HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

Request for Non-Material Change no.3
Worker Shift Patterns

PINS Reference Number: EN010007

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Revision 1.0

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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Contents

List of Appendices

List of Tables

List of Figures

1 Introduction

1.1 Purpose of this report

1.1.1 Horizon Nuclear Power Wylfa Limited ("Horizon") is proposing a non-material change to the worker shift patterns (i.e. number of shifts, start/end times and duration) during the construction phase of the Wylfa Newydd Development Consent Order Project ("the Project").

1.1.2 Further details of the proposed change are provided in section 2.2 of this document and have been assessed against relevant parts of the DCO application to determine whether it would result in any new or different likely significant environmental effects. In conclusion, no new or different likely significant environmental effects are predicted to occur as a consequence of this proposed change.

1.1.3 This report sets out the proposal for this non-material change to the Project's Development Consent Order application ("DCO application") that was submitted by Horizon and accepted for Examination by the Secretary of State for Business, Energy and Industrial Strategy on 28 June 2018. The Application is currently in the Examination phase.

1.1.4 Recipients of this report are invited to provide representations on the proposed non-material change to Horizon by Thursday 6 December 2018. Feedback will be via Horizon's freepost address (FREEPOST WYLFA NEWYDD, no stamp required) or by emailing wylfaenquiries@horizonnuclearpower.com. If you have any questions about the consultation, please call 0800 954 9516.

1.1.5 Following completion of consultation, Horizon will have regard to the responses received and update this document as appropriate. The updated report will then be submitted to the Examining Authority as a request for the non-material change to be considered for acceptance into Examination by the Examining Authority (with the opportunity for Interested Parties to make further representations in Examination accordingly).

1.1.6 This document uses terms and definitions that are taken from and can be seen in the DCO General Glossary (APP-006).

1.2 Scope of this report

1.2.1 This report describes the proposed change, the justifications for it being sought, and the environmental appraisal of this proposed change. It includes a table (Table 2-7) clearly setting out the implications of the proposed change for the environmental assessments detailed in the DCO Application, and a statement on any new or different likely significant environmental effects (if any) of the proposed change.

1.2.2 This report also includes a 'schedule of engagement' (Table 2-8) identifying the parties expected to have an interest in this proposed change and how Horizon is engaging with them.

1.2.3 Finally, a 'schedule of consequential amendments' is provided (Table 2-9), listing the original application documents (or parts thereof) which may be

amended by Horizon should the Examining Authority accept the proposed change into Examination.

1.2.4 Horizon's objective in compiling this report is to ensure that stakeholders are provided with sufficient information to comment on the proposed change and, after consultation, for the Examining Authority to be able to make a decision on whether or not the proposed change may be accepted and therefore included in the Examination of the DCO application.

1.2.5 However, should the Examining Authority require any further relevant additional information in support of this report, Horizon will endeavour to provide it as soon as possible in response to any request for such information.

1.3 Non-materiality of the proposed change

1.3.1 In assessing the proposed change, Horizon has had regard to the advice contained in the Planning Inspectorate's Advice Note 16: *How to request a change which may be material* (Version 2, March 2018) [RD1].

1.3.2 In determining the materiality of the change, Horizon reviewed the Environmental Statement including the following topics and their associated appendices to determine whether or not there were any new or different likely significant effects resulting from the proposed change in relation to:

- traffic and transport (chapter C2, APP-089);
- public access and recreation effects of traffic (chapter C3, APP-090);
- air quality effects of traffic (including those on ecological receptors which are beyond the discrete study areas assessed in volumes D to H of the Environmental Statement) (chapter C4, APP-091);
- noise and vibration effects of traffic (chapter C5, APP-092);
- combined topic effects (chapter C7, APP-094);
- intra-project cumulative effects (chapter I4, APP-387); and
- inter-project cumulative effects (chapter I5, APP-388).

1.3.3 The proposed change has been reviewed and assessed and has not been found to result in any new or different likely significant environmental effects than those reported in the Environmental Statement for the Project. It is not anticipated that the proposed change alters the Project to such a degree that it is a materially different project.

1.3.4 Further consideration has also been given to the potential effect on the Health Impact Assessment Report (APP-429) via air quality, noise and transport effects. The conclusions remain unchanged and there are no new or different likely significant effects identified.

1.3.5 All other assessments submitted as part of the DCO application (e.g. Welsh Language Impact Assessment, APP-429; Equality Impact Assessment, APP-434; and Water Framework Directive Compliance Assessment, APP-444) would remain unaffected by the proposed change and have therefore not been considered further.

1.3.6 The Shadow Habitats Regulations Assessment Report (APP-050/051), has also been considered in light of the proposed change, and Horizon has concluded that the change would not result in a change to the conclusions on effects in that report.

1.3.7 On the basis of the information presented here and in subsequent sections, it is not anticipated that the proposed change alters the Project to such a degree that it is a materially different project.

Cumulative effects

1.3.8 Horizon intends to make a request for a total of five non-material changes to the Project DCO application. Horizon has already consulted and submitted the following two non-material change requests:

- Request for Non-Material Change no.1 – Blasting Strategy (AS-012); and
- Request for Non-Material Change no.2 – Marine Vessel Movements (AS-013).

1.3.9 In addition to the non-material change (no.3) described in this document, Horizon has gone out to consultation with respect to two further non-material change requests:

- Request for Non-Material Change no.4 – Working Hours: and,
- Request for Non-Material Change no.5 – HGV delivery windows

1.3.10 The implications of each proposed change to the cumulative assessment reported in the DCO application is considered and assessed within each individual document. However, a cumulative assessment of all the proposed change combined has also been undertaken to determine whether these could interact to result in the Project having a greater cumulative effect to that reported in the DCO application.

1.3.11 The cumulative assessment is summarised in section 2.6 below with further information provided in appendix 1-1. Based on the information presented, it is not anticipated that the proposed change outlined in this report will interact with any of the non-material changes being sought to produce any new or different likely significant environmental effects resulting from the interaction of these changes either in combination or cumulatively with any other projects.

1.3.12 Taking the above factors into account, and subject to the representations received in response to this consultation, Horizon therefore considers that the proposed change to shift patterns should be regarded as non-material.

1.4 Engagement and consultation on the proposed change

1.4.1 Following notification of its intention to submit a written request for non-material change on Wednesday 17 October (AS-011), Horizon is undertaking consultation on the proposed change to ensure that all persons that are potentially affected have sufficient opportunity to provide their views.

1.4.2 Consultation on the proposed change is running for a period of **28** days, commencing Thursday 8 November 2018 and ending on Thursday 6

December 2018. In order to facilitate this engagement in the consultation, Horizon has:

- notified prescribed persons under section 42(a)-(d) of the Planning Act 2008, and any other person identified by Horizon as potentially affected, of the consultation process and invited their views;
- publicly notified the consultation in the London Gazette and over two successive weeks in The Daily Post; and
- carried out targeted mail drops at residential addresses and erected site notices near the affected area.

1.4.3 Section 2.7 identifies the parties expected to have an interest in this proposed change and how Horizon proposes to engage with them.

1.4.4 As the proposed change does not require any 'additional land', Horizon does not consider that the consent of persons with an interest in the relevant land is required under the Infrastructure Planning (Compulsory Acquisition) Regulations 2010.

1.4.5 Copies of the consultation documents are available for public viewing at:

- The Anglesey Business Centre, Isle of Anglesey County Council, Bryn Cefni Business Park, Llangefni, Anglesey, LL77 7XA, Monday to Friday 9am to 5pm, and;
- Wylfa Newydd Site Office, Cemaes Bay, Anglesey, LL67 0AA, Monday to Friday 9am to 5pm by appointment only, or
- on Horizon's consultation website, www.horizonnuclearpower.com/consultation.

1.5 Proposed procedure after consultation

1.5.1 Following consultation, Horizon will have regard to the responses received and will review and update this document as appropriate. It will then submit the revised version to the Examining Authority as a formal written request for a non-material change to the DCO application. Horizon expects that it will be able to submit this formal written request to the Examining Authority by Examination Deadline 3 (18 December 2018) or Examination Deadline 4 (17 January 2019). Responses received during consultation would be summarised in, and appended, to the written request for non-material change submitted to the Examining Authority, to demonstrate how Horizon has had regard to these responses.

1.5.2 Horizon acknowledges that the acceptance and procedure for consideration and examination of the proposed changes is entirely at the discretion of the Examining Authority. However, if the Examining Authority is minded to accept the proposed changes into the Examination, Horizon considers that the remainder of the Examination would provide sufficient time for Interested Parties to consider and make representations on the published proposed changes to the Examining Authority and for any other procedural requirements to be met. Such representations could be required to be submitted by Deadline 5 (Tuesday 12 February 2019).

1.5.3 Horizon also considers that, with the proposed change, the DCO application, would still be of a sufficient standard for Examination and any other procedural requirements can still be met.

2 Non-Material Change: Worker Shift Patterns

2.1 Background to the proposed change

2.1.1 During construction of the proposed Wylfa Newydd Power Station, workers will be required to work both day and night shifts to meet the Project construction programme. The assumed shift timings and day/night splits as submitted in the DCO application are presented in table 1-1 of the DCO Transport Assessment (APP-101) and provided in Table 2-1 below. It was assumed that there would be three staggered shifts in both the day and night time periods which would be in place throughout Main Construction.

Table 2-1 Shift patterns assessed in the DCO Transport Assessment (APP-101) and submitted as part of the DCO application

Shift	Start/end times
Construction day shift	07:00-17:00 07:30-17:30 08:00-18:00 (i.e. 10-hour shifts)
Construction night shift	16:30-03:00 17:00-03:30 17:30-04:00 (i.e.10.5-hour shifts)

2.1.2 The original shift start/finish times (including the overlap between day and night shifts) were selected to avoid increased traffic flows across Britannia Bridge during the busiest hours in the morning and evening peak periods (08:00-09:00 and 17:00-18:00). This issue was examined in chapter 4 of appendix L of the DCO Transport Assessment (APP-113). This assessment included a schematic diagram (figure 4-1) of the shift timings assumed in the DCO application and how they relate to travel over Britannia Bridge.

2.1.3 VISSIM modelling[1] of the road network surrounding Britannia Bridge demonstrated that these shift start/finish times would help to ensure there would be no substantial negative effects for the local residents and other road users of the A55 (see section 11.4 of the DCO Transport Assessment; APP-101).

2.1.4 Whilst the impact to the Britannia Bridge would be reduced, the overlap between day and night shifts poses a significant challenge to construction productivity, by limiting the effective transfer of work from one shift to the other.

2.1.5 Since the preparation and submission of the DCO application, Horizon has undertaken additional work to further analyse and understand the practical implications of the proposed shift patterns within the DCO application. This review has been necessitated by a number of factors including:

[1] VISSIM is a microscopic multi-modal traffic flow simulation software package.

- rationalisation of the preferred delivery model for the Project (shift from a joint venture to project management contractor structure which resulted in Horizon becoming responsible for logistical arrangements);
- the appointment of, and engagement with, the project management contractor; and
- continued engagement with the key stakeholders as part of the Statement of Common Ground process.

2.1.6 This review has resulted in Horizon having a more detailed understanding of the management requirements for controlling worker movements to and from site, and the impacts of the current shift patterns on worker productivity and safety during the overlapping changeover between the day and night shifts.

2.1.7 As a result of this review, Horizon has identified a change to the shift patterns in the DCO application is required to optimise worker productivity and build resilience into the construction programme. These adjusted shift patterns result in an improved or "no worse" environmental effect and ensure adequate construction traffic control on Anglesey and at Britannia Bridge so as to avoid adverse effects on the road network, particularly Britannia Bridge. Further description of the proposed change is provided below.

2.2 Description of the proposed change

2.2.1 Horizon is proposing to reduce the number of shifts in the early years (for example 2020) before the opening of the A5025 Off-line Highway Improvements, from that presented in Table 2-1, to two staggered day shifts and one night shift. This is due to the relatively low volume of site traffic associated with transporting workers to and from site in the early years of the construction programme.

2.2.2 During the peak construction years (for example 2023) and after the opening of the A5025 Off-line Highway Improvements, Horizon is proposing three staggered day shifts (as per the DCO application) as worker numbers increase but a reduction from three to two staggered night shifts. These dates were based on an assumed programme for DCO Examination at the time traffic modelling was undertaken, and although there is now slippage in this programme, this does not affect the conclusions of the assessment presented.

2.2.3 Horizon is also proposing the following changes to the primary shift times and duration:

- increase the day shift window by a half hour at the end of each shift;
- amend the start of the night shift window, by three hours; and,
- decrease the night shift window by a half hour during peak construction (for example 2023).

2.2.4 The proposed changes are summarised in Table 2-2 alongside the shift patterns submitted in the DCO application. These are shown visually in appendix 1-2 (see figure 3-2, figure 3-3 and figure 3-4).

Table 2-2 Primary shift patterns as submitted in the DCO application and the proposed changes to these

Shift	Primary shift start/end times/durations		
	DCO application	Proposed change (2020)	Proposed change (2023)
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)

2.2.5 The proposed change reflects the change Horizon is seeking for the primary shift patterns of workers and in this assessment it is assumed all workers follow this shift pattern to provide a worst-case assessment. However, it should be noted that there will continue to be operations on site (as per the DCO application) in which a minority of staff do not follow the primary shift pattern (for example catering, security, cleaning and some specialist construction operational staff). The travel associated with this minority of staff does not affect the assessments contained in the DCO application as a worst case is assessed and this group is therefore not considered further.

2.2.6 As a consequence of the proposed changes to construction worker shift patterns, revised 18-hour annual average weekday traffic flows (AAWT) were calculated to reflect the transfer of some vehicle movements from the early hours (03:00 to 05:00) to the period after 06:00. AWWTs are a key parameter for the modelling of road traffic noise emissions. No changes were made to the 24-hour annual average daily traffic flows (AADT), which are a key parameter for the air quality modelling of traffic emissions, as the total number of vehicle movements on any day would stay the same.

2.3 Justification for the proposed change

Improving construction productivity and resilience

2.3.2 As noted above, the current DCO shift patterns result in overlap between construction shifts which mean that the first three hours of each night shift is unproductive. By amending the shift times so that the day shift has left the site before the night shift arrives, the proposed changes ensure that this overlap is eliminated and that the night shift can start work immediately upon arrival at site.

2.3.3 This increase in the productivity of the construction workforce will ensure that an appropriate level of flexibility and resilience can be built into the construction programme so Horizon can better accommodate unforeseen events.

Urgent need for new nuclear

2.3.4 By improving worker productivity and programme resilience, the proposed changes will enable Horizon to assist the UK Government in meeting its energy security and carbon reduction objectives through the delivery of this nationally significant infrastructure project. The urgent need for new nuclear has been firmly established in National Policy Statements EN-1 [RD2] and EN-6 [RD3] and the recent Ministerial Statement on Energy Infrastructure (December 2017) [RD4] which confirms the Government's continued support for new nuclear power generation post-2025.

Improving road safety and community impacts

2.3.5 With the proposed change, traffic associated with the night shift will be travelling through local communities between 05:30 to 06:30, rather than between 03:00 and 04:30. Shifting travel times to later in the morning will improve the safety of night shift workers who will be able to travel during the early daylight hours in spring and summer (rather than in darkness year-round). In addition, it will also mean that night shift workers are travelling through communities at less sensitive times which will have positive impacts on residential amenity.

2.3.6 Changes to shift timings also 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 Project and vehicles associated with travel to and from local schools is reduced.

Ensures shift-related traffic avoids Britannia Bridge at peak times

2.3.7 As with the original shift pattern, the proposed change has been designed to ensure that construction shift traffic avoids creating adverse impacts on Britannia Bridge (as identified in Figure 2-1). This is because, under the proposed change:

- By the morning rush hour peak period of 08:00 and 09:00:
  - Day shift workers would have crossed Britannia Bridge (westbound) between 05:00 and 07:00 and started work on site; and
  - Night shift workers traveling from the site would have crossed Britannia Bridge (eastbound) between 06:30 and 07:30; and
- By the evening rush hour peak period between 17:00 and 18:00:
  - Day shift workers will still be traveling eastbound on the A55 from site to cross the Britannia Bridge (eastbound) between 18:30 to 20:00; and

- Night shift workers traveling to the site would still be travelling across the mainland to cross the Britannia Bridge (westbound) between 18:00 and 19:00.

2.3.8 The proposed change results in an improved or "no worse" environmental effect due to improved construction traffic control on Anglesey and at Britannia Bridge. Environmental modelling has demonstrated that these revised shift patterns ensure that negative effects on local residents and other users of the A55 are avoided by ensuring construction workers were travelling to and from the site outside peak periods.

Increasing site safety

2.3.9 The current shift patterns will mean there is a large number of workers moving around site during overlapping shift times. By reducing the number of workers that are on the site at between 16:00 and 20:00, the proposed change will increase site health and safety, particularly in respect of HGV movements around the Main Site.

2.4 Summary of environmental appraisal

2.4.1 The proposed change has been reviewed and assessed in order to identify any potential likely significant effects that would be new or materially different to those assessed in the DCO application. This information is summarised in Table 2-7; where relevant, further discussion is provided below.

Environmental Statement

2.4.2 This review identified that the proposed change could potentially have implications for the following assessments outlined in the Environmental Statement:

- traffic and transport (chapter C2, APP-089);
- public access and recreation effects of traffic (chapter C3, APP-090);
- air quality effects of traffic (including those on ecological receptors which are beyond the discrete study areas assessed in volumes D to H of the Environmental Statement) (chapter C4, APP-091);
- noise and vibration effects of traffic (chapter C5, APP-092);
- combined topic effects (chapter C7, APP-094);
- intra-project cumulative effects (chapter I4, APP-387); and
- inter-project cumulative effects (chapter I5, APP-388).

2.4.3 The proposed change to shift patterns only relates to traffic movements as site operations/timings will be unaffected and has implications specifically to assessments outlined in volume C (project-wide effects) of the Environmental Statement. Thus, there are no further implications for ecological receptors assessed in volumes D to H of the Environmental Statement.

2.4.4 The proposed change would not affect the total number of workers present on site (per 24 hours or overall) or the intensity of the construction activities undertaken, therefore all the remaining topic assessments detailed within

volume C of the Environmental Statement are not considered to be affected by the proposed change and thus, the conclusions remain as reported in the DCO application.

Other Assessments

2.4.5 Further consideration has also been given to the potential effect on the Health Impact Assessment Report (APP-429) via air quality, noise and transport effects. The conclusions remain unchanged and there are no new or different likely significant effects identified.

2.4.6 Consideration has also been given to the potential effect of the proposed change to the appropriate assessment for habitats and species detailed in the Shadow Habitats Regulations Assessment Report (APP-050 and APP-051) via effects to air quality and noise. As the peak noise and air quality effects are not predicted to change significantly as a result of the proposed change compared to those presented in the DCO application, the assessments reported in the Shadow Habitats Regulations Assessment Report (APP-050/051) would remain unchanged.

2.4.7 All other assessments submitted as part of the Wylfa Newydd DCO application (e.g. Welsh Language Impact Assessment, APP-432; Equality Impact Assessment, APP-434; and Water Framework Directive Compliance Assessment, APP-444) would also remain unaffected by the proposed change and have therefore not been considered further.

2.5 Topic assessments

2.5.1 The effects of the proposed change to the assessments listed in paragraphs 2.4.2 and 2.4.5 above are summarised in Table 2-7, with further discussion provided below where relevant.

Traffic and transport

2.5.2 The effects of the proposed 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

2.5.3 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).

2.5.4 The VISSIM was re-run to include the proposed 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 proposed change in shift patterns are summarised below in Table 2-3.

Table 2-3 Changes in journey times (seconds per vehicle) across Britannia Bridge due to the proposed 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 proposed change to shift patterns (VISSIM + National Grid traffic)	108	114	190	120	129	351
Change due to the proposed 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 proposed change to shift patterns (VISSIM + National Grid traffic)	124	137	366	124	126	130
Change due to the proposed change to shift patterns	0	0	+11	0	0	+2

2.5.5 The proposed changes to shift patterns would 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.

2.5.6 The proposed changes to shift patterns would 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.

2.5.7 Overall the potential changes 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.

2.5.8 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.

2.5.9 This analysis shows that the proposed 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

2.5.10 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.

2.5.11 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.

2.5.12 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).

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

2.5.14 For reference, the locations of the 38 assessed junctions are presented in Figure 2-1. 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 2-1 Location of assessed junctions and their journey time from the Wylfa Newydd Development Area

Traffic impact in 2020

2.5.15 The proposed 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 2.2.1 of this document and in paragraphs 10.1.5 to 10.1.7 of the DCO Transport Assessment (APP-101).

2.5.16 Paragraphs 2.5.17 and 2.5.25 below summarise the traffic impacts of the proposed change to shift patterns for the 2020 day shift and night shift.

2020 Day shift

2.5.17 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.

2.5.18 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).

2.5.19 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).

2.5.20 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.

2.5.21 Assessed junctions that fall within a 10-minute drive time of the Wylfa Newydd Development Area are listed in Table 2-4 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 2-4 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%

2.5.22 It can be seen from Table 2-4 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 proposed 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

2.5.23 The proposed 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.

2.5.24 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).

2.5.25 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

2.5.26 The proposed change for shift timings in 2023 would have no detrimental impacts to the junctions assessed in the DCO Transport Assessment (APP-101). This is due to the fact that the proposed 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.

2.5.27 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

2.5.28 The proposed 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 Project and vehicles associated with travel to and from local schools is reduced.

Summary

2.5.29 The proposed 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).

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

2.5.31 Similarly, the proposed 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 proposed change does not cause any new or different likely significant environmental effects than those reported in the Environmental Statement.

Public access and recreation

2.5.32 The proposed 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.

2.5.33 The potential effects on public access, onshore recreation and active travel have been considered for the following study areas:

- Junction 4 of the A55 to the Park and Ride; and
- Junction 3 of the A55 to the Off-Site Power Station Facilities and the Wylfa Newydd Development Area using the A5 and A5025.

2.5.34 The proposed change in construction worker shift patterns would not result in new or different likely significant environmental effects than those reported in the Environmental Statement.

Air quality

2.5.35 The proposed change to construction worker shift patterns is not anticipated to change the main input parameters to the air quality modelling of road traffic emissions, for example the annual average daily traffic flow (AADT) or proportion of Light Duty Vehicles or Heavy Duty Vehicles. However, it would lead to modifications to the time of day or night upon which vehicles would arrive and depart from the Wylfa Newydd Development Area during construction.

2.5.36 The air quality modelling undertaken for chapter C4 (APP-091) of the Environmental Statement was based on a modelling method which distributed the AADT for each road link equally across each hour of the day and for each day of the week (i.e. the AADT was divided by 24 and the average hourly flow used to represent the traffic flows). Consequently, this approach did not take account of any diurnal variation in flows by hour of the day or day of the week.

2.5.37 In order to assess the effects of the proposed change (i.e. the re-distribution of vehicle movements due to the proposed changes to construction worker shift patterns), diurnal variations in traffic flows need to be considered. Recognising that this approach would deviate from that which was used within the DCO application, a sensitivity analysis has been carried out to understand the following:

- how the model which considers the diurnal variation in vehicle flows compares to the original modelling method used in the DCO application; and
- how the proposed change and resulting variations to the diurnal profile of vehicle flows would affect the assessment conclusions presented in chapter C4 (APP-091) of the Environmental Statement.

Comparison of modelling approaches

2.5.38 A description of the method used to model the vehicle flows using a diurnal approach for the sensitivity analysis is set out in **Error! Reference source not found.**. This appendix also contains details of the revised verification process and comparison of the modelled results for the two modelling approaches. In summary, the model verification process was repeated using a diurnal profile for one of the verification zones used in the original assessment (RAF Valley verification area). This zone was used as it contained the human receptor for which the greatest changes in nitrogen dioxide (NO_2) concentrations were predicted as a result of the Wylfa Newydd Project (receptor R20, receptor model ID Hum_1964). This verification zone also contained five receptor locations used as the verification points (referred to as receptors B, C, D, E and F in **Error! Reference source not found.**).

2.5.39 The model verification process detailed in **Error! Reference source not found.** showed that using a diurnal profile for modelling road traffic emissions, leads to higher differences between the raw modelled (i.e. before any adjustment) and monitored oxides of nitrogen (NOx) concentrations at the roadside monitoring locations compared to the non-diurnal verification modelling reported in appendix C4-1 (APP-114) of the Environmental Statement. This essentially means that although a more realistic representation of the traffic flows, the model does not perform as well when using a diurnal profile compared to when traffic flows were averaged across a 24-hour period. Consequently, this leads to the application of a higher model adjustment factor to the predicted raw NOx concentrations at receptor locations within 200m of the modelled road links before conversion of the NOx to NO_2.

2.5.40 As shown in **Error! Reference source not found.**, the final adjusted total modelled NO_2 concentrations at the verification points vary in comparison to those presented in appendix C4-1 (APP-114) of the Environmental Statement. As noted in **Error! Reference source not found.**, using the diurnal profile leads to some instances where the modelled total NO_2 concentrations are lower and one instance where the total concentrations are higher.

2.5.41 At receptor R20, the modelling using a diurnal profile was undertaken for the future baseline and future with Wylfa Newydd Project scenarios for the 2020 (representative of early years construction) and 2023 (representative of peak construction) assessment years to allow direct comparison to the results presented in chapter C4 (APP-091) of the Environmental Statement. This showed that at receptor R20, the predicted NO_2 concentrations using a diurnal profile were slightly higher for both the future baseline and future with Wylfa

Newydd Project scenarios for both assessment years, compared to those presented in chapter C4 (APP-091) of the Environmental Statement.

2.5.42 Initial observations could conclude that for higher concentrations, the diurnal profile method leads to higher total concentrations; however, for some of the verification points, the total concentrations for no diurnal profile are very similar to those for receptor Hum_1964 for the future 2020 and 2023 baseline and yet the diurnal profile method concentration is lower for these receptors and higher for receptor Hum_1964. From the comparison of the modelled concentrations in **Error! Reference source not found.**, it is concluded that for receptors which are very close to the edge of the modelled road source (i.e. less than 1m from the kerb), the diurnal profile method leads to higher total NOx and NO_2 concentrations (the verification point at A5025 Valley (diffusion tube D) and receptor Hum_1964 are both approximately 0.5m from the edge of the road), and for the other receptors further from the road source the method without diurnal profile leads to higher concentrations (all other verification points, diffusion tubes B, C, E and F range from 1.2m to 1.7m from the kerbside).

2.5.43 On this basis, it is unlikely that use of a diurnal method would change the outcome and conclusions of the air quality assessment presented in chapter C4 (APP-091) of the Environmental Statement.

Assessment of effects of proposed change to air quality

2.5.44 Although the change at the worst-case long-term receptor for annual mean concentrations (i.e. Hum_1964, the human receptor closest to the road source, at 0.5m from the edge of the road, which experiences the highest predicted change in concentrations) is slightly higher for the diurnal method, this would potentially only change the effect descriptor for the 2023 scenario from small adverse to medium adverse for this one receptor. As the vast majority of receptors are more than 1m from the edge of the roads, the total concentrations and change in concentrations due to the proposed change to construction worker shift patterns are unlikely to be any higher than those presented in chapter C4 (APP-091) of the Environmental Statement.

2.5.45 The balance of effects at human receptors would remain predominantly negligible with some beneficial effects due to the A5025 Offline Highway Improvements.

2.5.46 As the distances from the modelled road sources to ecological receptors are generally further than the very close locations (less than 1m) discussed above, using a diurnal profile would be unlikely to alter the assessment of effects at ecological receptors presented in chapter C4 (APP-091) of the Environmental Statement. The total concentrations and deposition rates and change in concentrations or deposition rates due to the proposed change to construction worker shift patterns are unlikely to be any higher than presented in chapter C4 (APP-091) of the Environmental Statement.

2.5.47 Given that there is unlikely to be any significant difference between using a diurnal method and the average hourly flow method used for the DCO application, the proposed change to construction worker shift patterns would not alter the conclusions of the air quality presented in chapter C4 (APP-091)

of the Environmental Statement, with the balance of effects at human receptors remaining predominantly negligible and no change to the assessment of effect at ecological receptors also assessed in chapter C4 (APP-091) of the Environmental Statement. Therefore, there would be no new or different likely significant environmental effects than those reported in the Environmental Statement.

Noise and vibration

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

2.5.49 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.

2.5.50 To determine the significance of the proposed change to shift patterns, a sensitivity study has been conducted which compares the road traffic noise emissions of segments of road resulting from the proposed 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) [RD2] and consider the following variables:

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

2.5.51 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.

2.5.52 To fully explore the potential road traffic noise effects arising from the Project, the DCO application considered several scenarios at differing points in time during the construction and operational phases. However, because the proposed 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.

2.5.53 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 2-5 below.

Table 2-5 Road segments selected for the noise sensitivity study which reflects the proposed 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

2.5.54 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.

2.5.55 Table 2-6 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 as shown in Table 2-1 and the proposed new shift patterns; the difference in the basic noise levels between the proposed patterns and those submitted in the DCO application is also shown.

2.5.56 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 2-6 Basic noise levels and noise change between the proposed 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

2.5.57 As can be seen in Table 2-6 there are no calculated noise changes between the proposed 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 would not change the conclusions of the noise assessment reported for day-time effects in chapter C5 (APP-092) of the Environmental Statement.

2.5.58 Table 2-6 shows that for the night-time period, the proposed 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 proposed 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

2.5.59 Assessment of the proposed 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.

2.5.60 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.

2.5.61 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 proposed 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.

Health impacts

2.5.62 This section discusses the implications for the Health Impact Assessment Report (APP-429) arising from the proposed change to shift patterns.

Scope of health analysis

2.5.63 The proposed changes to shift patterns discussed here relate only to issues associated with vehicles transporting people on the local road network. The relevant geographical population is predominantly the population near the local road network.

2.5.64 Effects relate to the periods close to the start and end times of shifts, as these are associated with the movement of cars and buses transporting the construction workforce. The intervening period during shifts is not expected to be associated with effects to the road network.

2.5.65 The proposed changes to shift patterns are relevant to the following topics discussed in the Health Impact Assessment Report (APP-429).

- air quality (section C.2 Air quality, emissions from vehicles transporting materials and people on the local road network during construction);
- noise (section C.3 Noise, noise from vehicles transporting materials and people on the local road network during construction);
- traffic (section C.5 Transport, road safety during construction and health trip journey times (e.g. to a hospital) during construction); and
- construction workers (section C.7 Lifestyle and behaviour, healthy and safe communities during construction).

2.5.66 The health assessment presented in the following sections draws on conclusions within other parts of this request for non-material change to shift patterns, including quantitative modelling and sensitivity testing relating to the following assessments: traffic and transport (paragraphs 2.5.2 to 2.5.31); air quality (paragraphs 2.5.35 to 2.5.47); and noise (paragraphs 2.5.48 to 2.5.61). Sensitivity testing for air quality and noise undertaken to assess the impacts of the proposed change to shift patterns and presented in previous sections considers average changes over the relevant 24-hour or night-time periods.

Therefore, the health conclusions presented in the following sections do not consider shorter-term or peak events.

Changes to periods of increased road activity

2.5.67 The shift patterns assumed in the DCO application resulted in three periods of increased road activity. These were associated with:

- the end of night shifts between 03:00 and 04:00 (night-time period);
- the start of day shifts between 07:00 and 08:00 (morning period); and
- the start of night shifts and end of day shifts between 16:30 and 18:00 (afternoon/early evening period).

2.5.68 Within the Health Impact Assessment Report (APP-429) the night-time period was associated with potential for sleep disturbance. The morning and afternoon/early evening periods were associated with potential for travel delays.

2.5.69 The proposed changes to the shift patterns would alter these periods of increased road activity. For the 2020 shift pattern the periods of increased road activity would be associated with:

- the end of the night shift and start of the day shifts between 06:00 and 07:30 (early morning period); and
- the end of the day shifts and start of the night shift between 17:30 and 19:30 (afternoon/early evening period).

2.5.70 For the 2023 shift pattern the periods of increased road activity would be associated with:

- the end of the night shift and start of the day shifts between 05:30 and 08:00 (early morning period); and
- the end of the day shifts and start of the night shift between 17:30 and 20:00 (afternoon/early evening period).

Air quality related health effects

2.5.71 Sensitivity testing of the air quality models presented in the DCO application is discussed above in paragraphs 2.5.35 to 2.5.47. The results indicate that the effect of the proposed changes to shift patterns on average concentrations of air pollutants associated with the Project's vehicle movements along the road network would not alter the conclusions presented in chapter C4 (APP-091) of the Environmental Statement.

2.5.72 On this basis, it is considered that the conclusions reached in the Health Impact Assessment Report (APP-429) in relation to potential air quality effects on population health from vehicles transporting people on the local road network during construction would remain unchanged and there would be no new or different likely significant environmental effects than those reported. As described in paragraphs C.2.22 and C.2.23 of the Health Impact Assessment Report (APP-429) this would be a negligible effect on the health of the general population and up to a minor adverse effect on the health of

particularly sensitive groups. These conclusions continue to take account of the potential for non-threshold effects of some pollutants.

Noise related health effects

2.5.73 Under the proposed 2020 and 2023 shift patterns, traffic noise would be expected to commence earlier in the morning and finish later in the evening (compared to the shift patterns assumed in the DCO application). The earlier starts could cause sleep disturbance from 05:30 or 06:00. However, the 10.5-hour period between 19:30 and 06:00 (proposed 2020 shift pattern) or 9.5-hour period between 20:00 and 05:30 (proposed 2023 shift pattern) would be less disturbed by the proposed shift changes (there being no night-shifts ending between 03:00 and 04:00). This is considered a beneficial change from the health perspective as it reduces the potential for sleep disturbance (a greater length of time available when most people are likely to sleep before any potential of shift change related disturbance).

2.5.74 To assess the effects of the proposed change on noise, sensitivity testing of the noise models presented in chapter C5 (APP-092) of the Environmental Statement was undertaken and discussed above in paragraphs 2.5.48 to 2.5.61. The results indicate that the proposed shift changes to shift patterns would be unlikely to perceptibly change the average levels of noise over the night-time period at representative locations (stretches of roads with dwellings predicted in the DCO application to experience adverse noise effects from road transport).

2.5.75 On this basis, it is considered that the conclusions reached in the Health Impact Assessment Report (APP-429) in relation to potential noise disturbance effects on population health (particularly at night) from vehicles transporting people on the local road network during construction would remain unchanged and there would be no new or different likely significant environmental effects than those reported. As described in paragraphs C.3.20 and C.3.12 of the Health Impact Assessment Report (APP-429) this would be a negligible effect on the health of the general population and up to a minor adverse effect on the health of particularly sensitive groups.

Transport related health effects

2.5.76 The proposed changes to shift patterns are likely to present a slight improvement in terms of road safety for children which, as sensitive road users, are present in greater numbers during the travel to and from school times (as vehicle passengers, cyclists and pedestrians).

2.5.77 For example, the proposed 2020 early morning period of shift change related vehicle movements is likely to be more beneficial for road safety (and journey times) during travel to school. The change being from between 07:00 and 08:00 in the DCO application, to between 06:00 and 07:30 in the proposed 2020 shift pattern.

2.5.78 Similarly, the proposed 2020 and 2023 afternoon/early evening period of shift change related vehicle movements is likely to be more beneficial for road safety (and journey times) during travel from school (and extra-curricular activities). The change being from between 16:30 and 18:00 in the DCO

application, to between 17:30 and 19:30 (proposed 2020 shift pattern) or 17:30 and 20:00 (proposed 2023 shift pattern).

2.5.79 Transport modelling of the proposed shift pattern changes is discussed above in paragraphs 2.5.2 to 2.5.31. The results indicate minor effects on travel times that are considered not significant at Britannia Bridge; no adverse effects (and some improvements) at key junctions; and an overall improvement in traffic impacts for the wider road network.

2.5.80 On this basis, it is considered that the conclusions reached in the Health Impact Assessment Report (APP-429) in relation to road safety associated with vehicles transporting people on the local road network during construction would remain unchanged (the changes being generally beneficial but slight) and there would be no new or different likely significant environmental effects than those reported. As described in paragraphs C.5.13 and C.5.14 of the Health Impact Assessment Report (APP-429) this would be a negligible effect on the health of the general population and up to a minor adverse effect on the health for particularly sensitive groups.

2.5.81 Similarly, the conclusions reached in the Health Impact Assessment Report (APP-429) in relation to health trip journey times (which are sensitive to delays on the local road network) would remain unchanged and there would be no new or different likely significant environmental effects than those reported. As described in paragraphs C.5.35 and C.5.36 of the Health Impact Assessment Report (APP-429) this would be a negligible effect on the health of the general population and up to a minor adverse effect on the health of particularly sensitive groups.

Construction workers

2.5.82 The proposed changes to shift patterns are not expected to affect conclusions within the Health Impact Assessment Report (APP-429) in relation to the potential for community effects associated with the off-shift workforce and there would be no new or different likely significant environmental effects than those reported. The proposed shift patterns would still be expected to stagger leisure time across the week. This would continue to limit the potential for large congregations of off-shift construction workers in a single community location at any one time.

2.5.83 On this basis, it is also considered that the conclusions reached in the Health Impact Assessment Report (APP-429) in relation to healthy and safe communities during construction would be unchanged and there would be no new or different likely significant environmental effects than those reported. As described in paragraphs C.7.26 and C.7.27 of the Health Impact Assessment Report (APP-429) this would be a negligible effect on the health of the general population and up to a minor adverse effect on the health of particularly sensitive groups.

Table 2-7 Likely new or different environmental effects

Document name	Examination Reference Number	Chapter name / section name	New or different likely significant effects	Material change / non-material change / no change
Environmental Statement appendix C2-4	APP-101	DCO Transport Assessment	As outlined in paragraphs 2.5.2 to 2.5.31, the proposed change to 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). Overall, the updated traffic assessment of Britannia Bridge shows that the proposed change does not cause any new or different likely significant environmental effects than those reported in the Environmental Statement. Similarly, the proposed 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	Non-material change

Document name	Examination Reference Number	Chapter name / section name	New or different likely significant effects	Material change / non-material change / no change
			analysis presented in the DCO application. Overall, the updated traffic assessment of other junctions shows that the proposed change does not cause any new or different likely significant environmental effects than those reported in the Environmental Statement.	
Environmental Statement chapter C3	APP-090	Public access and recreation effects of traffic	As outlined in paragraphs 2.5.32 to 2.5.34, the proposed change would result in a change to the assumptions regarding shift patterns but would not result in new or different likely significant environmental effects than those reported in the Environmental Statement, and the conclusions of the public access and recreation assessment presented in chapter C3 (APP-090) of the Environmental Statement would remain as reported.	No change
Environmental Statement chapter C4	APP-091	Air quality effects of traffic	As outlined in paragraphs 2.5.35 to 2.5.47, the proposed change would not significantly alter the air quality assessment, in particular effects to human and ecological receptors, due to the proposed change in construction worker shift patterns. Thus, there is considered to be no new or different likely significant environmental effects to the assessment of air quality and the conclusions presented in chapter C4 (APP-	Non-material change

Document name	Examination Reference Number	Chapter name / section name	New or different likely significant effects	Material change / non-material change / no change
			091) of the Environmental Statement remain as reported.	
Environmental Statement chapter C5	APP-092	Noise and vibration effects of traffic	During the construction phase there are unlikely to be any changes for the day-time scenarios from those reported in the DCO application. During the construction phase in 2020 (for both the with and without bypasses scenarios) small increases in night-time noise may occur; such increases would be well below the threshold of human perception and are therefore not considered to result in new or different likely significant effects than those reported in the Environmental Statement. For the peak year of construction traffic in 2023 there are no differences in predicted road traffic noise at night, and therefore this assessment would remain as presented in the DCO application. Thus, there is considered to be no new or different likely significant environmental effects to the assessment of noise and the conclusions presented in chapter C5 (APP-092) of the Environmental Statement remain as reported.	Non-material change.
Environmental Statement chapter C7	APP-094	Combined topic effects	As outlined in the topic assessments, the proposed change is not considered to result in any new or different likely environmental	No change

Document name	Examination Reference Number	Chapter name / section name	New or different likely significant effects	Material change / non-material change / no change
			effects as a result of the proposed change. Consequently, there are not considered to be any receptors subject to new combined topic effects, and therefore the assessment presented in chapter C7 (APP-094) of the Environmental Statement remains as reported.	
Environmental Statement, chapter I4	APP-387	Intra-project cumulative effects	As outlined in section 2.5 and summarised in this table, the proposed change would not significantly alter the conclusions of the public access and recreation, air quality and noise assessments presented in the DCO application. Any small increases in night-time noise would be well below the threshold of human perception and are not considered to result in new or different likely significant environmental effects than those reported in the Environmental Statement.	Non-material change.
Environmental Statement chapter I5	APP-388	Inter-project cumulative effects	As outlined in section 2.5 and summarised in this table, the proposed change would not significantly alter the conclusions of the traffic and transport, public access and recreation, air quality and noise assessments presented in the DCO application.	Non-material change

Document name	Examination Reference Number	Chapter name / section name	New or different likely significant effects	Material change / non-material change / no change
			Any small increases in night-time noise would be well below the threshold of human perception and are therefore not considered to result in new or different likely significant environmental effects than those reported in the Environmental Statement.	
Health Impact Assessment Report	APP-429	Air quality (section C.2) Noise (section C.3 Noise) Traffic (section C.5) Construction workers (section C.7)	As outlined in paragraphs 2.5.62 to 2.5.83, the proposed change to shift patterns does not result in any new or different likely significant environmental effects and does not change the conclusions reached in the Health Impact Assessment Report (APP-429). The proposed changes relate to vehicle movements associated with the movement of construction workers at times of shift changes. The redistribution of such vehicles over different time periods on the road network is expected to result in only slight changes to emissions, disturbance, journey times, road safety and off-shift worker distribution. There are both beneficial and adverse changes; however, none are expected to be of a magnitude to warrant additional mitigation and all are considered within the bounds of the existing assessment scores.	Non-material change

Document name	Examination Reference Number	Chapter name / section name	New or different likely significant effects	Material change / non-material change / no change
			Thus, there is considered to be no new or different likely significant environmental effects to the assessment of effects to human health and the conclusions of the Health Impact Assessment Report (APP-429) remain as reported.	

2.6 Cumulative assessment for the proposed changes

2.6.1 To assess whether all the proposed non-material changes could interact to result in the Wylfa Newydd Project having a greater cumulative effect to that reported in the DCO application, a cumulative assessment has been carried out, the results of which can be found in appendix 1-1.

2.6.2 Cumulative effects include both intra-project (resulting from the various developments that comprise the Wylfa Newydd Project) and inter-project (resulting from the Wylfa Newydd Project together with external projects) effects; these assessments are reported in volume I (cumulative effects) (APP-384 to APP-388) of the Environmental Statement.

2.6.3 Combined topic effects, also known as intra-development effects, occur when a single receptor is affected in more than one way by the same development. The relevant combined topic assessment (i.e. project-wide effects) is reported in chapter C7 (APP-094) of the Environmental Statement.

2.6.4 As demonstrated in the cumulative assessment report (appendix 1-1), there are considered to be no new or different intra- and inter- project cumulative effects to environmental receptors as a consequence of the proposed change or any other non-material change requests. Furthermore, there are considered to be no new or different combined topic effects as a consequence of the proposed changes.

2.6.5 Consequently, the overall cumulative assessment of the Wylfa Newydd Project remains as reported in the DCO application.

2.7 Schedule of engagements

Table 2-8 Schedule of engagements

Date	Event
17 October 2018	Horizon wrote to PINS, submitting Batch 1 Requests for Non-Material Change (Blasting Strategy and Marine Vessel Movements) and advising of an emerging Batch 2 (Working Hours, Shift Patterns and HGV Deliveries)
23 October 2018	Preliminary Meeting
31 October 2018	Horizon's letter of 17 October 2018 accepted at the discretion of the Examining Authority
31 October 2018	First notice advertising consultation on Batch 2 (8 November to 6 December 2018) published in The Daily Post
7 November 2018	Second notice advertising consultation on Batch 2 (8 November to 6 December 2018) published in The Daily Post, and also in the London Gazette
8 November 2018	28-day consultation on Batch 2 begins

19 November 2018, 1-7pm	Horizon Open Surgery at Cemaes Village Hall, attended by Batch 2 consultation team
6 December 2018	28-day consultation on Batch 2 ends
7-17 December 2018	Expected dates during which Horizon will have regard to representations received and update consultation documents as required
18 December 2018 (Exam Deadline 3)	Earliest expected date for submission into Examination of second batch of formal requests for non-material change
17 January 2019 (Exam Deadline 4)	Latest expected date for submission into Examination of second batch of formal requests for non-material change
23 April 2019	End of Examination

2.7.2 As noted in paragraph 1.4.5, copies of the consultation documents are available for public viewing at:

- The Anglesey Business Centre, Isle of Anglesey County Council, Bryn Cefni Business Park, Llangefni, Anglesey, LL77 7XA, Monday to Friday 9am to 5pm, and
- Wylfa Newydd Site Office, Cemaes Bay, Anglesey, LL67 0AA, Monday to Friday 9am to 5pm by appointment only, or
- on Horizon's consultation website, www.horizonnuclearpower.com/consultation.

2.7.3 List of specified consultees (prescribed persons under section 42(a)-(d) of the Planning Act 2008):

- Welsh Government
- Natural Resources Wales
- Isle of Anglesey Council
- Gwynedd Council
- Conwy County Borough Council
- North Wales Economic Ambition Board
- North Wales Wildlife Trust
- RSPB Cymru
- National Trust
- The Crown Estate
- Betsi Cadwaladr University Health Board
- Public Health Wales
- Welsh Ambulance Service Trust
- North Wales Police

- RAF Valley
- North Wales Fire and Rescue Service
- National Grid
- Welsh Water
- North & Mid Wales Trunk Road Agency
- The Marine Management Organisation
- North West & North Wales Sea Fisheries Committee x
- The Maritime & Coastguard Agency
- Marine Conservation Trust
- Royal National Lifeboat Institution
- The Maritime & Coastguard Agency
- SP Manweb plc
- Magnox
- Nuclear Decommissioning Authority
- North Anglesey Partnership
- Destination Anglesey Partnership
- North Wales Economic Ambition Board
- Trinity House
- Joint Nature Conservation Committee
- Cyngor Tref Amlwch (Town Council)
- Cyngor Cymuned Cylch-Y-Garn (Community Council)
- Cyngor Cymuned Llanbadrig
- Cyngor Cymuned Mechell
- Cyngor Cymuned Llaneilian
- Cyngor Cymuned Rhosybol
- Bodedern Community Council
- Bryngwran Community Council
- Llanfachraeth Community Council
- Llanfaethlu Community Council
- Trearddur Community Council
- Valley Community Council
- Llanfair yn Neubwll Community Council
- Talybolion Local Members
- Twrcelyn Local Members

2.7.4 Targeted mail drops:

- Main Site – regular list of near neighbours, comprising 909 addresses in Cemaes and Tregele
- A5025 corridor – list of addresses (within 1km wide corridor along the A5025 from Main Site to and including Valley) used for on-line road consultations for applications under the Town & Country Planning Act 1990 – 1,679 addresses
- Logistics Centre, Parc Cybi – a new zone of 750m radius from the Centre, comprising 67 residential and business addresses
- Park and Ride, Dalar Hir – a new zone based on a 1,250m radius, with the addition of some further properties close to the zone, comprising a total of 363 addresses
- TOTAL: 3,018 addresses.

2.7.5 Site notices:

- 22 locations around Anglesey

2.7.6 The proposed changes do not require any 'additional land', so Horizon does not consider that the consent of persons with an interest in the relevant land is required under the Infrastructure Planning (Compulsory Acquisition) Regulations 2010. However, letters providing information about the consultation have been sent to persons with an interest in land relating to the Main Site, A5025, Parc Cybi and Dalar Hir, comprising approximately 850 addresses.

2.7.7 Horizon's letter to the Planning Inspectorate of 17 October 2018 (notifying of the emerging second batch of non-material changes) advised that Horizon did not propose to undertake 'roadshow' type events as part of the consultation, but instead to undertake consultation on a written basis only (due to the scheduled hearings and other demands of the examination process on stakeholders). However, Horizon has identified an opportunity to send a Batch 2 consultation team to one of the regular 'Open Surgeries' hosted at Cemaes Village Hall, thereby giving stakeholders an opportunity to discuss the Batch 2 changes in person, as noted in the schedule of engagements above.

2.8 Schedule of consequential amendments to application documents

Table 2-9 Schedule of consequential amendments to application documents

Application document name	Examination Reference Number	Section of document	Version to be amended	Description of amendment
DCO Transport Assessment	APP-101	Executive Summary	1.0	Update to shift pattern details in text and table 1-1
DCO Transport Assessment	APP-101	7.3, 11.4, 14.1	1.0	Update to shift pattern details and text relating to VISSIM results
DCO Transport Assessment – appendix I – VISSIM Model Results	APP-110	Throughout	1.0	Update to reflect proposed changes shift patterns and associated results
DCO Transport Assessment – appendix L – Supplementary information	APP-113	4	1.0	Update to shift pattern details
Environmental Statement chapter C3: Public access and recreation effects of traffic	APP-090	3.4, 3.5	1.0	Update to shift pattern details
Environmental Statement appendix C5-1: Operational road traffic input and output	APP-116	1.1, 3, 4	1.0	Update to traffic flows for the 2020 and 2023 scenarios, minor changes to noise levels and small changes to the exact numbers of properties in each category in the night-time columns of tables 4-1 to 4-5

Application document name	Examination Reference Number	Section of document	Version to be amended	Description of amendment
Main Power Station Site sub-CoCP	APP-415	4.3	1.0	Update to shift pattern details
Logistics Centre sub-CoCP	APP-419	4.4	1.0	Update to shift pattern details
Environmental Statement chapter D1: Proposed development	APP-120	1.6	1.0	Update to shift pattern details
Environmental Statement chapter F1: Proposed development	APP-266	1.1	1.0	Update to shift pattern details
Design and Access Statement - Volume 3 – Associated Developments and Off-Site Power Station Facilities	APP-409	1.6	1.0	Update to shift pattern details

3 References

Table 3-1 Schedule of references

ID	Reference
RD1	The Planning Inspectorate. 2018. Advice Note 16: How to request a change which may be material. [Online]. [Accessed: June 2018]. Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/07/Advice-note-16.pdf
RD2	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

Appendix 1-1 Cumulative Assessment Report

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Appendix 1-2 Effect of shift patterns on travel over Britannia Bridge

Figure 3-2 Shift pattern presented in DCO application

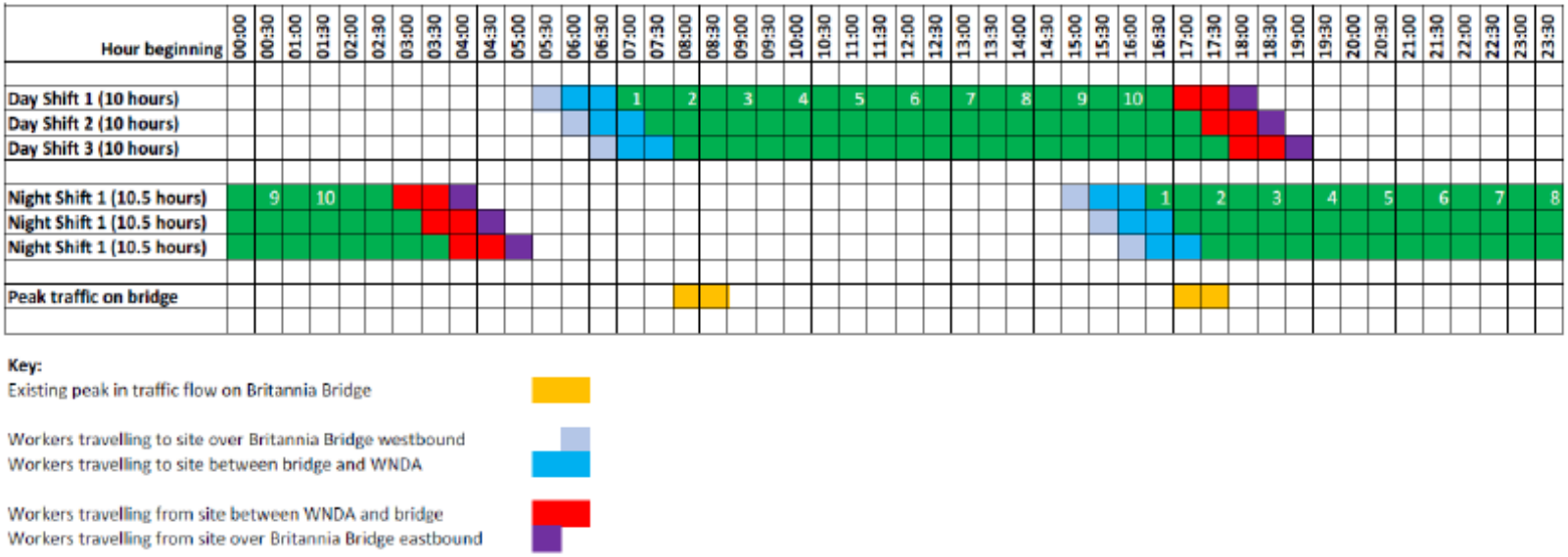


Figure 3-3 Proposed change to shift timings 2020

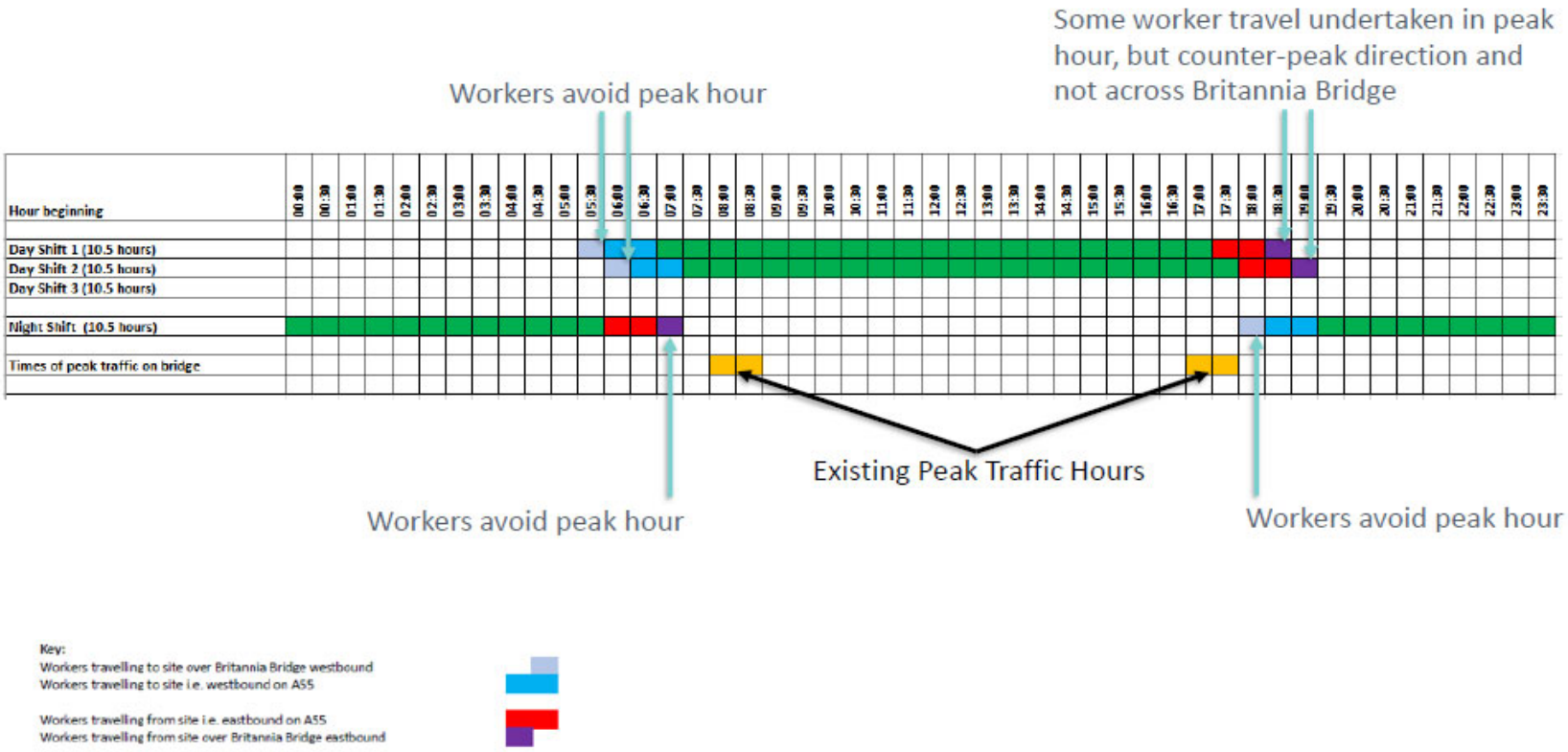
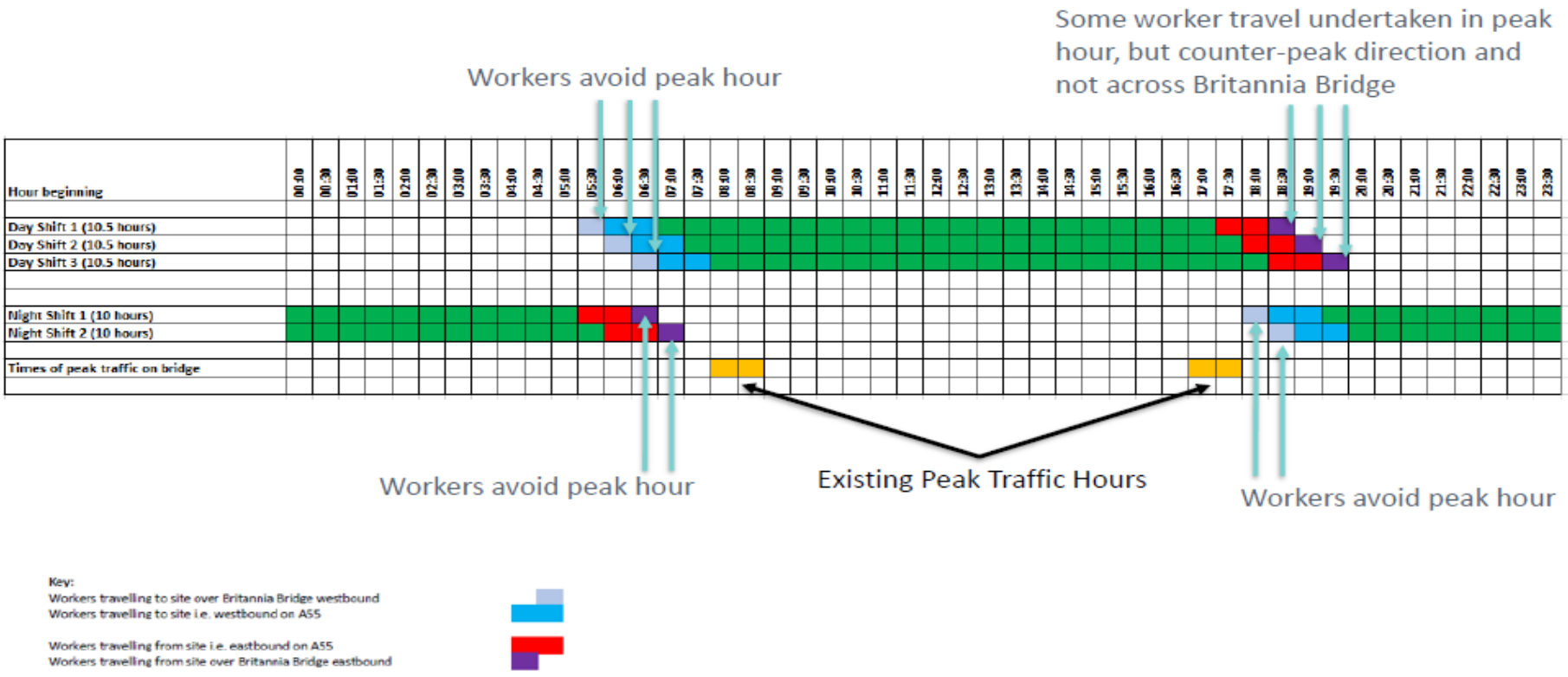


Figure 3-4 Proposed change to shift timings 2023



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Appendix 1-3 Modelling of road traffic emissions with diurnal profile

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Appendix 1-1 Cumulative Assessment Report

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Contents

List of Tables

1 Introduction

1.1.1 Horizon intends to make a request for a total of five non-material changes to the Project DCO application. Horizon has already consulted and submitted the following two non-material change requests:

- Request for Non-Material Change no.1 – Blasting Strategy (AS-012); and
- Request for Non-Material Change no.2 – Marine Vessel Movements (AS-013).

1.1.2 Horizon has also gone out to consultation with respect to the following three non-material change requests:

- Request for Non-Material Change no.3 – Worker Shift Patterns;
- Request for Non-Material Change no.4 – Working Hours; and
- Request for Non-Material Change no.5 – HGV delivery window.

1.1.3 Further information related to each non-material change is provided in section 1.2 below; detailed assessments can be found in the standalone candidate for change documents.

1.2 Scope

1.2.1 This appendix (which is attached – in duplicate form – to documents 3, 4 and 5 listed above) sets out an assessment of the effects of all five proposed non-material changes to the cumulative assessment reported in the DCO application. The purpose is to assess whether the proposed changes could interact to result in the Project having a greater cumulative effect to that reported in the DCO application. The effect of each separate request for non-material change on the cumulative assessment reported in the DCO application has been assessed and reported within the standalone candidate for change documents.

1.2.2 The approach to the cumulative assessment of the proposed changes is consistent with the Project Environmental Impact Assessment (EIA); see chapter B1 (introduction to the assessment process, APP-066) of the Environmental Statement for an overview of this process. There are three components to the assessment of cumulative EIA effects: combined topic effects; intra-project effects; and inter-project effects, and all are described further below.

1.2.3 Combined topic effects (also known as intra-development effects) occur when a single receptor is affected in more than one way by the same development. Combined topic effects for each development comprising the Project are reported in chapters C7 (Project-wide effects, APP-094), D16 (WNDA Development, APP-135), E12 (Off-Site Power Station Facilities: AECC ESL and MEEG, APP-250), F12 (Park and Ride, APP-227), G12 (A5025 Off-line Highway Improvements, APP-315) and H12 (Logistics Centre, APP-366) of the Environmental Statement.

1.2.4 Intra-project effects result from the various developments that comprise the Project, whilst inter-project effects result from the Wylfa Newydd Project

together with external projects. These assessments are reported in volume I (cumulative effects) (APP-384 to APP388) of the Environmental Statement.

1.2.5 Consideration has also been given to the cumulative effects of the proposed changes to the Health Impact Assessment Report (APP-429) and the Shadow Habitats Regulations Assessment Report (APP-050/051) and a conclusion of no new cumulative or in-combination effects has been reached, respectively.

1.2.6 All other assessments submitted as part of the DCO application (e.g. Welsh Language Impact Assessment, APP-432; Equality Impact Assessment, APP-434; and Water Framework Directive Compliance Assessment, APP-444) would remain unaffected by the proposed changes and have therefore not been considered further.

1.3 Assessment approach

1.3.1 For the purpose of the assessment and in order to assess a worst case, it is assumed that the proposed changes and the associated construction activities and environmental effects would occur concurrently. This is considered worst case as in reality the proposed changes are unlikely to fully overlap with one another (e.g. blasting activities will occur earlier in the programme than marine vessel movements but are estimated to overlap for approximately 8 months).

Assessment of noise effects

1.3.2 The noise assessments for each of the following requests for non-material change identified the potential for new or different likely significant environmental effects:

- Request for Non-Material Change no.4 – Working Hours; and
- Request for Non-Material Change no.5 – HGV delivery window.

1.3.3 However, implementation of a Local Noise Mitigation Strategy (LNMS) for the Project, as well as other mitigation measures secured in the Wylfa Newydd Code of Construction Practice (CoCP) (APP-414), will reduce the assessment of effects arising from the proposed changes. With the potential for some small increases in the number of adverse effects, including cumulatively, a number of options for new and enhanced mitigation have been proposed. Included in these options is an extension to the commitment made in the LNMS set out in section 8.3 of the Wylfa Newydd CoCP (APP-414) irrespective of the proposed changes to working hours and the HGV delivery window (Requests for Non-Material Change no. 4 and 5). This extension will on balance mitigate the worse affected properties and reduce major significant effects identified in the DCO application and as of the proposed change.

1.3.4 On the basis of this mitigation, the noise and vibration topic assessment for the proposed change to working hours and the HGV delivery window (Requests for Non-Material Change no. 4 and 5) concluded that on balance, there would be no new or different likely significant environmental effects. However, the potential cumulative effect of changes to noise disturbance as a result of the five requests for non-material change to the DCO application has been considered within this appendix (see sections 2 to 4).

Assessment of air quality effects

1.3.5 The air quality dispersion modelling which was undertaken to assess the air quality effects of the proposed change to working hours (Request for Non-Material Change no. 4) took into consideration Horizons' pre-existing commitment within the DCO application to use lower emitting plant, machinery and marine vessels proposed as additional mitigation. It also took account of the proposed change to the marine vessel movements (Request for Non-Material Change no. 2) which has been submitted to the Examining Authority.

1.3.6 Although air quality modelling work was undertaken to assess the proposed change to worker shift patterns and the HGV delivery window (Requests for Non-Material Change no. 3 and 5), there was no requirement to take account of any pre-existing mitigation commitments within the DCO application. The proposed change to the blasting strategy (Request for Non-Material Change no. 1) relates to the timings for carrying out blasting and has no effect on the amount or magnitude of blasting required. Therefore, this proposed change does not affect the assessment of air quality effects reported in the DCO application.

1.3.7 As expected, the lower emitting construction plant, machinery and vessels delivered significant reductions in air quality effects. The effect of the proposed changes to working hours (Request for Non-Material Change no. 4) have therefore been assessed against the quantified residual effects of the two modelling scenarios (for year 2 and year 5) which take account of this mitigation as this is considered to be a more appropriate baseline scenario than the DCO application which does not quantify this mitigation within the modelling assessments (see paragraphs 2.5.2 to 2.5.4 of the request for non-material change to working hours). This forms the basis of the cumulative assessment.

Assessment of human health impacts

1.3.8 The Health Impact Assessment has adopted the same assessment approach to mitigation as the noise and air quality assessments described above. This forms the basis of the cumulative assessment.

1.4 Description of the proposed non-material changes

1.4.1 A detailed description of the five proposed non-material changes being sought by Horizon, including a justification for their requirement and non-materiality can be found in the standalone candidate for change documents.

1.4.2 For reference, a brief description of each proposed non-material change is provided in Table 1-1 below.

Table 1-1 Proposed non-material changes to the DCO application being sought by Horizon

Proposed non-material change	Description
Request for Non-Material Change no.1 – Blasting Strategy (AS-012)	Horizon is seeking an extension to the daily 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 (as submitted in the DCO application); to Monday to Friday between 09:00 and 19:00, and Saturday between 08:00 and 13:00 (with no blasting after dusk between March and September). In practice, because of the change in length of day and the change to BST, dusk falls after 19:00 from April until September.
Non-Material Change no.2 – Marine Vessel Movements (AS-013)	Horizon is seeking to increase the upper daily limit from four movements per day (two vessels) to 16 movements per day (eight vessels). These changes fall within the total vessel movements described and assessed in the DCO application.
Request for Non-Material Change no.3 – Worker Shift Patterns	Horizon is also seeking the following changes to shift times and durations: • increase the day shift windows by half hour at the end of each shift; • amend the start of the night shift window by three hours; and • decrease the night shift window by half hour during peak construction (e.g. 2023).
Request for Non-Material Change no.4 – Working Hours	Horizon is seeking to extend the following working hours to include 19:00-07:00 hours (i.e. 24-hours) for: • marine piling (percussion piling to 19:00 only); • MOLF construction • preparation for blasting including rock drilling and packing for blasting; • moving/repositioning won rock in the excavations; and • support operations which covers a range of activities required to support the early works and Main Construction As a consequence of the proposed change to working hours and to reduce overall environmental effects from those reported in the DCO application, Horizon is also

Proposed non-material change	Description
	seeking an extension to the working hours for site grading in construction zones 6, 7, 8 and 9 and the transportation of resultant material on haul routes HR-013, HR-B1 and HR-B2 for the construction of Mound E and Mound B from 19:00 to 23:00.
Request for Non-Material Change no.5 – HGV delivery window	Horizon is seeking to extend the weekday (Monday to Friday inclusive) delivery window into the evening, to include deliveries between the hours of 19:00 and 23:00 (up to a maximum of 20 HGV movements in each direction). Furthermore, an additional delivery window is proposed on Saturday mornings, between 08:00 and 13:00 (up to a maximum of 50 HGV movements in each direction).

2 Combined topic effects (i.e. intra-development cumulative effects)

2.1.1 The proposed changes to worker shift patterns and the HGV delivery window (Requests for Non-Material Change no. 3 and 5) have potential implications to the assessment of project-wide effects outlined in volume C of the Environmental Statement. The remaining proposed changes to the blasting strategy, marine vessel movements, and working hours (Request for Non-Material Change no. 1, 2 and 4) relate specifically to the WNDA Development which is assessed in volume D of the Environmental Statement (Table 2-1).

2.1.2 Thus, this section examines the potential effect of the proposed changes to the combined topic effects assessments presented within chapter C7 (APP-094) (project-wide effects) and D16 (APP-135) (WNDA Development) of the Environmental Statement.

Table 2-1 Summary matrix of the non-material change requests and the developments effected

Proposed non-material change	Project-wide effect (volume C)	WNDA Development (volume D)
Request for Non-Material Change no.1 – Blasting Strategy (AS-012)		X
Non-Material Change no.2 – Marine Vessel Movements (AS-013)		X
Request for Non-Material Change no.3 – Worker Shift Patterns	X	
Request for Non-Material Change no.4 – Working Hours		X
Request for Non-Material Change no.5 – HGV delivery window	X	

The proposed changes do not affect assessments of combined topic effects relating to the Off-Site Power Station Facilities: AECC ESL and MEEG (volume E), Park and Ride (volume F), A5025 Off-line Highway Improvements (volume G) and the Logistics Centre (volume H) as there is no pathway of effect to receptors considered within these assessments. Therefore, the assessment of combined topic effects for these developments remain as reported in chapters E12 (APP-250), F12 (APP-277), G12 (APP-315) and H12 (APP-366) of the Environmental Statement.

2.2 Project-wide combined topic effects

2.2.1 The project-wide combined topic effects assessment of each of the proposed changes to worker shift patterns and the HGV delivery window (Requests for Non-Material Change no. 3 and 5), concluded no change to the assessment and conclusions presented in chapter C7 (APP-094) of the Environmental Statement.

2.2.2 Considering these proposed changes together, it was identified that there could be effects to the following receptors via the traffic and transport, and public access and recreation project-wide topic assessments (see Table 2-2):

- Motorised and public transport users (traffic and transport);
- Recreational cyclists and walkers (public access and recreation); and
- Active travel cyclists and walkers (public access and recreation).

Table 2-2 Topic assessments and receptors potentially affected by the proposed changes to worker shift patterns and the HGV delivery window (adapted from appendix C7-1 (APP-118))

Proposed non-material change	Socio-economics	Traffic and transport	Public access and recreation	Air quality	Noise and vibration	Waster and materials management
Motorised and public transport users		Y				
Recreational cyclists and walkers			Y			
Active travel cyclists and walkers			Y			

2.2.3 As a consequence of the proposed changes to worker shift patterns and HGV delivery windows, no new receptors would be scoped into the project-wide combined topic effects assessment.

Traffic and transport

2.2.4 The proposed changes to worker shift patterns and the HGV delivery window (Requests for Non-Material Change no. 3 and 5) both have the potential to alter traffic flows, and in the case of Saturday morning HGV deliveries, introduce new construction-related traffic from that assessed within the DCO application.

2.2.5 The traffic and transport assessment for the proposed changes to shift patterns (Request for Non-Material Change no. 3) and the HGV delivery window (Request for Non-Material Change no. 5) each concluded that there would be no new or different likely significant combined effects than those reported in chapter C7 (APP-094) of the Environmental Statement.

2.2.6 When considering these two proposed changes in combination, the only potential for a cumulative effect to occur is during the weekday evenings around the commencement of the evening night shift (i.e. 19:00) as HGV deliveries would continue past 19:00. There would be no overlap in the timing of worker shift patterns (which means workers arrive at the Wylfa Newydd Development Area before 08:00) and the HGV delivery window on Saturdays (which ensures there are no HGV movements before 08:00) and so any impacts of these proposed changes are considered independent of one another.

2.2.7 If HGV movements were to be introduced in the evenings, the number of HGV movements in the hour that overlaps with worker traffic movements associated with the proposed change to shift patterns would be small (an average of five HGVs per direction). Lower background traffic flows in the evening period mean that impacts should be less than those assessed during peak hours of traffic on the road network. Furthermore, in practice the proposed change would reduce peak hourly flows during the day as the same number of HGV deliveries would occur over a greater time period. Given the limited temporal overlap of the two proposed changes and the small vehicle numbers involved, there would be no new or different likely cumulative transport impacts.

2.2.8 Consequently, there is considered to be no change to the assessment of combined topic effects to motorised and public transport users presented within chapter C7 (APP-094) of the Environmental Statement. Thus, the conclusions remain as reported in the DCO application.

Public access and recreation

2.2.9 The proposed changes to shift patterns and the HGV delivery window both have the potential to affect recreational amenity value as well as active travel for walkers and cyclists as a result of changes to, or increased traffic flows.

2.2.10 The public access and recreation assessment for the proposed changes to worker shift patterns (Request for Non-Material Change no. 3) and the HGV delivery window (Request for Non-Material Change no. 5) each concluded that with consideration of existing embedded and additional mitigation measures already secured in the DCO application, there would be no new or different likely significant combined effects than those reported in chapter C7 (APP-094) of the Environmental Statement.

2.2.11 The proposed change to the HGV delivery window (Request for Non-Material Change no. 5) was found to alter the assessment of recreational amenity for walkers and cyclists from negligible to minor adverse effects due to the addition of HGV deliveries during weekday evenings and Saturdays. Minor changes to peak traffic flows associated with the proposed change to worker shift patterns (Request for Non-Material Change no. 3) are not considered to combine to worsen the effect to this receptor.

2.2.12 Both proposed changes would not result in a net change in the number of vehicles or HGVs using the road network as a result of the Project. Considering the smaller number of HGV deliveries that would be permitted weekday evenings and on a Saturday morning and the timing of shift changes,

there are considered to be no new or different likely cumulative impacts to public access and recreation.

2.2.13 Consequently, there is considered to be no change to the assessment of combined topic effects to walkers and cyclists undertaking recreation or active travel presented within chapter C7 (APP-094) of the Environmental Statement. Thus, the conclusions remain as reported in the DCO application.

2.3 WNDA Development combined topic effects

2.3.1 The WNDA Development combined topic effects assessment for each of the proposed changes to the blasting strategy, marine vessel movements and working hours (Request for Non-Material Change no. 1, 2 and 4), concluded no change to the assessment and conclusions presented in chapter D16 (APP-135) of the Environmental Statement.

2.3.2 Considering these proposed changes together, it was identified that there could be a change to the WNDA Development combined topic assessment for the following receptors (which are already considered in chapter D16 (APP-135) of the Environmental Statement) via the air quality and noise and vibration topic assessments (Table 2-3):

- Human receptors:
  - i) residential receptors within 350m of the Wylfa Newydd Development Area.
- other receptors:
  - ii) bats; and
  - iii) marine mammals (pinnipeds and cetaceans).

2.3.3 As a consequence of the proposed changes to the blasting strategy, marine vessel movements and working hours, no new receptors would be scoped into the WNDA Development combined topic effects assessment.

Table 2-3 Topic assessments and receptors potentially affected by the proposed changes to the blasting strategy, marine vessel movements and working hours (denoted by 'Y'), as well as any other topics which affect the same (or similar) receptors but are not affected by the proposed changes (denoted by 'X') (adapted from appendix D16-1 (APP-236))

Proposed non-material change	Socio-economics	Public access and recreation	Air quality	Noise and vibration	Soils and geology	Surface water and groundwater	Terrestrial and freshwater ecology	Landscape and visual	Cultural heritage	Coastal processes and coastal geomorphology	Marine environment	Radiological effects	Shipping and navigation
Human receptors													
Residential receptors within 350m of the Wylfa Newydd Development Area			Y										
Other receptors													
Bats							Y						
Marine mammals (pinnipeds and cetaceans)											Y		

Human residential receptors

2.3.4 The proposed change to the blasting strategy, marine vessel movements, and working hours (Requests for Non-Material Change no. 1, 2 and 4) each have the potential to affect human residential receptors due to changes in noise and vibration effects. The proposed change to marine vessel movements and working hours also each have the potential to impact air quality. Those receptors potentially affected are likely to be located within 350m of the Wylfa Newydd Development Area which includes the majority of Tregele, the western half of Cemaes (i.e. those properties or locations to the west of the High Street) and several other properties located around the Wylfa Newydd Development Area.

2.3.5 The combined topic assessment for each of the proposed changes to the blasting strategy, marine vessel movements and working hours (Requests for Non-Material Change no. 1, 2 and 4) each concluded no change to the assessment and conclusions presented in chapter D16 (App-135) of the Environmental Statement. However, it is acknowledged that the proposed changes combined could result in an additive or combined effect which could lead to a change in the overall combined topic assessment for the WNDA Development.

2.3.6 The proposed change to marine vessel movements (Request for Non-Material Change no. 2) would result in a small increase in noise levels at 120 properties closest to the Wylda Newydd Development Area which would be undetectable to a person. As the proposed change to the blasting strategy (Request for Non-Material Change no. 1) would be subject to the noise and vibration control measures (including monitoring) set out in section 8 of the Main Power Station Site sub-CoCP and would include strict adherence to BS6472-2 [RD1], there would be no additive effect from these two proposed changes. This conclusion remains valid when the proposed change to working hours is also considered on the basis that new and enhanced mitigation has been offered to address any new or different likely significant noise disturbance effects associated with this proposed change.

2.3.7 The proposed changes to marine vessel movements and working hours (Requests for Non-Material Change no. 2 and 4) are both predicted to result in small changes in predicted concentrations of pollutants at human receptor locations, with some properties experiencing an additive effect. This change however, would be small and is not considered to alter the conclusions of the combined topic effects assessment presented in D16 (APP-135) of the Environmental Statement.

2.3.8 Overall, any changes to noise and air quality effects arising from the proposed changes to the blasting strategy (Request for Non-Material Change no. 1) would not combine to result in a change to the assessment of combined topic effects presented within chapter D16 (Application Number 6.4.16) of the Environmental Statement. Thus, the conclusions remain as reported in the DCO application

Other receptors

Bats

2.3.9 The proposed changes to the blasting strategy and working hours (Requests for Non-Material Change no. 1 and 4) both have the potential to affect bats via visual, noise and air quality disturbance effects as this crepuscular receptor is most active around dusk.

2.3.10 The terrestrial and freshwater ecology assessment for each of the proposed changes to the blasting strategy and working hours (Request for Non-Material Change no. 1 and 4) concluded that there would be no new or different likely significant combined effects than those reported in chapter D16 (APP-135) of the Environmental Statement.

2.3.11 Given the positive effects the lower emitting plant, machinery and marine vessels would have to air quality, the neutral effect of environmental lighting and the very minor changes to peak noise levels predicted as a result of the proposed changes, it is not considered that these effects would combine to alter the assessment of combined topic effects to bats presented within chapter D16 (APP-135) of the Environmental Statement. Thus, the conclusions remain as reported in the DCO application.

Marine mammals (pinnipeds and cetaceans)

2.3.12 The proposed changes to the marine vessel movements and working hours (Requests for Non-Material Change no. 2 and 4) both have the potential to affect marine mammals (pinnipeds and cetaceans) due to increases in underwater noise disturbance and the increased risk of vessel strikes associated with marine vessel movements.

2.3.13 The marine environment assessment for each of the proposed changes to the blasting strategy and working hours (Request for Non-Material Change no. 1 and 4) concluded that there would be no new or different likely significant combined effects than those reported in chapter D16 (APP-135) of the Environmental Statement.

2.3.14 Given that the assessment of underwater noise effects presented in chapter D13 (APP-132) of the Environmental Statement already takes into consideration 24-hr operations for marine dredging and that the overall number of vessel movements associated with the Project would be small, it is not considered that these effects would combine to alter the assessment of combined topic effects to marine mammals presented within chapter D16 (APP-135) of the Environmental Statement. Thus, the conclusions remain as reported in the DCO application.

3 Intra-project cumulative effects

3.1.1 An intra-project cumulative assessment has been undertaken for those topic assessments outlined in the Environmental Statement which are potentially affected by at least two of the non-material changes being sought in relation to the DCO application. The methodology used for the cumulative effects assessment has considered all residual effects that are minor adverse or greater.

Traffic and transport

3.1.2 Of the five requests for non-material change, the proposed change to worker shift patterns and the HGV delivery window (Request for Non-Material Change no. 3 and 5) have implications to the traffic and transport assessment reported in the DCO application. The potential effect of these proposed changes has already been assessed on a project-wide basis and is considered in section 2.2. Thus, there is no requirement to carry out an intra-project cumulative effects assessment for this topic.

Public access and recreation

3.1.3 Of the five requests for non-material change, the proposed changes to worker shift patterns and HGV delivery window (Request for Non-Material Change no. 3 and 5) have implications to the public access and recreation assessment reported in the DCO application. The potential effect of these proposed changes has already been assessed on a project-wide basis and is considered in section 2.2. Thus, there is no requirement to carry out an intra-project cumulative effects assessment for this topic.

Air quality

3.1.4 Of the five requests for non-material change, the proposed changes to worker marine vessels movements, shift patterns, working hours and the HGV delivery window (Request for Non-Material Change no. 2, 3, 4 and 5) have implications to both the project-wide and WNDA Development assessments of air quality. As such, there is potential for intra-project additive cumulative effects due to emissions to air from sources within the Wylfa Newydd Development Area and emissions from road traffic associated with the Wylfa Newydd Project.

3.1.5 The air quality assessment for the proposed changes associated with the WNDA Development demonstrated that, with the use of newer lower emitting plant, machinery and marine vessels, the majority of effects at human receptors would be negligible, and air quality effects as a consequence of the proposed change would be not significant.

3.1.6 The project-wide air quality assessment stated that there would be no net increase or decrease in the total vehicle flows on the road network. The changes would result in some modifications to the time of day or night upon which vehicles would arrive and depart from the Wylfa Newydd Development Area during construction. The assessments for the proposed changes to worker shift patterns and HGV movements (Request for Non-Material Change

no. 3 and 5) indicated that predicted concentrations or deposition rates are unlikely to be any higher than those presented in chapter C4 (APP-091) of the Environmental Statement. The assessments concluded that the balance of air quality effects at human receptors would remain predominantly negligible with some beneficial effects due to the A5025 Offline Highway Improvements.

3.1.7 Further consideration of the potential additive effects to air quality as a consequence of the proposed changes to worker shift patterns and HGV movements (Request for Non-Material Change no. 3 and 5) concluded no change to the intra-project cumulative assessment reported in the DCO application.

3.1.8 Air quality effects are local in scale; most air quality assessment methodologies in the UK only consider receptors within 200m of the road network when assessing emissions from road traffic and the largest effects are within very close proximity to the affected roads. Therefore, at most air quality sensitive receptors, the physical distance of the proposed changes listed associated with project-wide activities and those occurring at the WNDA Development would prevent intra-project cumulative air quality effects occurring.

3.1.9 However, there will be some receptors, particularly those close to the A5025 in the vicinity of the Wylfa Newydd Development Area, where there may be the potential for additive effects. However, given the negligible effect of the emissions from road traffic and minimal change in effects from the proposed changes to shift patterns and HGV deliveries (Requests for Non-Material Change no. 3 and 5), the intra-project cumulative effect of all the proposed changes is considered to be negligible.

3.1.10 The proposed changes are not considered to alter the intra-project cumulative effects reported in chapter I4 (APP-387) of the Environmental Statement. Thus, the conclusions remain as reported in the DCO application.

Noise and vibration

3.1.11 The proposed changes to the blasting strategy, marine vessel movements and shift patterns (Request for Non-Material Change no. 1, 2 and 3) has been shown not to result in any changes to noise effects and are therefore not considered further.

3.1.12 The proposed changes to working hours and the HGV delivery window (Request for Non-Material Change no. 4 and 5) have implications to both the project wide and WNDA Development assessments of noise effects. As such, there is potential for intra-project additive cumulative effects due to increased evening and night-time noise levels from sources within the Wylfa Newydd Development Area and from road traffic associated with the Project.

3.1.13 Considering both 2020 (representative of early construction) and 2023 (representative of peak construction), the proposed change to the HGV delivery window (Request for Non-Material Change no. 5) was found to potentially result in adverse effects at an additional 18 residential properties compared to the DCO application and in the absence of mitigation. These effects are predicted to occur at Cefn Coch, Kingsland, Llanfaethlu,

Llangynghenedl as well as outlying receptors at Llanfaethlu and Llanfachraeth.

3.1.14 The proposed change to working hours was also found to potentially result in a small number of additional significant effects at residential receptors located predominately over 1km from the Wylfa Newydd Development Area. A large number of residential receptors assessed as major significance in the DCO application would benefit from the proposed change to working hours; these are located in Cemaes.

3.1.15 There is very little overlap in the residential properties affected by the proposed change to the HGV delivery window and working hours. This is principally because these two non-material change requests relate to aspects of the project that are spatially segregated. Noise effects are local in scale; most noise assessment methodologies in the UK only consider receptors within 600m of the development scheme. Therefore, at most noise sensitive receptors, the physical distance of the proposed changes will prevent cumulative noise effects from one group at the other group. However, there is potential for some properties which are both adjacent to the Main Site and also adjacent to the A5025, and at which cumulative adverse effects could occur.

3.1.16 With consideration of the enhanced mitigation outlined in paragraph 1.3.3, the proposed changes to working hours and the HGV delivery window are not considered to result in any new intra-project effects with respect to increased noise levels from the effects of traffic and elevated noise levels during construction. Thus, the intra-project cumulative effects for this topic remain as reported in chapter I4 (APP-387) of the Environmental Statement.

Terrestrial and freshwater ecology

3.1.17 The only potential effects considered of minor or greater significance relate to the WNDA Development. As shown in section 2.3, the proposed changes to the blasting strategy, marine vessel movements and working hours (Request for Non-Material Change no. 1, 2 and 4) have no effect on this assessment and therefore there are no changes to the intra-project cumulative effects reported in chapter I4 (APP-387) of the Environmental Statement.

The marine environment

3.1.18 The only potential effects to the marine environment as a result of the proposed change to marine vessel movements and working hours (Request for Non-Material Change no. 2 and 4) relate to the WNDA Development (see section 2.3); hence, there are no intra-project cumulative effects to report for this topic.

4 Inter-project cumulative effects

4.1.1 An inter-project cumulative assessment has been undertaken for those topic assessments outlined in the Environmental Statement which are potentially affected by at least two of the non-material changes being sought in relation to the DCO application. These include:

- public access and recreation which is potentially affected by the proposed change to worker shift patterns and the HGV delivery window (Request for Non-Material Change no. 3 and 5);
- air quality which is potentially affected by the proposed change to marine vessel movements and working hours (Request for Non-Material Change no. 2 and 4); and
- noise and vibration which is potentially affected by the proposed change to working hours and the HGV delivery window (Request for Non-Material Change no. 4 and 5).

4.1.2 For these topics, all other requests for non-material change have been scoped out as requiring further consideration within the inter-project cumulative assessment as they have either no pathway for effect or their effect is negligible.

4.1.3 For the traffic and transport assessment, projects considered to have cumulative effects have been included in the traffic model for the Project and therefore form part of the assessment of effects that is represented in volume C of the Environmental Statement and considered in section 2.2 of this appendix.

4.1.4 The methodology used for the cumulative effects assessment has considered all residual effects that are minor adverse or greater.

4.1.5 The list of Reasonably Foreseeable Future Projects (RFFPs) which have been considered within the inter-project cumulative assessment is shown in appendix I2-2 (Matrix of receptors affected by the Wylfa Newydd Project and which short-listed projects could affect them) (APP-390). There is no requirement to scope in any additional RFFPs as a consequence of the proposed changes.

4.1.6 Considering the physical distance of the proposed changes; both the beneficial and adverse effects associated with these; and the new and enhanced mitigation proposed to address adverse effects associated with the Project, all five non-material changes requests even when combined are not considered to alter the inter-project cumulative assessment presented in chapter I5 (APP-388) and associated appendices in the Environmental Statement. Thus, the conclusions remain as reported in the DCO application.

5 Health impacts

5.1.1 The Health Impact Assessment (HIA) Report (APP-429) could potentially be affected by the proposed changes to the blasting strategy, worker shift patterns, working hours and HGV delivery (Request for Non-Material Change no. 1, 3, 4 and 5). The proposed change to the marine vessel movements (Request for Non-Material Change no. 2) will have no impact on human health.

5.1.2 The general influences relevant to population health that arise from the proposed changes are summarised in Table 5-1. The table shows the potential effects against the relevant geographical population groups as used in the Health Impact Assessment Report (APP-429).

5.1.3 The effects are summarised as follows:

- For the population near the Wylfa Newydd Development Area the proposed change to the blasting strategy and workings hours (Request for Non-Material Change no. 1 and 4) are the relevant sources of potential cumulative effects.
- For the population near the local road network (A5025, A55, A5 and A487) the proposed change to the HGV delivery window and worker shift patterns are the relevant sources of potential cumulative effects.

5.1.4 The proposed change to marine vessel movements (Request for Non-Material Change no. 2) is not considered to impact the assessment of effects to human health reported in the Health Impact assessment (HIA) Report (APP-429).

5.1.5 In both cases similar potentially vulnerable groups are relevant (children and young people; older people; and people with existing poor health). Where groups overlap, there may be increased vulnerability.

5.1.6 For the population near the Wylfa Newydd Development Area, the proposed changes that affect the same determinant of health relate to noise disturbance in the evening period from both blasting and construction related activities (including general earthworks close to communities). Other changes from the effects discussed in the DCO application HIA table I-2 that combine to influence the health of this population include: increased night-time noise and reduced nitrogen dioxide concentrations.

5.1.7 As appropriate new and enhanced mitigation is proposed (see paragraph 1.3.3), the overall effect for population health, taking account of the range of small residual beneficial and adverse changes across vulnerable groups, is not expected to alter the HIA conclusion that near the Wylfa Newydd Development Area the overall residual population health effect is considered to be up to minor adverse for the general population and up to moderate adverse for relevant vulnerable groups. The largest change relates to the air quality commitments to improved emission standards. Whilst beneficial, the change in this one determinant of health is unlikely to change the overall cumulative score, which takes account of a range of other health determinants.

5.1.8 For the population near the local road network (A5025, A55, A5 and A487), the proposed changes that affect the same determinants of health relate to

more noise disturbance in the evening period from both HGVs and from vehicles associated with worker shift changes. The combination of morning noise due to shift changes (06:00 or 05:30) and evening noise due to HGV movements (19:00 to 23:00) would also reduce the period when Project related transport would not contribute to potential sleep disturbance. Changes to the times at which these two categories of Project vehicle would be using the local road network may also contribute to both beneficial and adverse influences on road safety. Other changes from the effects discussed in the DCO application HIA (table I-2) that combine to influence the health of this population include: reduced night-time noise (there being no night-shifts ending between 03:00 and 04:00); reduced potential for health-trip journey time delays (e.g. to a hospital); and the potential for weekend HGV movements to reduce amenity and discourage physical activity.

5.1.9 As appropriate new and enhanced mitigation is proposed, the overall effect for population health, taking account of the range of small residual beneficial and adverse changes across vulnerable groups, is not expected to alter the HIA conclusion that near the local road network the overall residual population health effect is considered to be negligible for the general population and up to minor adverse for relevant vulnerable groups. Thus, the conclusions remain as reported in the DCO application.

Table 5-1 Health analysis cumulative assessment

	Relevant geographical population groups	
	Population near the Wylfa Newydd Development Area	**Population near the local road network**
Changes to working hours		
Air quality	Less potential for adverse effects from air pollution due to commitment to higher emission standards.	N/A
Lighting	No changes to community identity or sleep disturbance expected.	N/A
Changes to the HGV delivery window		
Air quality	N/A	No change to air quality from redistribution of vehicle times.
Traffic	N/A	More potential for accident risk during the weekend, as more pedestrians and cyclists. Less potential for journey delays as more use of off-peak times.
Changes to worker shift patterns		
Air quality	N/A	No change to air quality from redistribution of vehicle times.
Traffic	N/A	Less potential for accident risk as less overlap with school travel. Less potential for journey delays.
Construction workers	N/A	No change to community interaction with workforce.

6 Shadow Habitats Regulations Assessment

6.1.1 It was identified that the Shadow Habitats Regulations Assessment (APP-050/051) could potentially be affected by the proposed changes to the blasting strategy, marine vessel movements and working hours (Request for Non-Material Change no. 1, 2 and 4).

6.1.2 Assessments of each of these proposed changes concluded no new or different likely significant (alone or in-combination) effects to that reported in the Shadow Habitats Regulations Assessment (APP-050/051). Consequently, there is not considered to be any new or likely significant (alone or in-combination) effects from the three changes being sought in relation to the Project (i.e. blasting strategy, marine vessel movements and working hours, Request for Non-Material Change no. 1, 2 and 4). Thus, the conclusions remain as reported in the DCO application.

7 Schedule of consequential amendments to application documents

Table 7-1 Schedule of consequential amendments to application documents

Application document name	Examination Reference Number	Section of document	Version to be amended	Description of amendment
Environmental Statement chapter I4: Intra-project cumulative effects	APP-387	4.2	1.0	Update to air quality and noise modelling results
Environmental Statement appendix I4-2: Project-wide and WNDA development intra-project air quality assessment	APP-393	5	1.0	Update to air quality modelling results
Environmental statement appendix I4-3: Intra-project cumulative noise effects	APP-394	1.2	1.0	Update to noise modelling results

8 References

Table 8-1 Schedule of references

ID	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.

Appendix 1-2 Effect of shift patterns on travel over Britannia Bridge

Figure 3-2 Shift pattern presented in DCO application

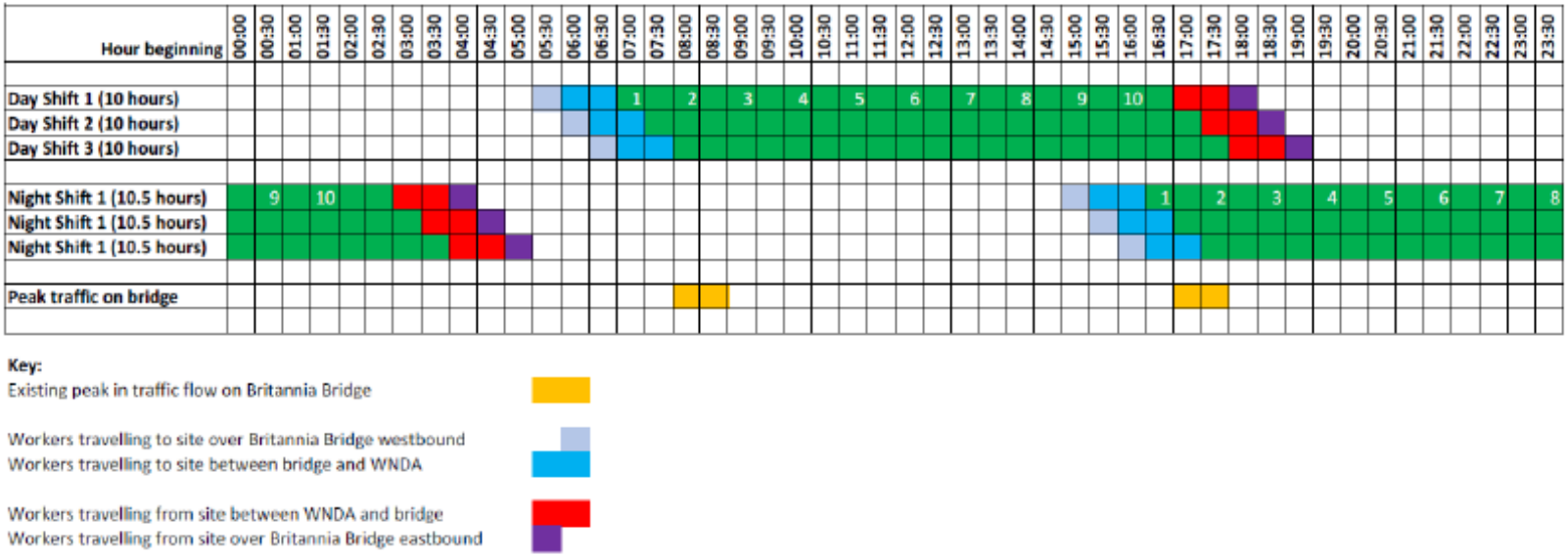


Figure 3-3 Proposed change to shift timings 2020

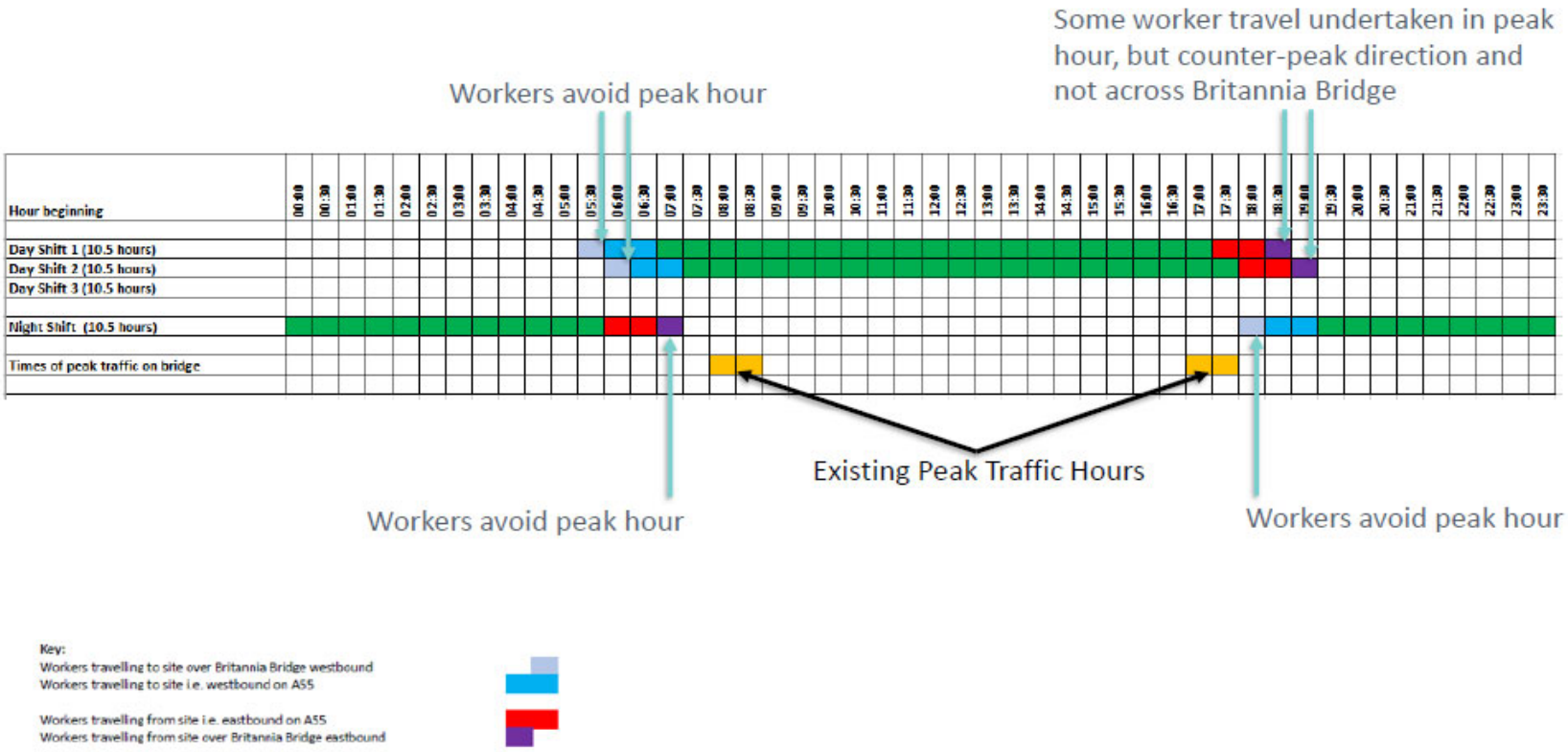
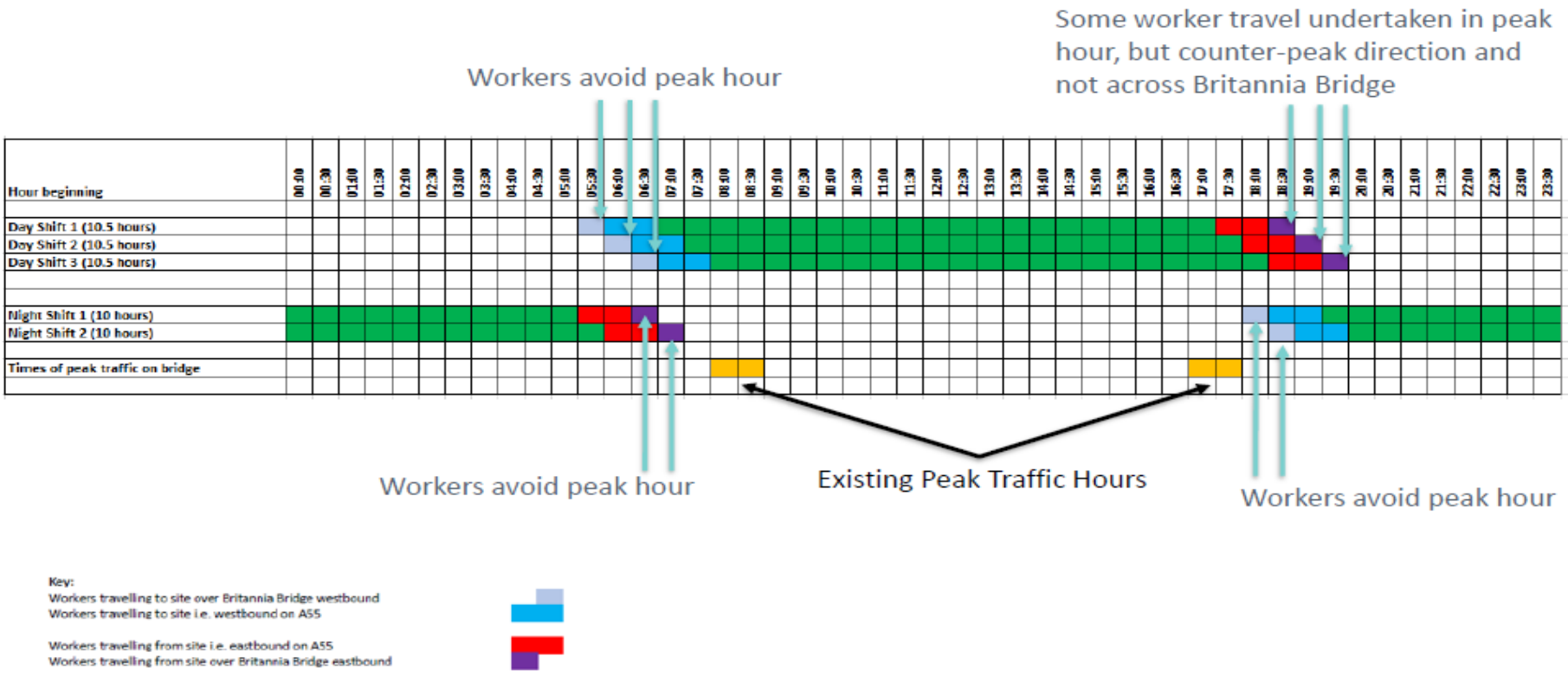


Figure 3-4 Proposed change to shift timings 2023



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Appendix 1-3 Sensitivity analysis methodology for air quality assessment

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Contents

List of Tables

List of Figures

1 Introduction

1.1 Purpose of this report

1.1.1 As a part of the Non-Material Change assessment of the effects upon air quality, an evaluation has been carried out of the effect of using an hourly diurnal profile of vehicle flows for modelling of dispersion of air pollutants from vehicles on the A55, A5 and A5025, connected with the Wylfa Newydd Project. For the DCO submission, a single, annual average hourly traffic (AAHT) flow was input to the model for each hour of the day, derived from annual average daily traffic (AADT) flows.

1.1.2 The Non-Material Change would re-distribute construction-related traffic on an hourly basis to and from the site within the 24-hour periods of days but would not result in any net increase in daily traffic flows of light duty vehicles (LDV) or heavy duty vehicles (HDV) over and above the DCO submission case.

1.1.3 Initially, further modelling was undertaken for one receptor, Hum_1964, which was identified as the receptor experiencing the largest change in concentrations as a result of project traffic on the A5025. It was then recognised that the use of a diurnal profile would have an effect on the adjustment factors applied to the emissions from road traffic results; therefore, the diurnal profile modelling was expanded to include the diffusion tube locations around the Valley area and an updated adjustment factor was calculated.

1.1.4 This report contains a summary of the modelling methodology adopted in the assessment, the results of the revised modelling and the effect upon the model verification and adjustment procedures. A section of road links comprising the A55, A5 around Valley and the A5025 immediately to the north of Valley has been used as a test case.

2 Methodology

2.1 Background to the proposed methodology

2.1.1 This modelling uses the previous verification model (from Autumn 2017) as a base.

2.1.2 Jacobs was requested to provide Wood with the hourly traffic flows for the relevant road links in the model. This traffic flow profile is consistent with the Strategic Traffic Model (STM) used in the DCO submission. Relevant road links consist of those within 200 m – 250 m of the diffusion tube locations and Hum_1964.

2.1.3 Hourly traffic flows were converted into hourly emission factors for each link, using different profiles for LDV flows and HDV flows.

2.1.4 A fac file was created to incorporate these emission factors into the model. The fac file uses a 3-day diurnal profile, for weekdays, Saturdays and Sundays.

2.1.5 There are two profiles for each road link, as we need an HDV profile and a LDV profile, consistent with the road traffic flow data split.

2.1.6 Since two profiles cannot be applied to one road source, roads sources with profiles applied need to be duplicated. In this case, the following statements are true:

- the locations of duplicated sources remain the same,
- for links where the LDV profile is applied, the HDV flows are set to zero,
- for links where the HDV profile is applied, the LDV flows are set to zero; and
- therefore, the total traffic flows along the links remain the same.

2.1.7 The model included 5 of the diffusion tube locations as receptors and Hum_1964, using RAF Valley meteorological data. This aligns with the previous verification modelling undertaken at the diffusion tube locations. For more details, see Appendix C4.1 in the DCO Environmental Statement. The receptor locations are presented in Table 2.1.

Table 2-1 Receptors included in the modelling

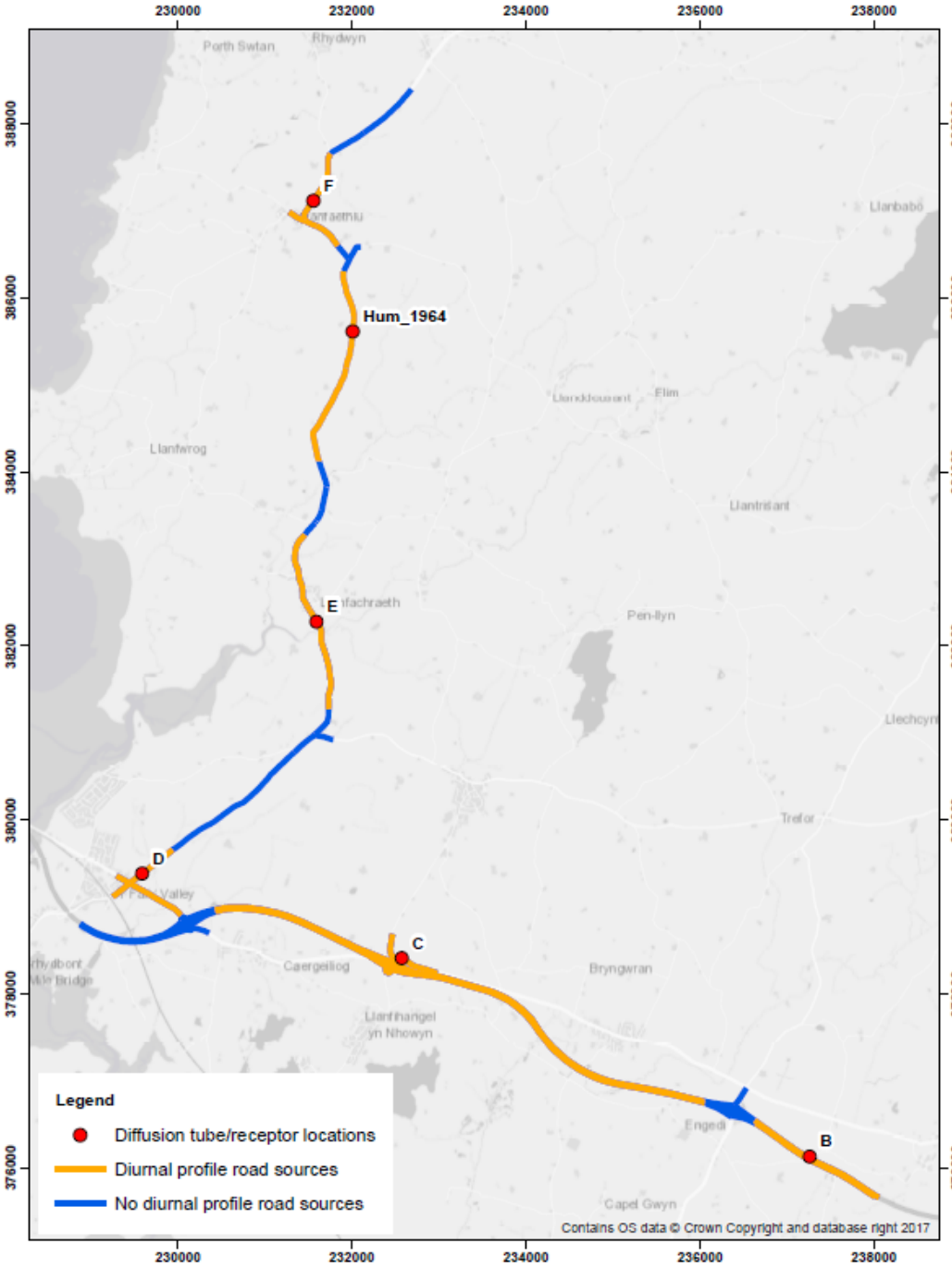
Diffusion tube/receptor ID	Location	X (m)	Y (m)
B	Minor road A55	237267	376129
C	A5 at Dalar Hir	232573	378407
D	A5025 Valley	229588	379382
E	A5025 Llanfacraeth	231593	382274
F	A5025 Llanfaethlu	231555	387112
Hum_1964	A5025 between Llanfacraeth and Llanfaethlu	232008	385608

2.1.8 Figure 2-1 provides a visualisation of the receptor locations and the road sources included in the modelling. The road links included in the modelling which had a diurnal profile applied are also listed below.

- A55_J5_J6_EB,
- A55_J5_J6_WB,
- A5_30,
- A55_J4_ON-SLIP_EB,
- A55_J4_ON-SLIP_WB,
- A55_J4_OFF-SLIP_EB,
- A55_J4_OFF-SLIP_WB,
- A44_J4_THR_JCT_EB,
- A44_J4_THR_JCT_WB,
- A55_J4_J5_EB,
- A55_J4_J5_WB,
- A55_J3_J4_EB,
- A55_J3_J4_WB,
- A55_J4_BRIDGE_NB,
- A55_J4_BRIDGE_SB,
- LOCAL_10; and
- A5025_71 (applied to all relevant A5025 links i.e. the profile was assumed to be the same along the entirety of the A5025).

2.1.9 Note that there are road links included in the model that did not have a profile applied. Where this occurred, it was because the road link is more than 250 m from the relevant receptor location and was left in the model for completion.

Figure 2-1 Road sources and receptor locations included in the modelling



2.1.10 Note: Figure 2.1 shows the road sources without bypasses (i.e. without the A5025 off-line highway improvements) and without the Logistics Centre and Park and Ride. As such, this represents an early project year.

3 Results and Discussion

3.1 Summary

3.1.1 The re-run of the verification with the diurnal profile in place results in lower modelled raw NOx (i.e. unadjusted) concentrations at the diffusion tube locations. This is consistent with the initial modelling completed for receptor Hum_1964.

3.1.2 Overall, this results in a higher model adjustment factor, because the difference between the modelled results and the monitoring data has increased, when compared with the original verification. Using the diurnal profile, therefore, indicates that the model performs less well than without the profile in place:

- The previous Valley adjustment factor, without the diurnal profile applied, was 3.62,
- The Valley adjustment factor, with the diurnal profile applied, is now 4.89; and
- This may bring about increases in modelled NO2 concentrations at receptors where the adjustment factor is applied. However, where the reduction with the profile is large enough to offset the effect of a larger adjustment factor, the overall concentration will decrease.

3.2 Verification calculations

3.2.1 Table 3.1 shows the comparison of the monitored and unadjusted modelled NO2 results at the diffusion tube locations. The comparison indicates that it is appropriate to undertake model verification, as the differences between the modelled and monitored NO2 are greater than 25%.

Table 3-1 Comparison of unadjusted and monitored NO_2 concentrations

Diffusion tube location	Background NO2 (µg m-3)	Monitored total NO2 (µg m-3)	Modelled total NO2 (µg m-3)	% difference (modelled vs. monitored)
B	3.8	9.6	4.98	-48.1%
C	3.9	11.1	5.20	-53.2%
D	4.5	15.1	6.92	-54.2%
E	3.9	9.8	4.97	-49.3%
F	3.8	9.3	4.87	-47.6%

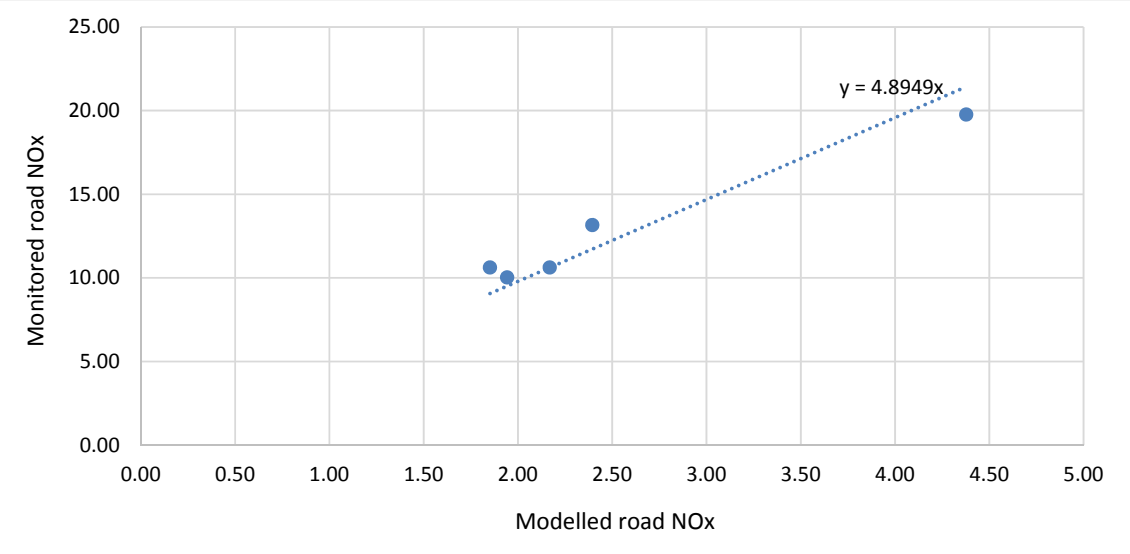
3.2.2 The data required for model adjustment is presented in Table 3.2.

Table 3-2 Model adjustment data

Diffusion tube location	Monitored road contribution NOx (µg m-3)	Modelled road contribution NOx (µg m-3)
B	10.62	2.17
C	13.16	2.40
D	19.76	4.38
E	10.62	1.85
F	10.02	1.94

3.2.3 Figure 3-1 provides a comparison of the modelled road contribution NOx versus modelled road contribution NOx and the equation of the trend line based on linear regression through zero for each of the verification areas. The equation of the trend line gives the adjustment factor which should be applied to the modelled results.

Figure 3-1 Adjustment factor line of regression



3.2.4 The raw results and the verified (adjusted) results for each of the diffusion tube locations are shown in Table 3.3.

Table 3-3 Model results after verification

Diffusion tube location	Monitored total NO2 (µg m-3)	Adjusted modelled total NO2 (µg m-3)	% difference (modelled vs. monitored)	Adjustment factor
B	9.6	9.6	<0.1%	4.89
C	11.1	10.3	-7.4%	4.89
D	15.1	16.0	5.7%	4.89
E	9.8	8.9	-9.0%	4.89
F	9.3	9.0	-2.9%	4.89

3.3 Results at Hum_1964

3.3.1 Using the updated adjustment factor calculated in section 3.2, the results at Hum_1964 with the diurnal profile in place are presented in Table 3.4. 'Baseline' and 'with project' scenarios for 2020 and 2023 have been evaluated.

Table 3-4 Annual mean NO_2 results at Hum_1964 with diurnal profile

Scenario	Raw road NOx concentration (µg m-3)	Adjusted modelled road NO2 (µg m-3)	Adjusted modelled total NO2 (µg m-3)	% PEC of AQS*
2020 base	3.60	9.55	13.68	34.2%
2020 project	4.81	12.59	16.73	41.8%
2023 base	3.36	8.93	13.07	32.7%
2023 project	5.11	13.34	17.47	43.7%

*AQS for annual mean NO2 is 40 µg m-3

3.3.2 The results in Table 3.4 show that, with a diurnal profile and an adjustment factor of 4.89, the results at Hum_1964 are significantly below the air quality standard (AQS) in both the 2020/2023 base and 2020/2023 with project scenarios.

3.4 Results comparison – with and without diurnal profile

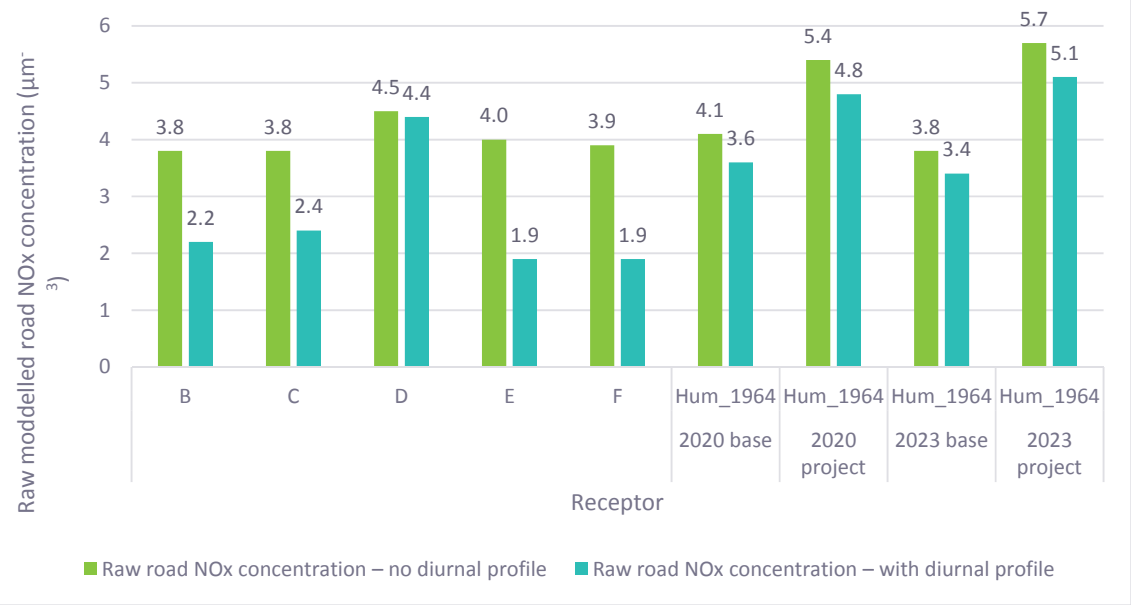
3.4.1 A comparison of the raw road contribution NOx concentrations (unadjusted) and the adjusted total NO2 concentrations at the receptor locations with and without the diurnal profile are presented in Table 3.5 and Figures 3.2 and 3.3. The adjustment factor for the No Profile scenario is 3.62 and the adjustment factor for the With Profile scenario is 4.89.

Table 3-5 Comparison of results with and without diurnal profile (µg m-3)

Scenario	Receptor location	Raw road NOx concentration – no diurnal profile	Raw road NOx concentration – with diurnal profile	Adjusted modelled total NO2 – no diurnal profile	Adjusted modelled total NO2 – with diurnal profile
2016 verification	B	3.8	2.2	11.3	9.6
2016 verification	C	3.8	2.4	11.4	10.3
2016 verification	D	4.5	4.4	13.2	16.0
2016 verification	E	4.0	1.9	11.9	8.9
2016 verification	F	3.9	1.9	11.4	9.0
2020 base	Hum_1964	4.1	3.6	12.3	13.7
2020 project	Hum_1964	5.4	4.8	14.7	16.7
2023 base	Hum_1964	3.8	3.4	11.5	13.1
2023 project	Hum_1964	5.7	5.1	15.0	17.5

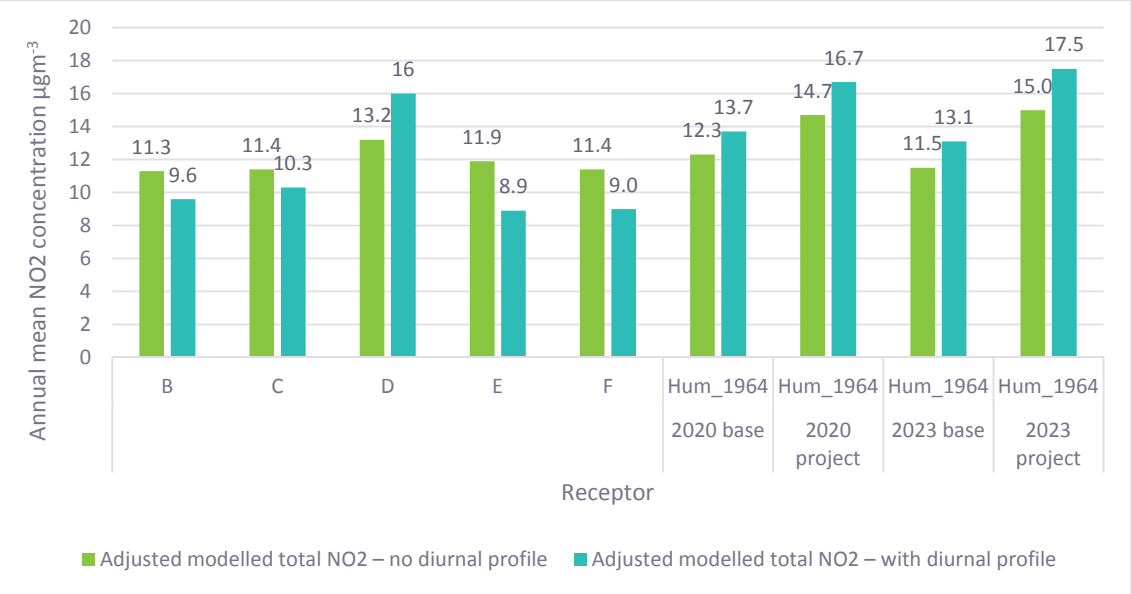
Note: the adjusted results for the No Profile scenario were derived using the same procedure as presented in section 3.2.

Figure 3-2 Comparison of results – raw modelled road NO_x



3.4.2 The data in Figure 3.2 show the comparison between the raw modelled road NOx (i.e. unadjusted) for the No Profile and With Profile scenarios. At all the receptors, the raw modelled road NOx is higher for the No Profile scenario.

Figure 3-3 Comparison of results – adjusted total modelled NO_2

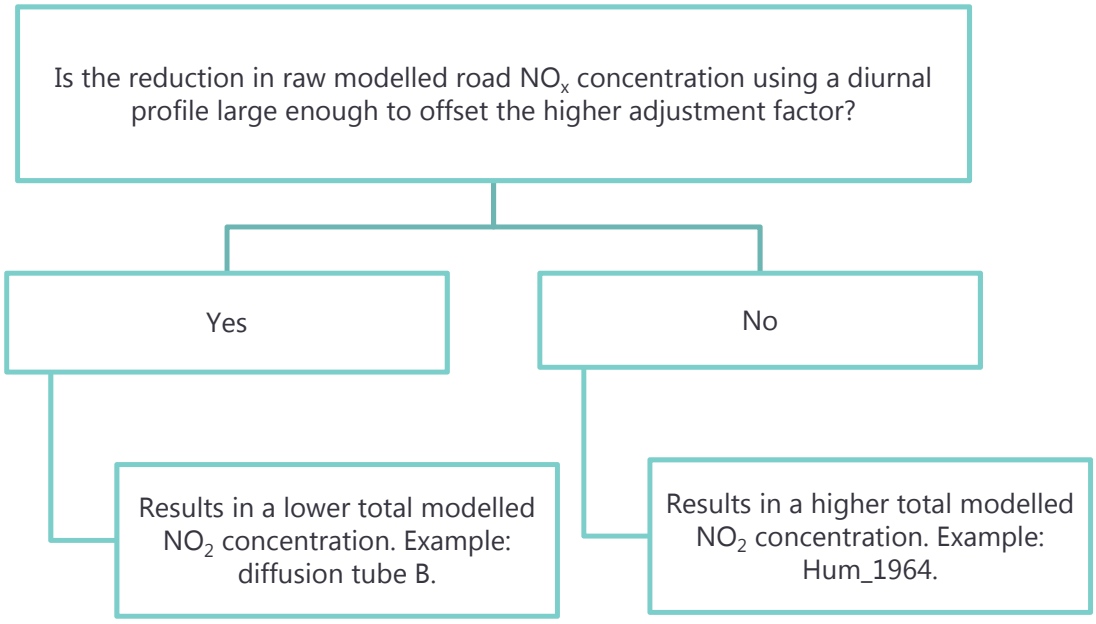


3.4.3 The data in Figure 3.3 compares the adjusted total modelled NO2 results for the No Profile and With Profile scenarios. For diffusion tubes B, C, E and F, using the diurnal profile results in lower total modelled NO2 concentrations. For diffusion tube D and Hum_1964 2020/2023 base/project, using the diurnal profile results in higher total modelled NO2 concentrations.

3.5 Discussion

3.5.1 The data in Table 3.5 and Figures 3.2 and 3.3 show that, for 4 of the receptors in this assessment, raw modelled roads NOx concentrations for the No Profile scenario are higher and therefore adjusted NO2 results at most receptors for the No Profile scenario are also higher, compared with those for the With Profile scenario. This is in spite of the higher adjustment factor derived for the With Profile scenario. At the other 2 receptors, diffusion tube D and Hum_1964, the reduction in raw NOx concentration as a result of using the diurnal profile is not significant enough to counteract the higher adjustment factor. Examples are shown in Figure 3.4 below.

Figure 3-4 Flow chart



3.5.2 The modelling demonstrates, therefore, that the use of a diurnal profile tends to reduce raw modelled road NOx concentrations, when compared with the No Profile scenario. However, the final, adjusted, total modelled NO2 results may increase or decrease, when compared with the No Profile scenario, due to the use of an adjustment factor.

The adjustment factor in the With Profile scenario has increased, because the ratio between the monitored road contribution NOx data and the modelled contribution NOx data has increased. This means that, where the use of a diurnal profile results in a decrease in raw modelled road NOx concentration that is significant enough to offset the increase in the adjustment factor, the overall total modelled NO2 result will be lower. However, the opposite is true if the diurnal profile results in a raw NOx concentration reduction that does not differ by a significant amount.

Appendix 1-1

Issued by	Approved by
Emma Dunabin	**Martin Peirce**

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