.25 Given peak noise disturbance levels are not predicted to increase significantly around retained roosts, and mitigation measures are proposed to offset adverse effects, it is considered that the change to working hours would not result in any change to the assessment presented within chapter D9 [APP-128] of the Environmental Statement.

Otter, water vole, red squirrel and freshwater fish

5.6.26 Otter, water vole, red squirrel and freshwater fish have been recorded within habitat to be retained on site during construction (e.g. Afon Cemlyn; Dame Sylvia Crowe's Mound). Although the change to working hours would result in noise levels continuing for longer periods than detailed within the DCO Environmental Statement, the embedded, good practice and additional mitigation detailed within chapter D9 [APP-128], to offset adverse effects on these species would remain relevant and functional regardless of timings. It is therefore considered that the change to working hours would not alter the conclusions of assessment for these species as it is presented within chapter D9 [APP-128] of the Environmental Statement.

Air quality related effects

5.6.27 As noted at 5.3.12, with the quantified additional mitigation there would no longer be any exceedances in the annual mean and 24-hour mean NOx critical levels at the sensitive ecological receptors included in the terrestrial and freshwater ecology assessment presented in chapter D9 [APP-128] of the Environmental Statement and all sites would be screened out from further consideration.

5.6.28 Two ecological receptors have been identified as requiring further consideration as a result of increases to nitrogen and acid deposition during both year 2 and year 5 modelled scenarios:

- Tre'r Gof SSSI (year 2 and year 5 for both nitrogen and acid deposition); and
- Cae Gwyn SSSI (year 2 and year 5 for both nitrogen and acid deposition).

5.6.29 As described in chapter D9 [APP-128], a study by Caporn *et al*. [RD3] was used to predict changes in habitat quality indicators at both Tre'r Gof SSSI and Cae Gwyn SSSI as a result of incremental changes in long-term nitrogen deposition above critical loads.

5.6.30 Although alkaline fen as a defined habitat was not represented within the Caporn *et al*. study [RD3], the nearest available equivalent was used; in this case bog habitat. It is acknowledged that, ecologically, the two habitats are distinct, but the effects of increased nitrogen deposition are considered similar for both. The eight-year study period employed by Caporn *et al*. is different from the two peak modelled scenarios assessed here. However, it is considered that the use of the Caporn *et al*. (study [RD3] represents a precautionary approach to this assessment.

5.6.31 A typical response to increases in nitrogen deposition is an increase in nutrient-demanding plants such as grasses and sedges (graminoids), and the consequent loss of less competitive species such as smaller herbs and bryophytes [RD3]; [RD4] which are likely to represent the rarer, more important species present within the SSSIs.

Tre'r Gof SSSI

5.6.32 At Tre'r Gof SSSI, the predicted increase in nitrogen deposition at year 2 is 1.03 kgN/ha/year, and at year 5 this drops to 0.6 kgN/ha/year. Following the Caporn *et al* 2016 study, the year 2 scenario would potentially lead to a 0.9% decrease in overall species richness within the SSSI, a 4.0% decrease in forb species richness, and a 1.5% increase in graminoid cover. The year 5 scenario would potentially lead to a 0.5% decrease in overall species richness within the SSSI, a 2.3% decrease in forb species richness, and a 0.9% increase in graminoid cover.

5.6.33 The predicted increases in acid deposition at Tre'r Gof SSSI as a result of the year 2 and year 5 scenarios are 0.09 keq/ha/year and 0.09 keq/ha/year respectively. This increase in acid is below the critical load value for the SSSI and is likely to be buffered by the fen's alkaline nature which provides resilience to changes in pH levels, although areas within the SSSI which are more acidic may be affected by a decrease in species diversity.

5.6.34 As a result of these predicted changes in nitrogen and acid deposition, it is considered that there would still be measurable changes in the attributes and quality of the SSSI (including fugitive dust). This would represent a small magnitude of change and a moderate adverse effect in the medium term, which is anticipated to reduce as changes in nitrogen and acid deposition reduce towards baseline conditions.

5.6.35 Additional ecological mitigation measures presented in chapter D9 [APP-128], would still be implemented and, once taken into account, it is considered that the overall effect on Tre'r Gof SSSI from changes in air quality would be minor adverse and therefore not significant as presented in Table D9-13 of chapter D9 [APP-128]. However, the combined effect to Tre'r Gof SSSI from changes to air quality and hydrology remains major adverse, as presented in chapter D9 [APP-128].

Cae Gwyn SSSI

5.6.36 The nitrogen deposition at Cae Gwyn SSSI predicted to occur at year 2 is an increase of 0.22 kgN/ha/year and, at year 5, an increase of 0.16 kgN/ha/year. Again, using the Caporn *et al* 2016 study, this increase would potentially lead to a 0.2% decrease in overall species richness within the SSSI, a 0.9% decrease in forb species richness, and a 0.3% increase in graminoid cover in year 2. In year 5, the air quality changes would potentially lead to a 0.1% decrease in overall species richness within the SSSI, a 0.6% decrease in forb species richness, and a 0.2% increase in graminoid cover.

5.6.37 The predicted increases in acid deposition at Cae Gwyn SSSI as a result of the year 2 and year 5 scenarios are 0.01 keq/ha/year and 0.01 keq/ha/year respectively. As with Tre'r Gof SSSI, this increase in acid is below the critical load value for the SSSI and is considered to be so small that any effect would be negligible on the species composition and integrity of the SSSI.

5.6.38 The overall changes in air quality at Cae Gwyn SSSI, including effects of fugitive dust, are predicted to lead to very small measurable changes in the interest features and quality of the SSSI. This is considered to represent a small magnitude of change and a minor adverse effect in the medium term, which is anticipated to reduce as changes in nitrogen deposition reduce towards baseline conditions.

5.6.39 Potential minor adverse effects on the SSSI are also predicted as a result of changes to hydrological conditions, as presented in chapter D9 [APP-128]. The overall combined effect for Cae Gwyn SSSI remains minor adverse.

Lighting related effects

5.6.40 Regarding disturbance effects on sensitive ecological receptors as a result of changes to lighting arising from the amendments to working hours, the environmental lighting assessment (Section 5.12), identifies three ecological receptors where there would be no change in effects and two ecological receptors where adverse effects from lighting disturbance may increase. However, with the provision of new and existing mitigation already secured in the DCO application (see Table 5-18), all predicted effects would be reduced to levels identified and assessed within the Environmental Statement, chapter D9 [APP-128] and appendix D10-10 [APP-201].

5.7 Landscape and visual

Relevant updates

5.7.1 The relevant updates listed in Table 5-1 that are applicable to landscape and visual issues comprise:

- updates to section 4.2 of the Main Power Station Site Sub-CoCP [as submitted at Deadline 8 (25 March 2019)];
- updates to section 11.2 of the Marine Works Sub-CoCP [as submitted at Deadline 8 (25 March 2019)]; and
- updates to sections 4.1, 5.4 and 6.5 of the Landscape and Habitat Management Strategy [as submitted at Deadline 8 (25 March 2019)].

Additional topic information

Supplementary community views assessment

5.7.2 The assessment of community views is presented in chapter D10 of the original Environmental Statement [APP-129]. Whilst that assessment is considered adequate to understand the likely significant effects on local communities, a supplementary community views assessment is presented in Appendix D10-A of this Environmental Statement Addendum to aid the Isle of Anglesey County Councils (IACC's) understanding of the visual effects on the communities in Cemaes and Tregele, following requests made by the IACC in submissions to the Examining Authority and at a meeting held between Horizon and the IACC on 17 October 2018.

5.7.3 The supplementary community views assessment is supported by an addendum to visual effects schedule in the original Environmental Statement (Appendix D10-7 [APP-198]), providing a detailed assessment of supplementary representative viewpoints, supplementary photomontage views (which represent an addendum to Appendix D10-8 [APP-199]) and revised figure D10-16 [APP-237] showing the location of supplementary representative viewpoints and photomontages.

5.7.4 The supplementary community viewpoints assessment confirms the findings of the assessment of visual effects on the communities in Cemaes and Tregele presented in chapter D10 of the original Environmental Statement [APP-129]. The visual effects identified at all of the supplementary representative community viewpoints are either within the existing range of effects identified for these communities or of a lower significance of effect than what is reported in chapter D10 of the Environmental Statement [APP-129].

Revised assessments

5.7.5 The use of remote switching to manage lighting for the laydown area behind Mound B and the Wylfa Newydd Development Area car park during construction is consistent with the additional mitigation measure for construction lighting set out in table D10-40 of chapter D10 of the

Environmental Statement [APP-129]. Whilst this measure provides a more specific commitment to mitigate visual night-time effects for some receptors, including the community in Tregele, there would be no change to the significance of the residual night-time visual effects assessed in chapter D10 of the Environmental Statement during construction.

5.7.6 The ecological mitigation measures set out in section 11.2 of the Marine Works Sub-CoCP [as submitted at Deadline 8 (25 March 2019)], including the textured surfaces of precast concrete units, installation of precast rockpools and use of natural rock won from the site to provide rock armour, is consistent with the additional mitigation measures for structures within the marine environment listed in table D10-40 and D10-41 of chapter D10 of the original Environmental Statement [APP-129], which states that the selection of appropriate materials would *"seek to integrate new structures within the marine environment."* These measures would therefore contribute to integration of the structures within the natural seascape at Porth-y-pistyll, particularly once the surfaces become colonised by intertidal vegetation but would not change the significance of residual landscape and visual effects assessed in chapter D10 of the original Environmental Statement when considered in the wider context of the WNDA development [APP-129].

5.7.7 The detailed drainage design would be completed following grant of the DCO. However, it is likely that the potential requirement for additional surface water attenuation could be achieved by either increasing the depth of the sedimentation pond that is already proposed or by a slight increase in its area and would not therefore change the significance of the residual landscape and visual effects assessed in chapter D10 of the original Environmental Statement [APP-129] during construction or operation.

5.7.8 The increase in proposed biodiverse habitat areas for landscape reinstatement, including coarse sward species rich grassland, is considered in keeping with the generally pastoral character of the local landscape. This is because it is proposed that landscape restoration areas within the Wylfa Newydd Development Area would still primarily be grazed as described in the overarching landscape design principles, with the exception of the protected ecological areas and woodland, as shown in Figure 6-18 of Part 1 of the Landscape and Habitat Management Strategy [as submitted at Deadline 8 (25 March 2019)].

5.7.9 The addition of nine wildlife ponds in accordance with the illustrative design in the updated Landscape and Habitat Management Strategy (Rev 2.0) [REP2-039], would result in relatively inconspicuous landscape features in keeping with characteristic wetland and marshy habitats of the locality, for example, those at Tre'r Gof SSSI and Cae Gwyn SSSI. As such, there would be no change to the significance of the residual landscape and visual effects assessed in chapter D10 of the original Environmental Statement [APP-129].

5.7.10 Slopes steeper than 1:2 on the outer face of the landscape mound adjoining the A5025 (Mound B) would be limited to no more than 100m in length, to the west and south of Tregele Services. The mound slope would be designed to facilitate native shrub and small tree planting. The design of the slope will

incorporate measures to facilitate planting and given the location of the steeper part of the mound slope, it will be partially concealed behind Tregele Services in views from the A5025 and from Tregele. The potential reduction in effectiveness of planting mitigation during construction is not expected to change the significance of residual effects assessed in chapter D10 of the original Environmental Statement [APP-129] during construction for any landscape or visual receptors, due to the 'worst case' scenario assessed.

5.7.11 By year 15 of operation, the overall screening and softening of Power Station views would not be noticeably reduced, despite the growth of planting trees on the steeper part of the mound slope being potentially less vigorous than elsewhere, since by year 15 the substantial area of woodland planting on the final landscape mound behind the outer face would have established. As such, there would be no change to the significance of residual effects assessed in chapter D10 of the original Environmental Statement [APP-129] for any landscape or visual receptors during operation.

5.8 Cultural heritage

Relevant updates

5.8.1 The relevant updates listed in Table 5-1 that are applicable to Cultural Heritage are:

- updates to section 4.2, 7.5, 9.5 and 12.1 of the Main Power Station Site Sub-CoCP [as submitted at Deadline 8 (25 March 2019)];
- updates to Reference Point 5 in Plans, Sections and Drawings 2.6.1
- updates to section 11.2 of the Marine Works Sub-CoCP [as submitted at Deadline 8 (25 March 2019)];
- updates to sections 4.1, 5.4 and 6.5 of the Landscape and Habitat Management Strategy [as submitted at Deadline 8 (25 March 2019)];
- updates to Schedule 3 of the DCO s.106 agreement; and
- changes to the upper daily limit of marine vessels and extensions to working hours reported in Table 5-1.

Additional topic information

5.8.2 Since the assessment of effects presented in chapter D11 (cultural heritage) [APP-130], further archaeological investigations have been undertaken. Summary reports on the results of these investigations have been provided at Deadline 8 (25th March 2019).

5.8.3 Under the precautionary approach to the cultural heritage assessment in D11 [APP-130] nine archaeological remains within the WNDA were assessed to be high value. The results of the archaeological investigations have confirmed that for six of the archaeological remains this assessment of high value is appropriate and that archaeological remains of schedulable quality are likely to be associated with them. These archaeological remains are:

- Tregele Romano-British Settlement (Asset 540) (Area 4 (E3));
- Romano-British Settlement, East of Tyddyn Gele (Asset 547) (Area 05S);
- Romano-British Settlement, North-east of Tyddyn Gele (Asset 566) (Area 05S);
- Roman Settlement, North-west of Tregele (Asset 567) (Area O5 (n));
- Porth yr Ogof Roman Settlement (Asset 573) (Area F1); and
- Porth Wylfa Cist Cemetery (Asset 580) (Cemetery Site).

5.8.4 Based on the results of the investigations, the other three assets are no longer considered to be of high value, these are:

- Pennant Enclosure and Cist Cemetery (Asset 205)
- Stone Trackway, North-west of Tregele (Asset 568)
- Neolithic Flint Processing Site, West of Porth Wylfa (Asset 579)

5.8.5 The results of the investigations for each of the nine assets are considered further under 'Revised Assessments' below.

Revised assessments

5.8.6 Based on results of the archaeological investigations for the six archaeological remains identified in paragraph 5.8.3, the assessment of residual effects on these archaeological remains has been updated and is presented in Table 5-20.

5.8.7 The measures to mitigate the effects on these archaeological remains are as identified in the chapter D11 [APP-130] and comprises the archaeological excavation or archaeological strip map and sample undertaken followed by post-excavation assessment, reporting, analysis publication, dissemination and archiving. This mitigation is secured through the Archaeological Mitigation Scheme for the WNDA to be submitted and approved by IACC prior to the commencement of the Power Station Works or Site Campus. See Table 5-1 for reference to the amendments made to the DCO to secure this.

5.8.8 This mitigation would provide for the recording of these remains and enhanced understanding through the post-excavation assessment and is considered to have a significant bearing on the assessment of residual effects. However, given that these remains would be entirely removed during construction and the assets are of schedulable quality, the assessment of significance of residual effect on these archaeological remains has been assessed to be moderate adverse (previously minor adverse). As identified in chapter B11 (ES Volume B Introduction to the environmental assessments B11 – Cultural heritage [APP-076] these effects are considered to be significant in the context of the Infrastructure Planning EIA regulations (2009).

5.8.9 Under para 5.8.4 and 5.8.5 of the Overarching National Policy Statement for Energy EN-1 [RD7] where there are heritage assets with archaeological interest that are not currently designated as scheduled monuments, but which are demonstrably of equivalent significance, then these heritage assets should be considered subject to the same policy considerations as those that apply to designated heritage assets. Therefore, the removal of these heritage assets is considered to be commensurate with substantial harm.

5.8.10 The results of the investigations also demonstrate that the three further archaeological remains originally assessed as high value in chapter D11 (Assets 205, 568 and 579) can now be defined as medium value. This change in value is recorded in Table 5-20. However, this change in value does not change the conclusion regarding the residual significant effects for these three archaeological remains which remain minor adverse.

5.8.11 The conclusions regarding the residual significant effects on all other archaeological remains assessed in D11 remain unchanged after undertaking the measures to mitigate the effects on heritage assets, included in the Archaeological Mitigation Scheme described under the changes to the DCO in Table 5-1.

5.8.12 As identified in paragraph 11.4.12 of chapter D11 [APP-130], embedded mitigation for cultural heritage included the provision of landscape mounding and woodland planting would to help soften views of the Power Station and to help integrate the Power Station into the landscape. The assessment of effects presented in chapter D11 was based on Reference Point 5 – Operation drawing Rev 1 in Landscape and Habitat Mitigation Strategy [APP-424 and APP-245], which showed a higher proportion of more Sympathetically Managed Agricultural Grassland than is now proposed (see Table 5-1 for more information on this update). It is however not considered that increasing the proportion of habitats proposed from that presented in the Environmental Statement would significantly affect the integration of the Power Station into the landscape, and therefore no changes to the significance of residual effects on the setting of cultural heritage assets from those predicted in chapter D11 and appendix D11-6 are predicted.

5.8.13 The use of remote switching of lighting in zones within the laydown area when access is required to a specific zone during darkness would not reduce the effect of lighting on the setting of cultural heritage assets as reported in chapter D-11 and appendix D11-6. No change in the significance of residual effects as assessed in chapter D-11 and appendix D11-6 is therefore predicted.

5.8.14 An assessment of the potential effects resulting from an increase in the deposition of NOx, and increased nitrogen deposition and acid deposition on Cestyll Garden, a Grade II Registered Historic Park and Garden, were assessed in chapter D11. The assessment identified that:

- due to construction lasting a relatively short period of time in the lifespan of woody species and the ability of the soil to buffer against acidification from increased nitrogen deposition the effects of changes in air quality on woody species are likely to be limited;

- even with the potential for soil acidification, the pH is likely to remain within a healthy range for species such as rhododendrons and azaleas; and
- there is some potential for other plant species present within the valley garden plants to be affected due to changes in air quality, in particular an increase in the deposition of NOx, increased nitrogen deposition and acid deposition.

5.8.15 As noted in 5.3.16, the predicted annual mean and maximum 24-hour mean NOx concentrations and annual mean SO2 concentrations (reported in the Air Quality Mitigation Report [REP3-052]) at Cestyll Garden are below the criteria for requiring further consideration in the terrestrial and freshwater ecology assessment (see chapter B5 Air quality [APP-070] for more detail of these criteria). On this basis, effects due to increases in NOx concentrations are concluded to be negligible, and not significant for Cestyll Garden.

5.8.16 With regards to nitrogen and acid deposition at Cestyll Gardens, the magnitude has been shown to be small in Tables 5-11 to 5-14. However, as a precaution, the mitigation measure identified in paragraph 11.6.16 of chapter D11 (and secured in the Main Site sub-CoCP) of consulting with the landowner of Cestyll Garden to implement appropriate monitoring of soil pH and a visual inspection of the condition of plants during the bulk earthworks of the construction period, would still be undertaken. Considering the additional mitigation which is secured in the DCO application, the contribution of air quality effects to the major adverse effect to Cestyll Gardens identified in chapter D11 [APP-130] of the Environmental Statement would be reduced.

5.8.17 Due to other effects, including removal of the kitchen garden, removal of part of the Essential Setting, noise and visual intrusion during construction and decommissioning, and visual intrusion during operation, the significance of residual effect to Cestyll Garden would remain major adverse as reported in chapter D11 [APP-130].

5.8.18 While the updated commitment to undertake Level 4 historic building survey for Felin Gafnan Corn Mill (Grade II* Listed Building, Asset 137), Mill House at Felin Gafnan (Grade II* Listed Building, Asset 144), Corn-drying House at Felin Gafnan (Grade II Listed Building, Asset 141) as identified in Main Power Station Site Sub-CoCP above would help offset the effects on these historic buildings, it would not reduce the significance of residual effects identified in chapter D11.

5.8.19 While the ecological enhancement of marine works as described in Marine Works Sub-CoCP, Section 11.2 in table 5-1 above would help to soften the views of the MOLF and the Western Breakwater from heritage assets including Cestyll Garden and Felin Gafnan Corn Mill (Grade II* Listed Building, Asset 137), a Grade II Registered Historic Park and Garden, the construction of these elements would still introduce noise and visual intrusion into the setting of these heritage assets during construction and their continued presence during operation and decommissioning would continue to affect their settings. As such this update would not reduce the significance of effect for heritage assets as described and predicted in chapter D11.

5.8.20 The update to the design principles requiring detailed drainage design to ensure there is no increase in flow from the WNDA to Cemaes Stream as described under Landscape and Habitat Management Strategy, Section 4.1 and 5.4 in table 5-1 above would not result in any changes to the significance of residual effects assessed in chapter D-11 and appendix D11-6.

5.8.21 As identified in paragraph 11.4.7 of chapter D11, embedded mitigation for cultural heritage included:

- the phased implementation of landscape mounding, seeding of pasture and woodland planting to include early creation of the outer slopes of the linear landscaped mound adjacent to Tregele, and landscape mounding on the edge of Cemaes, and
- the provision of landscape mounding and woodland planting would to help soften views of the Power Station and to help integrate the Power Station into the landscape.

5.8.22 Steepening of a short section of the outer face of this mound opposite Tregele as described in the Landscape and Habitat Management Strategy, Section 4.1 in table 5-1 above is not considered to reduce the effectiveness of this embedded mitigation and therefore would not change the significance of any residual effects presented in chapter D11.

5.8.23 While the Visitors Centre could provide the venue for exhibitions that would aid in the dissemination of the results of the archaeological and other recording identified as mitigation in chapter D11, it would not change any of the significance of residual effects presented in chapter D11 and appendix D11-6.

5.9 Coastal processes and coastal geomorphology

Relevant updates

5.9.1 Additional mitigation has been developed to support the assessments made on the potential effect of the Wylfa Newydd Development on Esgair Gemlyn. These updates are presented in Section 11.5 of the Marine Works sub-CoCP and summarised in Table 5-1.

Additional topic information

5.9.2 A technical note was entered into examination at Deadline 2 [REP2-007] which summarised additional work undertaken with respect to coastal processes since the submission of the Wylfa Newydd DCO and Marine Licence and to provide a response to comments raised by NRW through the informal advice received on the Marine Licence application. The content of the memo also provided supplementary information requested at the HRA meeting with NRW on the 27 September.

5.9.3 Additional information was entered into Examination at Deadline 5 in response to the Issue Specific Hearing on Biodiversity [REP-5-056]. This provided additional information with respect to the effect of the cooling water discharge on coastal processes with relevant information summarised below.

Waves and shear stress

5.9.4 NRW raised specific concerns through the statement of common ground process and in their written representation [REP2-325] relating to the potential effects on Esgair Gemlyn from the Wylfa Newydd DCO Project.

5.9.5 The technical memo [REP5-056] provided additional information relating to:

- the effect of the 99 percentile winter wave condition on the bed shear stress and its implications for the morphological functioning of Esgair Gemlyn; and
- the effect of the cooling water discharge on coastal processes.

5.9.6 Additional work showed that whilst storms from the north-west give rise to a reflected wave condition within Cemlyn Bay, these waves (and their reflected components near to the ebb tidal delta) would result in a small increase in wave height (<20cm) and bed shear stress in a very localised area (the western fringes) under worst case conditions. While small increases occur at certain worst case conditions during a 99%ile winter storm decreases on baseline conditions occur in other areas of Cemlyn Bay. The degree of changes are not sufficient to modify the sediment transport regime to any significant degree in comparison to energetic events arising from waves, and shear stress generated from winds from a northerly sector. In this respect, it is the northerly storms that are considered to govern the largest scale morphological adjustments within the Bay and along the Esgair Gemlyn ridge, and not lower energy events.

Tidal vectors

5.9.7 Modelling was examined to look at the effect of the CW flow on the tidal vectors in the vicinity of the outfall as well as the wider environment. The magnitude of the change in the predicted flow field for the case with the development and the 99%ile winter wave can be seen in Figure 5-1 and 5-2. In these figures the flow conditions with the CW flow are shown in red and without the CW flow in blue.

5.9.8 Figure 5-1 shows the plotted the depth averaged mid flood velocity on a spring tide. There is a small increase in velocity near the outfall with the CW flow included. There are also some differences north of Cemlyn Bay in the wave induced flow towards the southern end of the breakwater. In general, the differences on the flood tide are fairly localised and the inclusion of the CW flow doesn't change the overall pattern of the tidal flow with the development in place and a 99%ile winter wave.

5.9.9 Figure 5-2 shows the mid ebb spring tide 99%ile winter wave developed case. The influence of the CW discharge on an ebb tide (with a 99%ile winter wave) can be seen in a change in predicted current direction around the outfall and in a line west from the outfall past the north of the western breakwater. There is some change to the detail of the predicted flow pattern in Cemlyn Bay but not to the overall picture of a counter clockwise flow. The inclusion of the CW flow does not change the overall pattern of the counter rotating flows in Cemaes Bay.

Figure 5-1 Effect of CW flow on tidal vectors during spring tide mid-flood with 99%ile winter wave

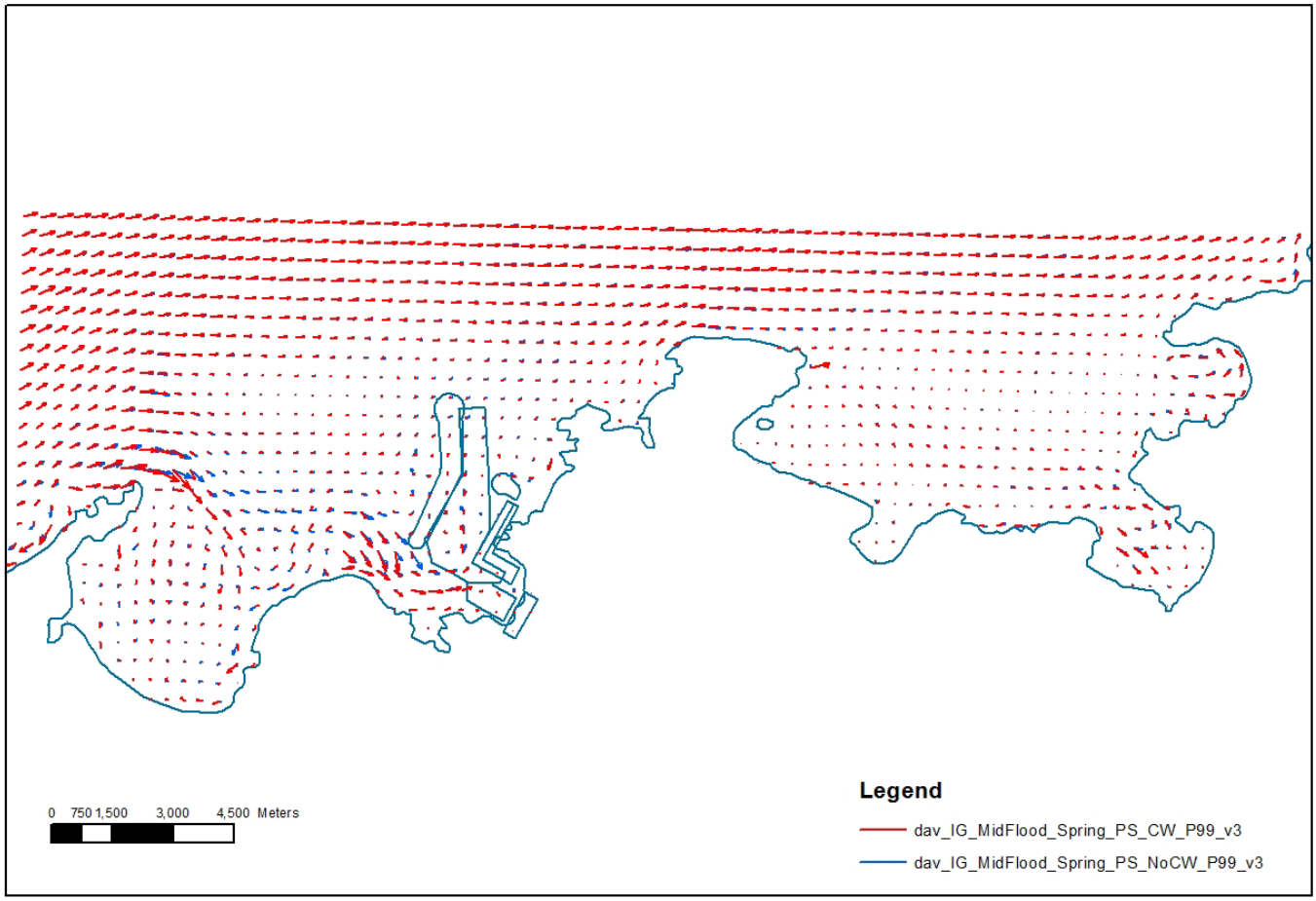
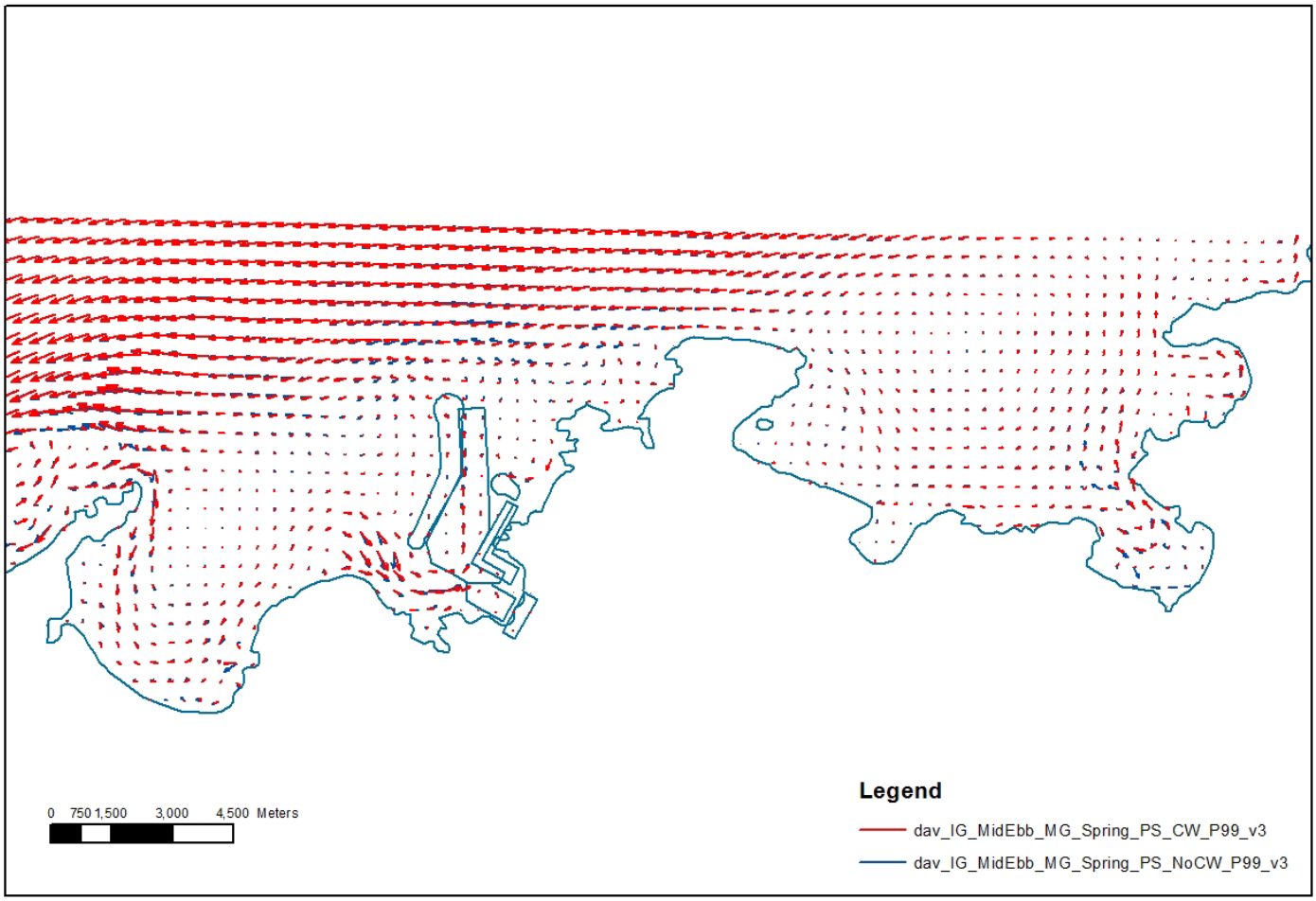


Figure 5-2 Effect of CW flow on tidal vectors during spring tide mid-ebb with 99%ile winter wave



Additional mitigation

5.9.10 To validate the modelling and assessment work undertaken to predict the no effect of coastal processes on Esgair Gemlyn Horizon will implement a coastal geomorphology monitoring programme and adopt an adaptive management approach. The principles for which will be secured in the Marine Works sub-CoCP [as submitted at Deadline 8 (25 March 2019)] and further details agreed with NRW through the Marine Licence. The monitoring programme will consist of:

- Annual ground topographic surveys during the construction phase of the Wylfa Newydd DCO Project. Surveys would monitor the topography of Esgair Gemlyn and consist of a terrestrial laser scanner or aerial LIDAR surveys.
- The relevant data collected during the construction phase (i.e. data from the surveys described above but also wider water quality data as part of construction water discharge Environmental Permit licence conditions) will be used to inform a future coastal geomorphology monitoring programme and management approach.

Revised assessments

5.9.11 In light of the above information there are no changes to the conclusions presented in chapter D12 [APP-131], (and also the Shadow HRA [APP-050 / 051]) with respect to the potential effects of coastal processes on Esgair Gemlyn in that there are no significant differences from baseline conditions. Based on the additional modelling scenarios undertaken and reported above, it can be concluded that the 98th and 99th percentile wave conditions are comparable worst cases in terms of the effect on bed shear stress and potential to affect coastal processes. The evidence presented together with the conceptual understanding of the potential changes to Cemlyn Bay and Esgair Gemlyn led to the conclusion that coastal processes within the Bay and the dynamic equilibrium of the ridge would be unlikely to change due to the presence of the western breakwater. Erosion and/or scour of the ridge would be unlikely given that sediment supply would not be expected to change and any variations in ebb and flood flows would likely be small.

5.9.12 It is apparent from the figures presented regarding tidal vectors that any changes to the flow field are localised and are not large enough to change the overall patterns within the Anglesey North waterbody, nor The Skerries waterbody. The natural gyres seen within Cemaes Bay and Cemlyn Bay are unaffected by the CW discharge.

5.10 Marine environment

Relevant updates

5.10.1 During the Examination process and statement of common ground, two key areas of concern were raised by NRW and the eNGOs. These included the following elements:

- The effectiveness of marine mitigation for the loss of benthic habitats; and
- The cumulative effect of land drainage and dredging on the marine environment.

In response to this, the additional mitigation has been developed further to provide assurance in the assessments made. These updates are presented in Sections 11.2 and 11.3 of the Marine Works sub-CoCP and summarised in Table 5-1.

5.10.2 The updates to the application arising from the Requests for Non-Material Change of relevance are the extension to blasting timeframes, the upper daily limit of marine vessel movements and extension of working hours for specified Main Construction activities into the evening or 24 hour working. These are further outlined in Table 5-1.

Additional topic information

Ecological enhancement

5.10.3 In response to concerns around marine mitigation for habitat loss, Horizon have considered the views raised by NRW through the SOCG and Examination process.

5.10.4 Horizon has submitted a detailed report at Deadline 4 [REP4-023] outlining the additional information that has been requested by NRW through SOCG meetings to expand upon the details submitted in the SOCG with NRW at Deadline 2 [REP2-049]. This new report expands on the engineering options appraisal undertaken to determine the ecological enhancement measures that are viable and can be considered as part of the Wylfa Newydd DCO Project to mitigate loss of marine habitats and species.

5.10.5 The report also details the mitigation proposed to address the impact of the Marine Works footprint that includes the implementation of shoreline protection and restoration of the intertidal zone following removal of the temporary causeway and habitat enhancement.

Effects on benthic habitats

5.10.6 The assessment of direct habitat loss shows that 23.5ha of subtidal (i.e. coastal bed) and 7.6ha of intertidal invertebrate habitat would be lost under the footprint of the Marine Works (which includes the cooling water discharge infrastructure) in the Wylfa Newydd Development Area (including both permanent and temporary structures). Based on a worst-case TRO discharge (as set out in Chapter D13 [APP-132] paragraph 13.6.747 onwards of the original Environmental Statement) it is estimated that an additional area of 5.6ha could be affected by the cooling water discharge. It is important to recognise that this effect does not result in a loss of 5.6 ha, instead this represents a mixing zone extent where the EQS of TRO is exceeded in the water column.

5.10.7 Within the calculations in paragraph 5.9.5,

- 27ha of the Skerries waterbody subtidal area (representing 0.6% of total area) would be affected cumulatively by the Wylfa Newydd DCO Project. Potential Cooling Water operational effects to intertidal areas within The Skerries waterbody are expected to be highly localised, being limited to less than 200m to the west of the Cooling Water outfall. Consequently, there is a limited cumulative impact to invertebrates found intertidally.
- 4.1ha of the Anglesey North waterbody, the majority of which would occur subtidally, (representing 0.03% of the total area) would be affected cumulatively by the Wylfa Newydd DCO Project.

5.10.8 It is not anticipated that all invertebrates within the total area of The Skerries and Anglesey North waterbodies potentially affected by the Wylfa Newydd DCO Project would be at risk of deterioration. Outfall surveys at the Existing Power Station have shown that acute effects such as reduced species

diversity and abundance, as well as the loss of key characterising species would only likely occur within a couple of hundred metres of the outfall. Beyond 300m, no significant differences in the subtidal communities were observed during Cooling Water outfall surveys of the Existing Power Station (appendix Chapter D13-5 Subtidal Dive Surveys at the Cooling Water Outfall for the Existing Power Station), [APP-223]. Although the Wylfa Newydd Power Station will discharge Cooling Water at a greater rate, the Cooling Water outfall has been designed to direct the plume away from the seabed thereby reducing effects to benthic invertebrates further.

5.10.9 As set out in section 13.6 of Chapter D13-5 Subtidal Dive Surveys at the Cooling Water Outfall for the Existing Power Station [APP-223], Horizon considers that most benthic invertebrate species would not experience lethal effects from TRO at the highest concentrations (i.e. 0.1mg/L) modelled close to the outfall. In addition, Horizon considers there to be no impact to invertebrate species from additional chemical changes associated with Cooling Water and other construction or operational water discharges (e.g. metal concentrations, dissolved oxygen, pH and ratio of ionised to unionised ammonia).

5.10.10 Therefore, while deterioration of habitat and sessile invertebrate species is likely to occur under the footprint of the Marine Works and within the immediate vicinity of the Cooling Water outfall (i.e. a couple of hundred metres), significant deterioration is not anticipated outside this area. Furthermore, mobile benthic invertebrates would be able to move away from areas of disturbance or unfavourable conditions, and so while habitat may be lost, fatalities may not occur. Subtidal and intertidal habitats along the north Anglesey coastline are not considered to be a limited resource for marine invertebrates known to be present within the area potentially affected.

5.10.11 Based on the worst-case assessment outlined above, the proportion of The Skerries waterbody potentially at risk of deterioration for marine invertebrates does not exceed 5% of its surface area, nor does it cover a contiguous surface area which exceeds 0.5km^2. This conclusion remains valid when intertidal and subtidal areas are considered in combination and isolation.

Revised assessments

5.10.12 The updates to mitigation described above do not result in changes to the assessments made within Environmental Statement Volume D - WNDA Development D13 - Marine environment [APP-132] because the mitigation for ecological enhancement had already been considered within the assessment. In addition, the cumulative effect on benthic habitats does not require more mitigation than that already presented.

5.10.13 For the extension of blasting hours, blasting would not be permitted to occur after dusk between March and September during the tern breeding season. No additional lighting is required and consequently, this would not alter the magnitude of visual disturbance effects to the tern colony at Cemlyn Lagoon

As the extension of blasting activities would not increase the overall impact of noise disturbance to, or lighting impacts on, the tern colony at Cemlyn Lagoon

from that currently assessed in D13 of the Environmental Statement [APP-132] and there is no change to the conclusions presented in chapter D13 [APP-132] of the Environmental Statement.

Underwater noise from vessel movements

5.10.14 The predicted noise levels related to vessels are low and not discernible above measured background at distances of 2.4km for medium vessels and 4.4km for large vessels. The impact ranges summarised in Table D13-26 and Table D13-27 (Chapter D13 [APP-132]) show that Permanent Threshold Shift (known as PTS) and Temporary Threshold Shift (known as TTS) to harbour porpoise and pinnipeds in water from vessel movements is considered unlikely. With regards to behavioural effects for harbour porpoise, the assessment predicted only localised avoidance within 60m of large vessels and 10m of medium vessels. Predicted ranges show that behavioural effects for pinnipeds in water are unlikely. It has been suggested that the primary effect of vessel movements is the masking of biologically important sounds. However, most shipping generates low frequency sound below 1kHz and is therefore outside of the auditory range for most cetaceans and it is likely to be only detectable to pinnipeds. The effect to cetaceans is considered to be negligible and has not been considered further in the assessment.

5.10.15 With regards to underwater noise, it is the size of the vessel that is of importance rather than the frequency of vessel movements. Considering there will be no change in the size of vessels to be used in relation to the increase in upper daily limit of marine vessel movements it is considered that the conclusions of the assessment of effects arising from underwater noise from vessels in remain not significant as assessed in D13 [APP-132].

Physical injury of marine mammals from vessel strikes

5.10.16 Prior to construction and on completion of the Marine Works, marine plant and vessels would be required to transit to/from the Wylfa Newydd Development Area. The numbers of vessels are small in comparison to the vessel density in the wider area of up to 25 vessels per week. Once on-site, much of the marine plant would be stationary for long periods of time or travelling at relatively slow speeds. Work boats and safety boats may travel at faster speeds but movement would generally be limited to the Wylfa Newydd Development Area. Marine mammals have been recorded in low abundance here and given the likely occurrence of other disturbance effects (e.g. underwater noise), displacement of individuals from the area is probable. The risk of vessel strikes from marine plant and vessels transiting to site and once on-site is therefore considered to be negligible.

5.10.17 During operation of the Marine Off-loading Facility (MOLF) marine traffic would be comprised of primarily large slow-moving vessels required to transport general equipment, cement and aggregate. The slow travelling speeds of these vessels means that the likelihood of marine mammal strikes is low. Therefore, the magnitude of change is predicted to be negligible and the effect on marine mammals from vessel strikes is negligible.

5.10.18 Despite there being an increase in the daily vessel movements, the total number of vessels using the MOLF over the whole construction programme would remain the same. The assessment demonstrated that although all types of vessels may collide with marine mammals, the most lethal and serious injuries are caused by large ships (e.g. 80m or longer) and vessels travelling at speeds faster than 14 knots. Considering there will be no change in the size of vessels used or their travel speed (10 knots), and that displacement of individuals from the area is probable due to other disturbance effects during construction, it is considered that the conclusions of the assessment of no significant effect presented in D13 [APP-132] remain valid.

Changes to visual disturbance

5.10.19 Seabirds (including terns as well as other species such as Manx shearwater, *Puffinus puffinus*) exhibit relatively low sensitivity to vessel traffic ([RD5], [RD6]) and consequently, the change to the upper daily limit would not result in discernible increase in visual disturbance to seabirds. This disturbance is unlikely to have more than minor effects on foraging or commuting behaviour, which would be inconsequential in terms of any population-level effect. Therefore, the change to the upper daily limit would not alter the magnitude of visual disturbance effects to seabirds, remaining as reported in D13 [APP-132] of the Environmental Statement.

5.10.20 The additional working hours and plant associated with the Marine Works as outlined in Table 5-1 have the potential to change assessed levels of visual disturbance and lighting as well as airborne noise disturbance.

Fish and marine mammals

5.10.21 The assessments of visual disturbance effects for the Marine Works which is presented within chapter D13 [APP-132] of the Environmental Statement was based on 24-hour working to account for the dredging operations. Light can act either as an attractant (for planktivorous feeders) or a deterrent (predatory feeders) for fish and therefore artificial light levels can affect the natural behaviour of species.

5.10.22 The presence of personnel and construction lighting from marine operations was considered to have the potential to result in temporary displacement of fish from the area and disturbance to feeding. The effect of visual disturbance on all fish receptors was assessed as negligible in chapter D13 [APP-132] of the Environmental Statement owing to the fact that there is available habitat along the north Anglesey coastline therefore displacement would only be localised and would not have an effect on populations. As indicated above, this assessment was already based on 24-hour operations for marine dredging therefore any changes to personnel, plant and lighting that may be required for the Marine Works due to the amendment to working hours would not have an effect on the assessments made.

5.10.23 For marine mammals, visual disturbance was assessed in the context of grey seals that have either surfaced or are hauled-out. The effects could cause seals to cease feeding, resting and socialising and result in displacement from the area. The assessment within chapter D13 [APP-132] of the Environmental

Statement took account of the fact that dredging operations would occur for 24 hours a day and concluded negligible effects on marine mammals owing to there being no primary or secondary breeding sites along the north Anglesey coastline and sightings in the Wylfa Newydd Development Area are sporadic individuals or small groups. As with fish receptors, the assessment already assumed visual disturbance for 24 hours a day, therefore any changes in personnel, plant and lighting that may be required for the Marine Works due to the amendment to working hours will not have an effect on the assessments made.

Seabirds

5.10.24 The assessments of visual disturbance on seabirds was made within chapter D13 [APP-132] of the Environmental Statement and accounted for:

- construction activities for the breakwater, MOLF, temporary cofferdam and subsequent Cooling Water System intake and outfall works;
- increased barge/vessels in construction areas;
- lighting for offshore ground works;
- ground works and construction activities; and
- increased presence of human activity.

5.10.25 Assessments of visual disturbance made in chapter D13 [APP-132] of the Environmental Statement and the Shadow Habitats Regulations Assessment [APP-050/051] were based on earthworks being completed between the hours of 07:00 and 19:00 and included additional mitigation that was developed to protect the tern colony in Cemlyn Lagoon which forms the Anglesey Terns/Morwenoliaid Ynys Mon SPA. The mitigation defined in the Wylfa Newydd CoCP [as submitted at Deadline 8 (25 March 2019)] stipulates restrictions on any construction works within 500m of the nesting islands and shingle ridge between the 15 April and 15 May to protect pre-laying and nest establishment in the tern colony. It also goes on to stipulate that no bulk earthworks will be undertaken within 500m of any known active tern nests within the Anglesey Terns/Morwenoliaid Ynys Mon SPA. This mitigation would remain applicable in the case of the amended working hours.

5.10.26 Terns and breeding black-headed gulls may be sensitive to the use of lighting at night. The assessments made in chapter D13 [APP-132] of the Environmental Statement took account of the works for the proposed MOLF and breakwaters located over 1km from the breeding colony. The lighting from the Marine Works was considered to have no effect on terns and breeding black-headed gulls, as they do not normally fly or actively feed at night. In addition, the lighting levels were assessed to not extend outside of the bay and therefore would not affect nesting terns.

5.10.27 The Environmental Lighting Assessment (Section 5.12) identifies that the indicative haul routes lighting design shows there would be no additional light spill onto Cemlyn Bay (receptor 4/5) and the effect would remain negligible as shown in Table 5-19. Whilst this would need to be confirmed at the detailed

design stage, the indicative haul routes and the associated lighting is not considered to affect the assessment of visual disturbance presented in chapter D13 [APP-132] of the Environmental Statement and the Shadow Habitats Regulations Assessment Report [APP-050/051].

5.10.28 The potential effects of the changes to working hours to the terns and breeding black-headed gulls is not considered likely to result in anything more than a negligible magnitude of change and therefore the significance of the effect would remain negligible, as reported in the chapter D13 [APP-132]. Furthermore, any changes to personnel, plant and lighting that may be required for the Marine Works as a consequence of the amended working hours would have no effect on the conclusions as the assessment already takes into consideration 24-hour dredging operations.

5.10.29 For lighting and visual disturbance from earthworks, the extent of visual change with potential to affect the terns (either at the colony or at sea) was assessed as not likely to generate levels of visual disturbance significantly above existing background levels (i.e. in terms of potential disturbance to terns, they would be consistent with disturbance generated by other industrial, agricultural and recreational activities that are routinely undertaken in the local landscape, and would be unlikely to be greater than visual disturbance generated by e.g. visitors and walkers utilising public rights of way and accessing the shingle ridge). The mitigation presented above protects nesting terns from disturbance and therefore any changes to personnel, plant and lighting that may be required for land based operations as a consequence of the amended working hours would not change the assessment made within chapter D13 [APP-132] of negligible effect or the Shadow Habitats Regulations Assessment [APP-050/051] of no likely significant effect.

5.11 Shipping and navigation

Relevant updates

5.11.1 The update relevant to Shipping and Navigation, arises from the Requests for Non-Material Change, to increase the upper daily limit of marine vessel movements to a peak of 16 movements per 24 hour period (i.e. eight movements per 12 hour period). A vessel movement is defined as one trip into, or out of the Marine Off-loading Facility (MOLF). This does not increase the total vessel movements set out in the Navigational Risk Assessment (NRA) in Appendix D15-1 [APP-235], only the upper daily limit which was previously 4 vessel movements per day.

Revised assessments

5.11.2 The update to the daily limit of marine vessel movements changes the NRA (Environmental Statement Appendix D15-1 [APP-235]) for the operational phase of the MOLF, through the addition of one hazard scenario considering ‘berth unavailable’. This additional hazard scenario increases the frequency count of both ‘causes’ and ‘mitigation (controls)’.

5.11.3 The additional hazard scenario identified due to the increase in the upper daily limit relates to the potential that a suitable berth is not available for a vessel proceeding to the MOLF. This would result in the requirement for more vessels to wait offshore for a berth to become available. This risk would be controlled by good practice mitigation measures described in chapter D15 [APP-134] of the Environmental Statement and secured in the Marine Works sub-CoCP [as submitted at Deadline 8 (25 March 2019)].

5.11.4 Table 5-17 details the changes to identified causes for hazard scenarios in the NRA.

Table 5-17 Changes to Cause frequency increase

Cause	DCO application frequency (4 vessel movements per day)	New upper limit (16 vessel movements per day)	Difference in frequency arising from change to upper limit in daily movements
Human error	18	19	+1
Human error/fatigue - Ship Personnel	17	18	+1
Communication failure - Personnel	13	14	+1
Competence	9	10	+1
Human error/fatigue - Port/Marine Personnel	5	6	+1
Communication failure - Equipment	4	5	+1
Language problems	4	5	+1
Failure to comply with VTS/LPS/SOPs	2	3	+1
High traffic density	1	2	+1
Non-attendance of boatmen	0	1	+1

5.11.5 The increase in the upper daily vessel limit would not require any additional mitigation (control) measures to be adopted and would be mitigated by previously identified mitigation measures as outlined in Table D15-3, chapter D15 [APP-134] of the Environmental Statement. Changes to additional mitigation (control) measure frequency arising from the change to the upper daily limit are outlined in Table 5-18.

Table 5-18 Mitigation (control) measure frequency increase

Cause	DCO application frequency (4 vessel movements per day)	New upper limit (16 vessel movements per day)	Difference in frequency arising from change to upper limit in daily movements
Local Port Services - Harbour control office	20	21	+1
Marine Safety Management System	16	17	+1
PMSC compliance	16	17	+1
Contingency plan exercises	11	12	+1
Port Facility Emergency Plan	11	12	+1
LPS broadcast (navigation and safety information)	10	11	+1
Oil spill contingency plans	10	11	+1
Pilotage service	10	11	+1
Training of port marine/operations personnel	9	10	+1
Availability of pollution response equipment	7	8	+1

5.11.6 Although there has been an additional hazard scenario identified, this change does not require any further embedded, good-practice, or additional mitigation measures. This is due to the hazard scenario being effectively mitigated by the measures identified for the other hazard scenarios in the NRA.

5.11.7 Therefore, it has been concluded that there are no changes to the shipping and navigation assessment, and the conclusions presented in chapter D15 [APP-134] of the Environmental Statement remain as reported. A revised version of the NRA reflecting the additional hazard scenario is included in Appendix D15-1-A.

5.12 Environmental Lighting Impact Assessment

Relevant updates

5.12.1 The likely lighting effects on dark skies, nearby communities and ecological receptors, that would result from the construction of the Wylfa Newydd DCO Project are presented in Appendix D10-10 [APP-201] of the Environmental Statement. The amendments made to the working hours described in Table 5-1 are relevant to the assessment of lighting effects.

Additional topic information

5.12.2 Even though the majority of construction activities associated with the earthworks would remain restricted to 07:00-19:00 hours, grading activities will continue up to 22:00 meaning that haul routes out to Mounds B1 and E will be in use up to this time. Similarly, haul routes specifically associated with night time working in the deep excavations at the centre of the Main Power Station Site will be in use 24/7. Consequently, there is a requirement to light haul routes for security and maintenance purposes as a minimum and therefore modelling of the haul road lighting during the earthworks phase has been undertaken.

5.12.3 The modelled vertical grids showing indicative lux levels from haul road lighting for receptors 7,8,11,12 and 13 shown in Figure 2-2 of Appendix D-A of this Addendum.

5.12.4 The basis of modelling and assessment assumes that the indicative lighting design for the haul routes complies to BS5489-2013 standard, lighting class P2, and with assumed lighting levels of 10lux average with a 3lux minimum, which is the lighting class for subsidiary roads with a typical speed of ≤30mph. Due to the size of the moving vehicles and with no pedestrian routes to safeguard pedestrians at the earthworks phase, the traffic flow has been assessed as 'busy'. Maximum column mounting height would be 12m and lanterns have been designed to mount post top with 0 degrees of tilt to reduce light pollution.

Revised assessments

5.12.5 **Error! Reference source not found.**Table 5-19 details the lighting effects on five sensitive receptors considered in Appendix D10-10 [APP-201] of the Environmental Statement along with a further three sensitive receptors that have been identified as potentially affected. This table updates the conclusions for these receptors in Table 1-8 of D10-10 [APP-201].

5.12.6 The three additional residential receptors are located on the western boundary of the Wylfa Newydd Development Area (receptors 11, 12 and 14). The locations of all eight potential receptors are shown in Figure 2-3 of Appendix D-A of this Addendum.

5.12.7 As detailed in paragraph 1.3.29 of appendix D10-10 [APP-201] of the Environmental Statement, the Environmental Lighting Impact Assessment does not assess significance in relation to ecological receptors. Instead, it provides an assessment of magnitude for changes in lighting levels to inform the assessment of effects on terrestrial and freshwater ecology (Section 5.6), marine environment [Section 5.10] and the shadow Habitats Regulations Assessment [APP-050/051]. Reference should be made to those assessments for the predicted significance of lighting effects on specific receptors.

5.12.8 Regarding the community receptors, the updated lighting modelling results which reflect the change to working hours, showed that there would be no

additional lighting effects to the nearby communities of Cemaes (receptor 2) or Tregele Village (receptor 7)

5.12.9 The updated lighting modelling showed no significant effect on residential receptor 12 and 13. An adverse effect from the change to working hours was identified at receptor 11, but with mitigation in place which has already been secured in the DCO application, such as issue of blackout blinds to residents of this property, light disturbance at this receptor would be negligible.

5.12.10 It is noted that the requirement for an Overarching Construction Lighting Scheme (secured by Schedule 3 Requirement WN1, prepared in accordance with the details in Schedule 21, Part 2) and the Phased Construction Lighting Plans (Requirement WN[B]) have been added to the DCO [REP5-003]. This provides for approval of these schemes by IACC in consultation with NRW.

Table 5-19 Lighting effects on sensitive receptors

Receptor (or group of receptors)	Summary of baseline lighting condition / Sensitivity of receptor	Description of potential effect	Nature of effect	Potential magnitude of change	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
Cemlyn Bay	Lighting from Existing Power Station is visible although the lagoon is dark. Evaluated as Environmental Zone E1. Refer to Shadow HRA Report [APP50-51] and chapter D9 [APP-128] for sensitivity of species associated with this area to lighting.	There is potential for some task lighting and headlights associated with construction of Mound E to affect lagoon. Due to limited working hours at this location, effects would be limited. However short-term exceedances of the 0.1lux threshold are predicted.	Temporary adverse	Small adverse	Additional lighting control measures to be applied to keep lighting levels to below 0.1lux threshold.	Negligible	Refer to Shadow HRA Report (Application Reference Number: 5.2) for effects in relation to the SPA. Refer to Section 5.6 and 5.10 for significance of lighting effects on ecology.
Caerdegog Farm	Low levels of lighting present. Evaluated as Environmental Zone E2.	No noticeable increase in lighting predicted due to distance.	Neutral	Negligible	None identified.	N/A	Refer to Section 5.6 for significance of lighting

Receptor (or group of receptors)	Summary of baseline lighting condition / Sensitivity of receptor	Description of potential effect	Nature of effect	Potential magnitude of change	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
	Refer to chapter D9 [APP-128] for sensitivity of species associated with this area to lighting.						effects on ecology.
Mynydd Ithel Farm	Intrinsically dark. Evaluated as Environmental Zone E1. Refer to chapter D9 D9 [APP-128] for sensitivity of species associated with this area to lighting.	No noticeable increase in lighting predicted due to distance.	Neutral	Negligible	None identified	N/A	Refer to Section 5.6 for significance of lighting effects on ecology
Buffer zones along watercourses within the Wylfa Newydd	Intrinsically dark. Evaluated as Environmental Zone E1.	Lighting from haul route HR-011 associated with Mound E would have potential to	Temporary adverse	Medium adverse	Lighting on the haul route, from columns within 40m either side of the watercourse, will be dimmed 50% using the Central Management System outside of	Small adverse	Refer to Section 5.6 for significance of lighting

Receptor (or group of receptors)	Summary of baseline lighting condition / Sensitivity of receptor	Description of potential effect	Nature of effect	Potential magnitude of change	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
Development Area	Refer to chapter D9 [APP-128] for sensitivity of species associated with this area to lighting.	trespass into buffer zone on watercourse. However, with mitigation in place which has already been secured in the DCO application (e.g. careful placement of lighting columns along with back light shields) light spill during working hours would be significantly reduced.			construction working hours to reduce light trespass around the watercourse. In the event of a security alert or for safety considerations this lighting will be reset to 100% for the duration of the alert but will resume its regular dimming profile once the incident has been resolved (this mitigation would be secured in the Wylfa Newydd CoCP [APP414]).		effects on ecology.
Residential receptor 11	Intrinsically dark, evaluated as E1	This dwelling is located west of the proposed site and in the vicinity of the tern nesting area; also 665m west of the proposed haul road. There is potential for some task lighting and headlights	Temporary adverse	Small adverse	With mitigation in place which has already been secured in the DCO application, such as issue of blackout blinds to residents of this property, light disturbance at this receptor would be reduced.	Minor adverse	Minor adverse

Receptor (or group of receptors)	Summary of baseline lighting condition / Sensitivity of receptor	Description of potential effect	Nature of effect	Potential magnitude of change	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
		associated with construction of Mound E to affect the dwelling, effects would be limited. Dark skies already compromised by sky glow caused by lighting from Existing Power Station, Cemaes and Tregele.					
Residential receptor 12	Intrinsically dark, evaluated as E1	This dwelling is located southwest of the proposed Horizon site and 200m south of the proposed haul road. There are not considered to be any potential effects. Dark skies already compromised by sky glow caused by lighting from Existing Power	Neutral	None identified	N/A	N/A	N/A

Receptor (or group of receptors)	Summary of baseline lighting condition / Sensitivity of receptor	Description of potential effect	Nature of effect	Potential magnitude of change	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
		Station, Cemaes and Tregele.					
Residential receptor 13	Intrinsically dark, evaluated as E1	This dwelling is located approximately 20m from the proposed Horizon site boundary and located central to three proposed haul routes; minimum distance to haul road is 203m.	Neutral	None identified	N/A	N/A	N/A

5.13 Combined topic effects

Relevant updates

5.13.1 The updates of relevance to the combined topic effects assessments are those arising from the Requests for Non-Material Change relating to the extension to blasting timeframes, the upper daily limit of marine vessel movements and extension of working hours for specified Main Construction activities into the evening or 24 hour working. These are further outlined in Table 5-1.

Revised assessments

5.13.2 The extension to blasting hours would not significantly alter the assessment of effects to human and ecological receptors for the reasons described in section 5.4 and therefore there would be no change to the assessment of effects presented in D16 [APP-135].

5.13.3 As outlined in Table 5-1, the change to working hours and the consequential changes to haul routes have implications to the air quality, noise, terrestrial and freshwater ecology, and landscape and visual topic assessments. Each of the topic assessments concluded overall no new or different likely significant environmental effects. Further assessment showed that overall the change to working hours would not result in any new receptors being scoped into the combined topic assessment for the WNDA Development nor would it alter the assessment of combined topic effects and conclusions reported in chapter D16 [APP-135] of the Environmental Statement

5.13.4 In summary, the changes to the application are not considered to alter the conclusions presented in chapter D16 [APP-135] of the Environmental Statement.

5.14 Residual effects summary

5.14.1 Table 5-20 presents a summary of where residual effects have been updated compared to Volume D of the original Environmental Statement.

Table 5-20 Summary of residual effects for the Wylfa Newydd Development Area

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
Surface water and groundwater								
Tre'r Gof SSSI	High	Reduction of flow of groundwater at seeps and flushes due to dewatering.	Potentially affecting water availability and water quality maintaining groundwater dependent ecosystems in Tre'r Gof SSSI	Moderate	Moderate adverse	Monitoring to identify any changes, controlling water loss from the site via the underground culvert to avoid the drying and oxidation of the peat body, construction methodologies to reduce groundwater ingress to the Cooling water tunnels,	Minor	Minor adverse

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
						recharging groundwater in areas potentially affected by dewatering during the construction period, adaptive water management mitigation within the Tre'r Gof catchment with a Hydrological Clerk of Works to oversee.		
Residential properties (Cemaes Catchment, Afon Cafnan Catchment	High	Reduction in flood depth	Beneficial Local Long-term	Negligible to Small	Negligible to Minor beneficial	None required	Negligible to Small	Negligible to Minor beneficial

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
and Nant Cemlyn Catchment including Cemlyn Road)								
Noise and vibration								
Residential properties (mainly in receptor groups A, B and F)	High	Long-term exposure to construction noise has the potential to cause annoyance, sleep disturbance and other adverse health outcomes.	Exposure to construction noise	Large at 15 properties. Medium at 227 properties. Small at 956 properties. Negligible at 23 properties.	Major adverse at 242 properties (15 + 227). Moderate adverse effects are predicted at 956 properties. Minor (not significant) effects are predicted at	Revised (lower) threshold for the LNMS, based on the onset of a medium magnitude of change.	Large at 15 properties. Medium at 227 properties. Small at 956 properties. Negligible (not significant) effects are predicted at 23 properties.[3]	Major adverse at 242 properties (15 + 227). Moderate adverse effects are predicted at 956 properties. Minor (not significant) effects are predicted at

[3] The noise insulation measures will reduce internal noise levels in properties, but will not normally reduce the external noise levels which are used to determine the magnitude of effect. Therefore the reported post-mitigation effects remains as pre-mitigation for the purposes of the Environmental Statement

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
					23 properties.			23 properties.[2] [4]
Schools and hotels	High	High noise levels in schools can affect learning, language development and retention.	Exposure to construction noise	Small at one school (Camaes Primary School) and five hotels. Negligible at one school.	Moderate at one school (Camaes Primary School) and five hotels. Minor at one school.	Funding of noise mitigation measures at Cemaes Primary School via DCO s.106 agreement. Revised (lower) LNMS thresholds apply to hotels	Small at one school and five hotels. Negligible at one school.[5]	Moderate at one school and five hotels. Minor at one school.[4]
Community buildings and places of worship	Medium	High levels of noise can cause annoyance and could	Exposure to construction noise	Medium at one place of worship (Eglwys Sant	Moderate at one place of worship (Eglwys	Funding of noise mitigation measures at Eglwys Sant	Medium at one place of worship. Small at four community	Moderate at one place of worship. Minor at four community

[4] In respect of NPS EN-1, it is considered that the LNMS will avoid significant noise effects.

[5] As the external noise levels will not change the reported post-mitigation effects remains as pre-mitigation for the purposes of the Environmental Statement:

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
		potentially effect speech intelligibility.		Padrig Church). Small at four community buildings and six places of worship.	Sant Padrig Church). Minor at four community buildings and six places of worship.	Padrig Church via DCO s.106 agreement.	buildings and six places of worship. [6]	buildings and six places of worship. [5] [7]
Commercial properties and offices	Low	High levels of noise can cause annoyance and could potentially effect speech intelligibility.	Exposure to construction noise	Large at one commercial building and five offices. Medium at four commercial buildings. Small at 27 commercial buildings	Moderate at one commercial buildings and five offices. Minor at 31 commercial buildings (4 + 27) and three offices. Negligible	None proposed.	Large at one commercial buildings and five offices. Medium at four commercial buildings. Small at 27 commercial buildings and three offices. Negligible at one	Moderate at one commercial building and five offices. Minor at 31 commercial buildings (4 + 27) and three offices. Negligible at one

[6] As the external noise levels will not change the reported post-mitigation effects remains as pre-mitigation for the purposes of the Environmental Statement.

[7] In NPS-EN1 it is considered that the DCO s.106 agreement will avoid significant noise effects at Eglwys Sant Padrig Church

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
				and three offices. Negligible at one commercial building.	at one commercial building.		commercial building.	commercial building.
Cultural Heritage								
Pennant Enclosure and Cist Cemetery (Asset 205)	Medium	Removal	Adverse Regional Permanent	Large	Major adverse	Archaeological Excavation	Small	Minor adverse
Tregele Romano-British Settlement (Asset 540)	High	Removal	Adverse National Permanent	Large	Major adverse	Archaeological excavation	Medium	Moderate Adverse
Romano-British Settlement, East of Tyddyn Gele (Asset 547)	High	Removal	Adverse National Permanent	Large	Major adverse	Archaeological Excavation	Medium	Moderate Adverse
Romano-British	High	Removal	Adverse National	Large	Major adverse	Strip, map and sample	Medium	Moderate Adverse

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
Settlement, North-east of Tyddyn Gele (Asset 566)			Permanent					
Roman Settlement, North-west of Tregele (Asset 567)	High	Removal	Adverse National Permanent	Large	Major adverse	Archaeological Excavation	Medium	Moderate Adverse
Stone Trackway, North-west of Tregele (Asset 568)	Medium	Removal	Adverse Regional Permanent	Large	Major adverse	Archaeological Excavation	Small	Minor adverse
Porth yr Ogof Roman Settlement (Asset 573)	High	Removal	Adverse National Permanent	Large	Major adverse	Archaeological Excavation	Medium	Moderate Adverse
Neolithic Flint Processing Site, West of Porth Wylfa (Asset	Medium	Removal	Adverse Regional Permanent	Large	Major adverse	Archaeological Excavation	Small	Minor adverse

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
579)								
Porth Wylfa Cist Cemetery (Asset 580)	High	Removal	Adverse National Permanent	Large	Major adverse	Archaeological Excavation	Medium	Moderate Adverse

5.15 References

Table 5-21 Schedule of references

RD	Reference
RD1	British Standards Institution. 2008. BS 6472-2 *Guide to Evaluation of human exposure to vibration in buildings. Blast-induced vibration*. London: British Standards Institution.
RD2	Adrienne Stratford (Welsh Chough Project) / RSPB pers. comm. in March and June 2017
RD3	Caporn, S., Field, C., Payne, R., Dise, N., Britton, A., Emmett, B., Jones, L., Phoenix, G., Power, S., Sheppard, L., Stevens, C. 2016. Assessing the effects of small increments of atmospheric nitrogen deposition (above the critical load) on semi-natural habitats of conservation importance. Natural England Commissioned Reports, Number 2010.
RD4	Stevens, C., Jones, L., Rowe, E., Dale, S., Hall, J., Payne, R., Evans, C., Caporn, S., Sheppard, L., Menichino, N., and Emmett, B. 2013. Review of the effectiveness of on-site habitat management to reduce atmospheric nitrogen deposition impacts on terrestrial habitats. CCW Science Report No. 1037 (A).
RD5	Garthe, S and Hüppop, O. 2004. Scaling possible adverse effects of marine wind farms on seabirds: Developing and applying a vulnerability index. *Journal of Applied Ecology*. 41, pp.724-734.
RD6	Furness, R.W, Wade, H.M. and Masden, E.A. 2013. Assessing vulnerability of marine bird populations to offshore wind farms. *Journal of Environmental Management*. 119, pp.56-66.
RD7	Department of Energy and Climate Change, *Overarching National Policy Statement for Energy (EN-1)*. London, UK: The Stationery Office, 2011 [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf.

6 Off-Site Power Station Facilities

6.1 Introduction

Site-specific updates

6.1.1 Table 6-1 outlines the updates that have occurred at the Off-Site Power Station Facilities since the application for development consent that are of relevance to the Environmental Statement. A review of these updates has been undertaken by EIA specialists across all topics assessed in the original Environmental Statement and the following sections provide an update to those assessments.

6.1.2 It has been concluded that the updates are not applicable to the assessment for the following topics, Socio-economics; Public Access and Recreation; Air Quality; Noise and Vibration; Soils and Geology; Surface Water and Groundwater and Combined Topic Effects.

6.1.3 Specialists have investigated the changes to lighting presented in respect of Landscape and Visual and Cultural Heritage assessments, and it has been concluded there are no resulting changes to the Environmental Statement.

Table 6-1 Updates at the Off-Site Power Station Facilities

Section Reference	Relevant updates arising since submission	Relevant topics
Code of Operational Practice [as submitted at Deadline 8 (25 March 2019)]		
Section 4.3	Off-site Power Station Facilities will have three lighting levels: • Everyday lighting to allow staff to enter and exit work to the required British Lighting standards. • Evening security lighting for after working hours to comply with security lighting standards; and • emergency lighting levels to allow safe access to heavy machinery and equipment.	Landscape and Visual Cultural Heritage

6.2 Terrestrial and freshwater ecology

Additional topic information

6.2.1 Horizon has updated the preliminary roost assessments of trees and buildings for bats carried out in 2016 as reported in chapter F9 of the Environmental Statement [APP-274]. Further surveys have been carried out of building M3, returning no records of bats using the building as a roost.

6.2.2 The emergence/re-entry survey of building M3 in 2018 is presented in Off-site Power Station Facilities - Building M3 Bat Survey Results [REP3-049].

Revised assessments

6.2.3 The additional survey information provides further evidence of the lack of bat roosts that could potentially be affected. The information is not considered to reduce the level of significance for residual effects on bats. There would therefore be no change to the residual significant effects assessed in chapter F9 of the Environmental Statement.

7 Park and Ride

7.1 Introduction

Site-specific updates

7.1.1 Table 7-1 outlines the updates that have occurred at the Park and Ride since the application for development consent that are of relevance to the Environmental Statement. A review of these updates has been undertaken by EIA specialists across all topics assessed in the original Environmental Statement and the following sections provide an update to those assessments. It has been concluded that the updates are not applicable to Combined Topic Effects.

Table 7-1 Updates at the Park and Ride

Section Reference	Relevant updates arising since submission	Relevant topics
Volume 2 Plans, sections and Drawings (Parts 11/19) **2.11 Park and Ride [as submitted at Deadline 8 (25 March 2019)]**		
WN0902-HZDCO-ADV-DRG-00033 WN0902-HZDCO-ADV-DRG-00035	Addition of flood storage basin / attenuation areas on plans for approval. See also addition of design principle 3.4.19 in DAS Volume 3. These flood attenuation areas have been developed through further detailed design work and were therefore not proposed in the application for development consent.	Noise and Vibration Surface Water and Groundwater Landscape and Visual Cultural Heritage
WN0902-HZDCO-ADV-DRG-00035 (Operation) WN0902-HZDCO-ADV-DRG-00040 (Restoration)	Addition of maximum slope angles for the storage basin / attenuation areas of 1:3 during operation of the Park and Ride, 1:6 following restoration.	
WN0902-HZDCO-ADV-DRG-00041- WN0902-HZDCO-ADV-DRG-00042 WN0902-HZDCO-ADV-DRG-0004	Design levels for the car park and spine road have been raised to at least 16.45m AOD, the original levels were presented in the drawings WN0902-HZDCO-ADV-DRG-00041-00043 Rev 1.0 [APP-023].	

Section Reference	Relevant updates arising since submission	Relevant topics
WNO 902--HZDCO ADV DRG-00036	Revision of the access arrangements at the Park and Ride, whereby the primary change is the removal of the access roundabout and revisions to the associated highways around the access. The additional leg provided on the north edge of the existing 70m ICD roundabout has been designed in accordance with DMRB TD16 standards. The land previously occupied by the deleted roundabout that is not part of the revised road layout will be incorporated into the soft landscape. The existing carriageway has been widened in the vicinity of the roundabout to provide a short length (around 30m) of two-lane approach, while minimising the impact on existing features.	Socio-economics Public Access and Recreation Air Quality Noise and Vibration Soils and Geology Surface Water and Groundwater Landscape and Visual Cultural Heritage
Park and Ride Sub-CoCP [as submitted at Deadline 8 (25 March 2019)]		
Section 4.3	The Park and Ride lighting will be be subject to variable lighting controls and motion sensors. Not all zones will be utilised for the entire construction period and when zones are not required, lighting will be deactivated. The carparking areas will be zoned and switched off if they are not in use. This is a new commitment that was not included in the original sub-CoCP.	Landscape and Visual Cultural Heritage
Section 10.4	Culvert apparatus within the site boundary will be periodically inspected for potential blockages and any debris found would be	Surface Water and Groundwater

Section Reference	Relevant updates arising since submission	Relevant topics
	removed. This is a new commitment that was not included in the original sub-CoCP.	
Section 11.2	The proposed security fencing around the Park and Ride will be finished using a visually recessive colour to mitigate potential adverse visual impacts. This is a new commitment that was not included in the original sub-CoCP.	Landscape and Visual Cultural Heritage
Design and Access Statement – Volume 3 – Associated Developments and Off-Site Power Station Facilities [as submitted at Deadline 8 (25 March 2019]		
Section 3.4	Inclusion of two flood attenuation areas to the north-east of the site. See also Plans, Sections and Drawings. These two flood attenuation areas have been developed through further design work and were therefore not proposed in the application for development consent.	Noise and Vibration Surface Water and Groundwater

7.2 Socio-economics

Relevant updates

7.2.1 The relevant update is the revision of the access arrangements at the Park and Ride, as shown in Table 7-1.

Revised assessments

7.2.2 The original Environmental Statement did not identify socio-economic effects associated with the Park and Ride, however effects were identified at a Project-wide level in Volume C of the original Environmental Statement. The change does not affect the socio-economic assessment presented in the original Environmental Statement as there was nothing associated with the Park and Ride access that had a bearing on the outcome of the socio-economic assessment.

7.3 Public access and recreation

Relevant updates

7.3.1 The relevant update is the revision of the access arrangements at the Park and Ride, as shown in Table 7-1.

Revised assessments

7.3.2 All changes associated with the revised Park and Ride entrance are within the Order Limits. As such, any effect on public access and recreation has already been assessed and reported in the original Environmental Statement. Therefore, the change does not affect the public access and recreation assessment presented in the original Environmental Statement.

7.4 Air Quality

Relevant updates

7.4.1 The relevant update is the revision of the access arrangements at the Park and Ride, as shown in Table 7-1.

Revised assessments

7.4.2 The revised access arrangements in themselves do not affect the air quality assessment presented in the original Environmental Statement. In addition, given the lack of new or different traffic and transport effects, there would not be any consequential effects on air quality from traffic. As such, the change does not affect the air quality assessment presented in the original Environmental Statement.

7.5 Noise and vibration

Relevant updates

7.5.2 The relevant updates for noise and vibration include the construction of the proposed flood attenuation areas which will update the proposed construction programme, and the working areas of some construction plant items, as well as the revision of access arrangements at the Park and Ride, as shown in Table 7-1.

Additional topic information

7.5.3 The location and design principles of the flood attenuation areas are presented in the updated Plans, Sections and Drawings (see Table 5-1) and within Appendix 1.3 of the Design and Access Statement Volume 3 (Part 2 of 2) [as submitted at Deadline 8 (25 March 2019)]

7.5.4 To construct the proposed flood attenuation ponds at the Dalar Hir site, the equipment that was identified for site clearance and groundworks would be mobilised earlier in the construction programme than has been assessed in

Environmental Statement Volume F - Park and Ride F6 - Noise and vibration [APP-271]. It is assumed that the following equipment will now be mobilised at the start of construction (rather than the start of month three):

- four tracked excavators,
- three bulldozers, and,
- six articulated dumper trucks.

7.5.5 It may also be the case that some of the equipment listed above is primarily located within the footprint of the flood attenuation ponds, which are situated to the north east of the Park and Ride site, rather than working across a wider area. All of the embedded and good practice noise mitigation set out in the DCO Application would be implemented.

Revised assessments

7.5.6 The construction noise modelling for the Park and Ride site has been updated to reflect these updates, and the scenarios for months one and two have been re-run. The noise emission data for these items of plant remains as stated in the rows for Activity ID 2 in Table 1-2 of Appendix F6-01 [APP-279].

7.5.7 The updated noise modelling, as shown in appendix F6-1-A, indicates that, whilst the noise levels at some receptors to the north and east of the Park and Ride may increase during months one and two, the façade incident noise levels at all properties will remain below 65 dB $L_{Aeq,T}$. The level of 65 dB $L_{Aeq,T}$ is given in BS5228-1:2009+A1:2014 [RD1] as an example threshold of potential significance for areas with pre-existing low ambient noise levels.

7.5.8 In accordance with Table F6-5 ‘Adopted magnitude scale for construction noise’ in Environmental Statement Volume F – Park and Ride F6 – Noise and vibration [APP-271] noise levels under 65 dB $L_{Aeq,T}$ are considered a negligible magnitude of change. This would result in minor (not significant) effects at approximately 85 residential properties and four non-residential receptors for up to 18 months during the construction of the Park and Ride. These receptor counts remain identical to those stated in the Environmental Statement chapter F6 [APP-271], and therefore the construction of the proposed flood attenuation ponds at the Park and Ride does not change the conclusions of the original assessment.

7.5.9 The revised access arrangements for the Park and Ride in themselves do not affect the noise and vibration assessment presented in the original Environmental Statement. Noise and vibration from the construction of the Park and Ride is assessed in the original Environmental Statement with appropriate mitigation put in place. The change from construction of an additional roundabout to construction of highway at the access is considered to be negligible from a noise and vibration perspective, although it may constitute a small improvement over that assessed in the original Environmental Statement. Any improvement is not considered to be of a scale sufficient enough to the alter the outcome of the assessment. In addition, given the lack of new or different traffic and transport effects, there are not expected to be any consequential effects on air quality from traffic. As such,

the change does not affect the noise and vibration assessment presented in the original Environmental Statement.

7.6 Soils and geology

Relevant updates

7.6.1 The relevant update to soils and geology is the revision of the access arrangements at the Park and Ride, as shown in Table 7-1.

Revised assessments

7.6.2 Some of the land where the access roundabout was to be constructed will now contain revised highway arrangements and will therefore still be developed. The remaining land will not be developed and will remain in its current state. As such, the change may constitute a small improvement, however not of a sufficient scale to affect the soils and geology assessment presented in the original Environmental Statement.

7.7 Surface water and groundwater

Relevant updates

7.7.1 As listed in Table 7-1, the relevant updates applicable to surface water and groundwater comprise the:

- addition of flood attenuation areas in the north east of the site adjacent to Nant Dalar Hir;
- car park and spine road elevations within the site that have been amended to ensure that these are above the predicted flood level in a 1% Annual Exceedance Probability (AEP) event, with a 15% allowance for climate change; and
- revision of the access arrangements at the Park and Ride

Additional topic information

7.7.2 The location and design principles of the flood attenuation areas are presented within Appendix 1.3 of the Design and Access Statement Volume 3 (Part 2 of 2) [as submitted at Deadline 8 (25 March 2019)].

7.7.3 A Flood Consequence Assessment Addendum was submitted at Deadline 2 [REP2-372], which presents additional information on the baseline flood risk at the site, the risk to the proposed development from flooding and the impact from the proposed development on flood risk elsewhere.

7.7.4 In summary, the revised baseline information presented in REP2-372 indicates that the Dalar Hir site remains at flood risk from the Nant Dalar Hir, with extensive flooding of lower lying land within the central area of the site along the southern boundary. The depths of flooding simulated, however, are not as great as those presented within the original FCA for the site [APP-281].

7.7.5 Blockage modelling requested by Natural Resources Wales and provided at Deadline 5 [REP5-056] has been taken account of and in the revised levels referred to in Table 7-1.

Revised assessments

7.7.6 The addition of the proposed flood attenuation areas which would be present during construction, operation and decommissioning alongside the development of the design to include appropriate ground elevations in the car park areas and along the spine road impacts the basis of the assessment in the following manner:

- The presence of the flood attenuation areas and ground spine road elevations provides further embedded mitigation. Note, the flood attenuation areas lie outside of the 15m buffer on Nant Dalar Hir, hence there is no change to this existing embedded mitigation;
- Further good practice mitigation during operation is expanded to include regular inspection of the culverts on the Nant Dalar Hir that lie on the southern, downstream boundary of the watercourse beneath the A55 and A5. This would focus on the presence, and lead to proactive clearance, of any debris to avoid the risk of blockage and flooding.

7.7.7 Taking the above embedded mitigation into account, the proposed flood attenuation areas and elevation updates act to control the location of flooding within the site during construction, operation and following decommissioning, such that the proposed development will be safe from flooding in events up to the 1% AEP event with a 15% allowance for climate change (because of the short lifespan of the proposed development). In addition, there will be a beneficial reduction in flood levels upstream and to the downstream A55 and A5, as well as downstream receptors further afield such as a farm and Llyn Traffwll SSSI. The magnitude of change to flood risk is considered to be large beneficial (as defined in Table B8-12 of chapter B8 [APP-073]) by virtue of its long-term nature.

7.7.8 Taking the above good practice mitigation into account, the residual risk of blockage will be managed over the development's lifespan, such that the proposed development will continue to provide a large beneficial magnitude of change to flood risk.

7.7.9 These updates result in an alteration to the conclusions regarding the residual significant effects reported in the original Environmental Statement, from adverse to beneficial. This is summarised in Table 7-2.

7.7.10 The removal of the access roundabout and inclusion of the revised highway arrangement would not affect the surface water or groundwater regimes on the Park and Ride site. There is no encroachment into the floodplain with the revised design, and there will be a reduced area of hardstanding (so less impact on runoff and local groundwater recharge) compared to the original design. The new design allows for less working of the ground so may result in fewer sources of sediment to affect water quality. Overall, the change would not affect the assessments or the residual significance of effects. As such,

the change does not affect the surface water, groundwater, flood risk or drainage assessments presented in the original Environmental Statement.

7.8 Landscape and visual

Relevant updates

7.8.1 As listed in Table 7-1, the relevant updates applicable to landscape and visual issues comprise the:

- additional flood attenuation areas detailed in the update to Plans, Sections and Drawings in Section 2.11 [as submitted at Deadline 8 (25 March 2019)] and the Design and Access Statement – Volume 3 – Associated Developments and Off-Site Power Station Facilities [REP4-018 and REP4-019];
- updates to section 4.3 and section 11.2 of the Park and Ride sub-CoCP [APP-418] on the management of external lighting and colour of perimeter fencing respectively; and
- revision of the access arrangements at the Park and Ride.

Revised assessments

7.8.2 The proposed updates comprise the updates of car park and spine road levels and addition of the flood attenuation areas, including topsoil stripping and storage in temporary mounds, excavation of flood storage basins and seeding the base and side slopes to form a permanent grass sward.

7.8.3 Updates to design levels are proposed in the east part of the site adjacent to the flood attenuation areas. Design levels would only be altered slightly compared to the levels assumed for the DCO Environmental Statement. The area identified for the proposed flood storage basins was previously identified as a soil storage area. Therefore, the construction of the flood storage basins would only result in a limited increase in the extent of construction area and construction activities would be similar to those described in chapter F10 of the Environmental Statement [APP-275]. The proposed updates are not therefore considered to increase the significance of landscape effects and there would be no change to the effects assessed in chapter F10 of the Environmental Statement during construction.

7.8.4 There would be some changes to views during construction of the flood attenuation areas from the Cartio Môn Go-Karting Centre, Gwyddfor Residential Home, the National Cycle Network Route 8 and from the local road network. However, the additional changes to views would only form a small proportion of the overall Park and Ride construction activity and are not considered to increase the level of significance of visual effects. The slight updates to design levels of the car park and spine road are not anticipated to result in any changes to the nature of views, compared to the assessment in chapter F10 of the Environmental Statement. There would therefore be no

change to the visual effects assessed in chapter F10 of the Environmental Statement during construction.

7.8.5 During operation, grass seeding of the flood attenuation areas would be established, helping to integrate the flood storage basins into the surrounding landscape. The slight updates to design levels of the car park and spine road are not anticipated to result in any changes to the landscape and visual effects assessed in chapter F10 of the Environmental Statement. There would therefore be no change to the level of significance for residual landscape or visual effects assessed in chapter F10 of the Environmental Statement during operation.

7.8.6 Following decommissioning at the end of Park and Ride operation, the flood attenuation areas would be retained with minor alterations, including slackening the gradient of perimeter slopes to 1:6 to help improve their integration into the surrounding landscape and facilitate restoration of the former land use for grazing. During decommissioning, the spine road and car park would be removed and the landform graded to tie in with the surrounding levels of the restored site. There would therefore be no change to the level of significance for residual landscape or visual effects assessed in chapter F10 of the Environmental Statement following decommissioning.

7.8.7 The use of variable lighting controls to manage Park and Ride lighting during operation is consistent with the embedded mitigation measure for construction lighting set out in Section 10.4 of chapter F10 of the Environmental Statement [APP-275] and secured as per in the Park and Ride sub-CoCP, Section 4.3 (see Table 7-1). Whilst this measure provides a more specific commitment to mitigate visual night-time effects, there would be no change to the significance of the residual visual effects assessed in chapter F10 of the Environmental Statement.

7.8.8 The use of a visually recessive colour for the proposed security fence would help mitigate potential adverse visual effects for visual receptors identified in chapter F10 of the Environmental Statement [APP-275]. However, although this measure provides additional mitigation of the effects it is not considered to reduce the level of significance for residual visual effects. There would therefore be no changes to the residual significant effects assessed in chapter F10 of the Environmental Statement.

7.8.9 The removal of the access roundabout and replacement with a revised highway arrangement will not change the visual appearance of the Park and Ride, or affect the landscape character differently to that assessed in the original Environmental Statement. The removal of the roundabout may constitute a small improvement over that assessed in the original Environmental Statement, however any improvement is not considered to be of a scale sufficient enough to the alter the outcome of the assessment. As such, the change does not affect the landscape and visual assessment presented in the original Environmental Statement.

7.8.10 It is anticipated that the change in design would result in a highways arrangement that could be lit to a lower level than that assessed in the original Environmental Statement for the access roundabout. Therefore, the change

may be an improvement on the lighting of the original design, and could have a small positive effect on the original assessment. However, any improvement is not considered to be of a scale sufficient enough to the alter the outcome of the assessment. As such, the change does not affect the lighting assessment presented in the original Environmental Statement.

7.9 Cultural heritage

Relevant updates

7.9.1 As listed in Table 7-1, the relevant updates applicable to cultural heritage comprise the:

- design updates identified in the Plans, Sections and Drawings, Section [as submitted at Deadline 7 (14 March 2019)];
- updates to the management of the lighting system identified in Park and Ride Sub-CoCP [as submitted at Deadline 8 (25 March 2019)];
- updates to the proposed security fencing in Section 11.2 of the Park and Ride Sub-CoCP [as submitted at Deadline 8 (25 March 2019); and
- revision of the access arrangements at the Park and Ride.

Revised assessments

7.9.2 The design updates identified in Plans, Sections and Drawings, Section [REP2-019] in Table 7-1 above would not result in the removal or partial removal of any additional heritage assets to those identified in chapter F11 (Cultural heritage) [APP-276] and therefore would not change the assessment of the significance of residual effects presented in chapter F11.

7.9.3 The design updates have the potential to be more visible from Bryngoleu Farmhouse and Buildings (Asset 9) during construction and operation than the proposed reinstated grassland assessed in chapter F-11. However, as the design updates would be seen in the context of the Park and Ride and would be partially screened in views west from Bryngoleu Farmhouse and Buildings (Asset 9) by existing vegetation which would be retained, they would not change the assessment of the significance of residual effect for this historic building presented in Appendix F11-5 [APP-301].

7.9.4 While the updates to the management of the lighting system identified in Park and Ride Sub-CoCP [as submitted at Deadline 8 (25 March 2019)], Section 4.3 in Table 7-1 would reduce the effect from lighting on the setting of Bryngoleu Farmhouse and Buildings (Asset 9) during operation, this reduction is not sufficient to reduce the significance of residual effect assessed in appendix F11-5.

7.9.5 The periodic inspection of culvert apparatus as described under Park and Ride Sub-CoCP [as submitted at Deadline 8 (25 March 2019)], Section 10.4 in

Table 7-1 above would not change any of the significance of residual effects presented in chapter F11 or appendix F11-5.

7.9.6 While finishing of proposed security fencing using a visually recessive colour as identified in Park and Ride Sub-CoCP [as submitted at Deadline 8 (25 March 2019)], Section 11.2 in Table 7-1 would reduce the visual effect on the setting of Bryngoleu Farmhouse and Buildings (Asset 9) during operation, this reduction is not sufficient to reduce the significance of residual effect assessed in appendix F11-5.

7.9.7 Regarding the revised access to the Park and Ride, some of the land where the access roundabout was to be constructed will now contain revised highway arrangements and will therefore still be developed. The remaining land will not be developed and will remain in its current state. Therefore, the loss of land assessed in the original Environmental Statement is representative of a worst case. As identified in the landscape and visual section, the removal of the access roundabout is expected to result in a small improvement in the visual appearance of the site. Therefore, the change is not expected to affect the assessment of cultural heritage assets presented in the original Environmental Statement. As such, the change does not affect the cultural heritage assessment presented in the original Environmental Statement.

7.10 Residual effects summary

7.10.1 Table 7-2 presents a summary of where residual effects have changed compared to Volume D of the original Environmental Statement.

Table 7-2 Summary of residual effects at the Park and Ride

Receptor (or group of receptors)	Value of receptor(s)	Description of potential effect	Nature of effect	Potential magnitude of change	Potential significance of effect	Additional mitigation	Post-mitigation magnitude of change	Significance of residual effect
Surface water and groundwater								
Park and Ride (on-site flood risk)	Medium	Reduced risk of flooding to Park and Ride due to the flood attenuation areas and changes in land levels.	Beneficial Local Long-term	Large	Major beneficial	None required	Large	Major beneficial
A55 and A5	High			Medium	Moderate beneficial		Medium	Moderate beneficial
Caer Elen Farm and Llyn Traffwll SSSI (off-site flood risk), and				Small	Minor beneficial		Small	Minor beneficial

7.11 Non-technical summary update

7.11.1 Within the Surface Water and Groundwater assessment at the Park and Ride site, there are now three receptors where the overall effects have changed from adverse to beneficial.

7.12 References

Table 7-3 Schedule of references

ID	Reference
RD1	British Standards Institution. 2014. BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise. London: British Standards Institution.

8 A5025 Off-line Highway Improvements

8.1 Introduction

Site-specific updates

8.1.1 Table 8-1 outlines the updates that have occurred in relation to the A5025 Off-line Highway Improvements since the application for development consent that are of relevance to the Environmental Statement. A review of these updates has been undertaken by EIA specialists across all topics assessed in the original Environmental Statement and the following sections provide an update to those assessments.

8.1.2 It has been concluded that the updates are not applicable to the assessment for the following topics, Socio-economics, Public Access and Recreation, Air Quality, Noise and Vibration; Soils and Geology; Surface Water and Groundwater; Terrestrial and Freshwater Ecology and Combined Topic Effects.

Table 8-1 Updates to A5025 Off-line Highway Improvements

Section Reference	Relevant updates arising since submission	Relevant topics
A5025 Off-line Highway Improvements Sub-CoCP [as submitted at Deadline 8 (25 March 2019)]		
Section 4.4	Lighting around the construction compound buildings will be switched to a motion activated control system (motion sensors) at 18:00, except lighting required for security measures. A two-metre-high construction compound solid fence will further mitigate night time light trespass once it has been constructed. Where localised task lighting is required, this will be provided by mobile lighting units and lighting levels will be task dependant. Once works have finished for the day this lighting will be switched off. Construction vehicles, when working during the darker months in the vicinity of residential properties, shall dip their headlights to limit light spill and glare into residential properties, where reasonably practicable and providing this aligns with safe methods of working.	Landscape and Visual Cultural Heritage

Section Reference	Relevant updates arising since submission	Relevant topics
	These are new items that were not proposed in the original A5025 Off-line Highway Improvements Sub-CoCP, as they have arisen due to development of mitigation.	
Design and Access Statement – Volume 3 – Associated Developments and Off-Site Power Station Facilities [as submitted at Deadline 8 (25 March 2019)]		
Appendix 1-5, Section 3.3	Design principle 14 has been amended to reflect that the alignment of Section 5 of the A5025 Off-line Highway Improvements will be designed to avoid the AONB, with the exception of construction works to tie in the highway within the lay-by on the existing A5025 east of Llanfaethlu (which lie within the AONB).	Landscape and Visual Cultural Heritage
DCO s.106 agreement		
Schedule 11, Section 6	Financial contribution to IACC to be applied in improving, supplementing or replacing the existing interpretation board at Capel Soar Standing Stone. This is a new item that was not originally included in the Environmental Statement assessment.	Cultural Heritage

8.2 Landscape and visual

Relevant updates

8.2.1 The relevant updates s applicable to landscape and visual issues comprise updates to section 4.4 of the A5025 Off-line Highway Improvements sub-CoCP [as submitted at Deadline 8 (25 March 2019)]; and section 3.3 of appendix 1-5 of the Design and Access Statement – Volume 3 – Associated Developments and Off-site Power Station Facilities [as submitted at Deadline 8 (25 March 2019)] as listed in table 8-1.

Additional topic information

8.2.2 The Isle of Anglesey AONB boundary has been updated on figure 7 of the A5025 Landscape Scheme within appendix G10-9 [APP-344]. This updated figure has been appended to the Environmental Statement addendum in appendix G10-9-A.

Revised assessments

8.2.3 The use of motion sensors and a solid fence at the construction compounds and dipped headlights on construction vehicles, as well as turning off mobile lighting units when not in use, would help mitigate potential adverse night-time visual effects for visual receptors identified in chapter G10 of the Environmental Statement [APP-313]. However, although these measures provide additional mitigation of effects it is not considered to reduce the level of significance for residual night-time visual effects.

8.2.4 Part of section 5 of the A5025 Off-line Highway Improvements are located within the Isle of Anglesey AONB boundary as shown in Appendix G10-9-A, resulting in direct effects that were not previously discussed within appendix G10-3 [APP-338]. Section 5 construction works would result in the loss of a group of trees and grass verge area within the lay-by on the existing A5025, east of Llanfaethlu. Loss of trees within the lay-by would be noticeable in the landscape during operation until year 15, when establishment of proposed shrubs with intermittent trees would restore vegetation lost during construction. However, effects on the Isle of Anglesey AONB at section 5 would be very localised and would not result in any change in the residual (not significant) effect assessed within appendix G10-3.

8.3 Cultural heritage

Relevant updates

8.3.1 The relevant update applicable to Cultural Heritage are the updates to design Principle 14 in the Design and Access Statement – Volume 3 – Associated Developments and Off-Site Power Station Facilities [as submitted at Deadline 8 (25 March 2019)] and the update to Schedule 11 of the DCO s.106 agreement, as listed in Table 8-1.

Revised assessments

8.3.2 While the use of a two-metre-high construction compound solid fence as described in A5025 Off-line Highway Improvements Sub-CoCP [as submitted at Deadline 8 (25 March 2019)], Section 4.4 in table 8-1 would result in the compounds being slightly more visible in the settings of cultural heritage assets in comparison with the 2m high mesh link fence assessed in the Environmental Statement, this update is not predicted to increase the significance of residual effects presented in chapter G11 (Cultural heritage) [APP-314] and in appendix G11-5 [APP-351].

8.3.3 The slight amendment to the wording of Design Principle 14 as identified in Design and Access Statement – Volume 3 – Associated Developments and Off-Site Power Station Facilities, Appendix 1-5, Section 3.3 in table 8-1 would not change the significance of residual effects assessed in chapter G11 (Cultural heritage) and in appendix G11-5.

8.3.4 While the provision of an interpretation board at Capel Soar Standing Stone (Asset 146) (see DCO s.106 agreement, Schedule 11, Section 6 in table 8-1 above) would help to offset the effects on this monument identified in chapter G11, it would not reduce the significance of residual effects assessed in chapter G11.

9 Logistics Centre

9.1 Introduction

Site-specific updates

9.1.1 Table 9-1 outlines the updates that have occurred in relation to the Logistics Centre since the application for development consent that are of relevance to the Environmental Statement. A review of these updates has been undertaken by EIA specialists across all topics assessed in the original Environmental Statement and the following sections provide an update to those assessments.

9.1.2 It has been concluded that the updates are not applicable to the assessment for the following topics, Socio-economics; Public Access and Recreation; Air Quality; Noise and Vibration; Soils and Geology; Surface Water and Groundwater; Terrestrial and Freshwater Ecology and Combined Topic Effects.

Table 9-1 Updates to the Logistics Centre

Section Reference	Relevant updates arising since submission	Relevant Topics
Logistics Centre Sub-CoCP [as submitted at Deadline 8 (25 March 2019)]		
Section 11.2	The proposed 2.4m high fence around the Logistics Centre will be finished using a visually recessive or otherwise appropriate colour to mitigate potential adverse visual impacts. Previously, the colour of the fence was not stipulated.	Landscape and Visual Cultural Heritage
DCO s.106 agreement		
Schedule 11, Section 6	Financial contribution to IACC to be applied in improving, supplementing or replacing the existing interpretation board at Trefignath Burial Chamber and Ty Mawr Standing Stone. This is a new commitment that was not included in the original Environmental Statement.	Cultural Heritage

9.2 Landscape and visual

Relevant updates

9.2.1 The relevant update applicable to Landscape and Visual issues comprises the update to Section 11.2 of the Logistics Centre sub-CoCP as submitted at Deadline 8 (25 March 2019)as listed in Table 9-1.

Revised assessments

9.2.2 The use of a visually recessive or otherwise appropriate colour for the proposed 2.4m high fence would help mitigate potential adverse visual effects for visual receptors identified in chapter H10 of the Environmental Statement [APP-364]. However, although this measure provides additional mitigation of the effect it is not considered to reduce the level of significance for residual visual effects. There would therefore be no change to the residual significant effects assessed in chapter H10 of the Environmental Statement.

9.3 Cultural heritage

Relevant updates

9.3.1 The relevant update applicable to Cultural Heritage issues comprises the update to Section 11.2 of the Logistics Centre sub-CoCP [as submitted at Deadline 8 (25 March 2019)] as submitted at Deadline 8 (25 March 2019)]as listed in Table 9-1.

Revised assessments

9.3.2 While the finishing of the proposed 2.4m high fence around the Logistics Centre using a visually recessive or otherwise appropriate colour would help to soften the visibility of the Logistics Centre in the setting of heritage assets identified in appendix chapter H11 (Cultural heritage) [APP-365] and appendix H11-2 [APP-381], including Trefignath Burial Chamber (Asset 21) and Ty Mawr Standing Stone, Holyhead (Asset 22) Scheduled Monuments (AN011 and AN012) during operation, this would not reduce the significance of residual effects presented in chapter H11 and appendix H11-1.

9.3.3 While improving, supplementing or replacing the existing interpretation board at Trefignath Burial Chamber (Asset 21) and Ty Mawr Standing Stone, Holyhead (Asset 22) Scheduled Monuments (AN011 and AN012) would help to offset the effects on these designated heritage assets, this would not reduce the significance of residual effects presented in chapter H11 and appendix H11-1.

10 Cumulative effects

10.1 Introduction

10.1.1 In total there have been five Requests for Non-Material Changes accepted into the DCO examination (as outlined in Section 3.3 of this Addendum). Two of these changes are recorded in Chapter 4 (Project-wide) of this Environmental Statement Addendum, specifically the changes to worker shift patterns and the HGV delivery window (Requests for Non-Material Change no. 3 and 5). Three of these changes are recorded in Chapter 5 (Wylfa Newydd Development Area) of this Environmental Statement Addendum, specifically the changes to marine vessel movements, blasting strategy and working hours (Request for Non-Material Change no. 1, 2 and 4).

10.1.2 In relation to inter-project cumulative effects, no changes to the original Environmental Statement chapter I5 [APP-388]) were identified. It is noted that the consequential amendments table (Table 2-24 of the Request for Non-Material Change: Working Hours [REP4-012]) it is shown that an update is required for noise and vibration in Chapter I5. However, this is an error and there is no requirement for the noise and vibration inter-project cumulative assessment to be updated, as explained within paragraph 4.1.23 of the Request for Non-Material Change: Working Hours [REP4-012].

10.1.3 The Request for Non-Material Change no. 6 (Dalar Hir Park and Ride Junction Improvement) also considered cumulative effects. In consideration that no change to the effects were identified in the environmental appraisal of the presented change, there is no resultant change to the cumulative effects.

Intra-project cumulative effects

10.1.4 Intra-project cumulative effects were presented in chapter I4 [APP-387] of the original ES. Within Appendix 1-1 Cumulative assessment report of the Request for Non-Material Change: Working Hours an intra-project cumulative assessment has been undertaken for those topic assessments outlined in the Environmental Statement that would be potentially affected by the non-material changes presented. The methodology used for the cumulative effects assessment has considered all residual effects that are minor adverse or greater. Table 10-1 presents the topics that were considered within this assessment, and which ones resulted in a change compared to the intra-project cumulative effects assessment presented in the original submission. Those topics that do not change are not reported further here.

Table 10-1 Topics considered within the intra-project cumulative effects assessment and relevant changes

Topic	Change compared to the original assessment (Y/N)
Traffic and transport	N
Public access and recreation	N
Air quality	Y
Noise and vibration	N
Terrestrial and freshwater ecology	N
The marine environment	N

Air quality

10.1.5 The updated air quality model results of the potential intra-project cumulative effects due to emissions of pollutants to air from sources within the Wylfa Newydd Development Area and project-wide road traffic emissions on the A5025 are set out in Appendix I4-2-A of the ES Addendum. The assessment considered those human and ecological receptors that would experience the largest increases in pollutant concentrations from these two sources during the construction of the Power Station.

10.1.6 The model results in Appendix I4-2-A show that the predicted annual mean additive PM_{10} and $PM_{2.5}$ concentrations at the key human receptors represent negligible adverse effects for the year 2 and year 5 scenarios. At the ecological receptors (Afon Wygyr Wildlife Site and Ancient Woodland sites (26051 and 26076)), the predicted magnitude of changes to concentrations of oxides of nitrogen (NOx), and deposition rates of nitrogen and acid are negligible and not significant. No further consideration needs to be given to the significance of intra-project effects at these ecological sites due to predicted changes in air pollutant concentrations or deposition.

10.1.7 With regard to nitrogen dioxide (NO_2), the annual mean and 99.8th percentile of one-hour mean concentrations range from negligible to medium adverse effect descriptors at human receptors R4 to R8 for year 2. However, these remain similar to the magnitude of change assessed in chapter 5 of the ES Addendum and concentrations are well within the relevant air quality objectives.

10.1.8 For year 5, the annual mean and 99.8th percentile of one-hour mean concentrations range from negligible to small adverse effect descriptors at human receptors R4 to R8. As with year 2, these also remain similar magnitude of changes as reported in chapter 5 of the ES Addendum and concentrations are well within the relevant air quality objectives.

10.1.9 In summary, combining the pollutant contributions from these sources (i.e. construction plant, machinery and marine vessels operating at the Wylfa Newydd Development Area and road traffic on the local road network) at key human receptors did not materially alter the changes in pollutant concentrations or the effect descriptors set out in the individual assessments in chapters C4 [APP-091] of the Environmental Statement and chapter 5 of the ES Addendum.

10.1.10 The assessment did not identify any overall changes to the determination of significant effects during construction of the Power Station at human or ecological receptors. Consequently, the intra-project cumulative air quality effect is concluded to be not significant.

Summary of intra-project cumulative effects

10.1.11 The conclusions presented in Table 10-1 and with regards to the updating air quality modelling show that the conclusions presented in chapter I4 [APP-387] remain unchanged.