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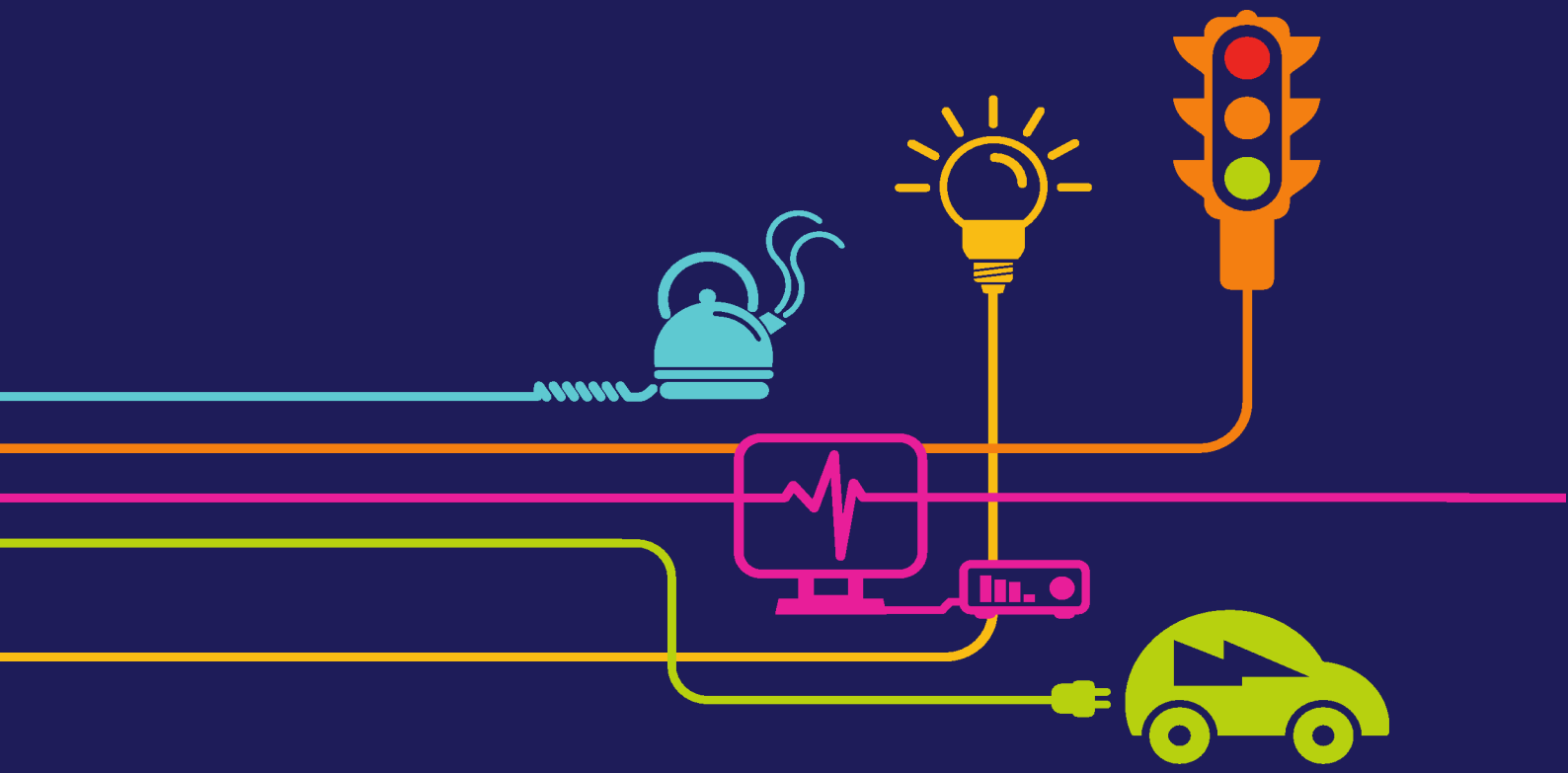
DOCUMENT 5.14

Environmental Statement Chapter 14 Air Quality

National Grid (North Wales Connection Project)

Regulation 5(2)(a) including (l) and (m) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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1 Introduction

1.1 INTRODUCTION

1.1.1 This chapter presents information about the air quality effects that have been identified that could result from the Proposed Development (as described in Chapter 3 Proposed Development Description (**Document 5.3**)). The chapter considers air quality and emissions within the Study Area (as defined in Section 6 study areas). It also identifies mitigation measures necessary to control air quality emissions to prevent any likely significant adverse effects resulting from the Proposed Development.

1.1.2 The main impacts to local air quality are likely to occur during the construction phase. Potential effects could occur as a result of impacts of fugitive emissions of airborne and deposited particulate matter generated by abrasive construction activities, and/or impacts of gaseous emissions from controlled sources (vehicles, construction plant etc.), including nitrogen dioxide (NO_2), particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$), from vehicle exhausts and energy generation plant exhausts.

1.1.3 The Proposed Development would not adversely affect air quality during its operational phase, which is limited to the maintenance of assets, including their refurbishment, to the extent that a significant effect could occur. Although there may be a need for emergency generators to be used during operation, for the limited periods when the mains supply would be temporarily unavailable, it is considered that the assessment of construction stage emergency generator use can be taken as a proxy for operational use. The energy demand during the construction phase would be greater than that of the operational phase. Through the Secretary of State's (SoS) scoping response, the operational air quality impact of the Proposed Development has been formally scoped out and is therefore not considered in this chapter.

1.1.4 Effects could result from maintenance of assets, including their refurbishment. Some refurbishment works may require the installation of temporary construction compounds, to facilitate these works; however, it is anticipated that such works would be infrequent, local in extent, and short-term in nature. Any emissions released would likely be of a magnitude that is undetectable from the natural variation in yearly air quality conditions.

1.1.5 The decommissioning of the Proposed Development is likely to have similar impacts to those identified during the construction phase, although the effect of such impacts on local air quality is likely to be less, due to the reduced scale of earthworks and fewer vehicle movements.

1.1.6 This chapter is supported by a number of Appendices as listed below:

- Appendix 14.1: Local Planning Policy (**Document 5.14.2.1**);
- Appendix 14.2: Construction Dust Assessment Method and Supporting Information (**Document 5.14.2.2**); and
- Appendix 14.3: Detailed Air Quality Modelling Assessment (**Document 5.14.2.3**).

1.1.7 Other chapters that are associated with this chapter are:

1.1.8 Chapter 9 Ecology and Nature Conservation (**Document 5.9**) – This chapter considers the significance of effect associated with air quality impacts on the ecological and nature conservation sites reported in the air quality assessment

1.1.9 Chapter 13 Traffic and Transport (**Document 5.13**) – This chapter reports the traffic impact of the Proposed Development, from which the traffic data used to inform the air quality assessment has been provided.

1.1.10 Chapter 19 Intra-project Cumulative Effects (**Document 5.19**) – This chapter considers the cumulative effects from the Proposed Development on receptors shared by other topics, for example construction noise and vibration, visual amenity, traffic and transport etc.

1.1.11 Reference is also made to the Construction Environmental Management Plan (CEMP) **(Document 7.4**), which sets out the mitigation measures that are relevant to this chapter.

1.1.12 All technical terms and abbreviations used within this chapter are defined in the Glossary **(Document 1.4)**.

2 Legislation and Planning Policy

2.1 INTRODUCTION

2.1.1 This section sets out the legislation and planning policy framework that is relevant to the air quality assessment. A full review of compliance with national and local planning policy is provided in the Planning Statement (**Document 7.14)** and a full review of relevant legislation is set out in the Legislation Compliance Audit **(Document 5.28.2.1**).

2.2 LEGISLATION

International

2.2.1 The Clean Air for Europe (CAFE) programme revisited the management of Air Quality within the EU and replaced the EU Framework Directive 96/62/EC (Ref 14.1), its associated Daughter Directives 1999/30/EC (Ref 14.2), 2000/69/EC (Ref 14.3), 2002/3/EC (Ref 14.4), and the Council Decision 97/101/EC (Ref 14.5) with a single legal Directive, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC (Ref 14.6).

National

2.2.2 Directive 2008/50/EC (Ref 14.6) is currently transcribed into UK legislation by the Air Quality Standards Regulations 2010 and the Air Quality Standards (Wales) Regulations 2010 (Ref 14.7), which came into force on 11th June 2010. This legislation sets limit values or objectives on levels of pollutants including nitrogen dioxide, sulphur dioxide and particulate matter PM_{10} and $PM_{2.5}$, which are binding on the UK and have been set with the aim of avoiding, preventing or reducing harmful effects on human health and on the environment as a whole.

Environment Act 1995

2.2.3 Part IV of the Environment Act 1995 (Ref 14.8) set out the responsibilities for local government in the management of local air quality. The UK National Air Quality Strategy (Ref 14.9) was initially published in 2000, under the requirements of the Environment Act 1995 (Ref 14.8); it covers Wales as well as the rest of the UK. The most recent revision of the strategy (Ref 14.10) sets objective values for key pollutants as a tool to help Local Authorities

manage local air quality improvements in accordance with the EU Air Quality Framework Directive.

Air Quality Wales Regulations 2000

2.2.4 Some of these objective values have been laid out within the Air Quality (Wales) Regulations 2000 (Ref 14.7).

2.2.5 The air quality objective values referred to above have been set down in regulation for the purposes of local air quality management. Under the local air quality management regime Isle of Anglesey County Council (IACC) and Gwynedd Council have a duty to carry out regular assessments of air quality against the objective values and if it is unlikely that the objective values will be met in the given timescale, they must designate an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) with the aim of achieving the objective values. The boundary of an AQMA is set by the governing local authority to define the geographical area that is to be subject to the management measures to be set out in a subsequent action plan. Consequently it is not unusual for the boundary of an AQMA to include within it relevant locations where air quality is not at risk of exceeding an air quality objective. The national air quality objective values for Wales for the pollutants of relevance to this assessment are displayed in Table 14.1.

Table 14.1 National Air Quality Objectives and Limit Values

Pollutant	Averaging Period	Objective Value	Maximum Permitted Exceedances
Human Health			
Nitrogen dioxide (NO_2)	Annual mean	40 μg/m^3	None
	Hourly mean	200 μg/m^3	18 times per year (99.79th percentile)
Particulate matter (PM_{10}) (1)	Annual mean	40 μg/m^3	None
	Daily mean	50 μg/m^3	35 times per year (90.41st percentile)
Fine particulate matter ($PM_{2.5}$) (1)	Annual mean	25 μg/m^3	None
Sulphur dioxide (SO_2)	Daily mean	125 μg/m^3	3 times per year (99.18th percentile)
	1 hour mean	350 μg/m^3	24 times a year (99.73rd percentile)

Table 14.1 National Air Quality Objectives and Limit Values			
Pollutant	Averaging Period	Objective Value	Maximum Permitted Exceedances
	15 minute mean	266 μg/m^3	35 times per year (99.90th percentile)
Ecology			
Oxides of Nitrogen (NO_X)	Annual mean	30 μg/m^3	None
	Daily mean	75 μg/m^3	None
Sulphur dioxide (SO_2)	Annual mean	10 μg/m^3 (2) 20 μg/m^3 (3)	None

(2) Where lichens are an interest feature of a designated site.

(3) Where lichens are not present.

2.3 NATIONAL POLICY

National Policy Statements

2.3.1 National Policy Statements set out the primary policy test against which the application for a DCO for the Proposed Development has been considered. The Overarching National Policy Statement for Energy (EN-1) (Ref 14.11) and National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 14.12) were adopted by Parliament in July 2011. EN-1 describes the requirements for an air quality assessment for energy and electricity infrastructure projects. EN-5 does not specifically reference air quality.

2.3.2 Specific references are made to the issue of air quality, and these are set out in Table 14.2, which also indicates where in the ES the required information is provided.

Table 14.2 Compliance with NPS (EN-1)	
NPS EN-1 Section	Where this is covered in the ES
5.2.1 Infrastructure development can have adverse effects on air quality. The construction, operation and decommissioning phases can involve emissions to air which could lead to adverse impacts on health, on	The air quality assessment described in this chapter considers the impact of the Proposed Development during its construction phase, on air quality sensitive human health and ecological receptors, and dust sensitive amenity,

Table 14.2 Compliance with NPS (EN-1)	
NPS EN-1 Section	Where this is covered in the ES
protected species and habitats, or on the wider countryside.	human health and ecologically sensitive receptors. Potential impacts during the decommissioning phase are considered to be no worse than those reported for construction phase impacts. In line with the SoS scoping response, operational air quality impacts have not been considered in this assessment. The limited emissions that would occur are considered to be no worse, and likely to be substantially better (shorter term, more localised and lower level) than those described for the construction phase.
5.2.3 A particular effect of air emissions from some energy infrastructure may be eutrophication, which is the excessive enrichment of nutrients in the environment. Eutrophication from air pollution results mainly from emissions of NOx and ammonia.	Road traffic and energy generation plant emissions are sources of NO_X that could increase nutrient nitrogen deposition. The impact of nitrogen emissions from these sources is considered within this chapter.
5.2.4 Emissions from combustion plants are generally released through exhaust stacks. Design of exhaust stacks, particularly height, is the primary driver for the delivery of optimal dispersion of emissions and is often determined by statutory requirements. The optimal stack height is dependent upon the local terrain and meteorological conditions, in combination with the emission characteristics of the plant.	The combustion plant associated with the Proposed Development would be for emergency use only and it is not anticipated that the plant would be operational for more than a few hours at a time. The assessment described within this chapter reports the impacts of the emergency generator plant on local air quality.
5.2.6 Where the Project is likely to have adverse effects on air quality the applicant should undertake an	This chapter and supporting appendices reports the method of assessing potential air quality impacts

Table 14.2 Compliance with NPS (EN-1)	
NPS EN-1 Section	Where this is covered in the ES
assessment of the impacts of the proposed project as part of the Environmental Statement (ES). 5.2.7 The ES should describe: - any significant air emissions, their mitigation and any residual effects distinguishing between the Project stages and taking account of any significant emissions from any road traffic generated by the Project; - the predicted absolute emission levels of the proposed project, after mitigation methods have been applied; - existing air quality levels and the relative change in air quality from existing levels; and - any potential eutrophication impacts.	(Section 4 and Appendix 14.2 (**Document 5.14.2.2**) and Appendix 14.3 (**Document 5.14.2.3**), the baseline against which impacts are compared (**Section 14.4**) and the impacts themselves (**Section 9 and Section 10**). Where the assessment identifies the need for mitigation, an assessment is made of residual impacts followed by the determination of significance, in line with relevant guidance.
5.2.8 Many activities involving air emissions are subject to pollution control. 5.2.9 The IPC should generally give air quality considerations substantial weight where a project would lead to a deterioration in air quality in an area, or leads to a new area where air quality breaches any national air quality limits. However air quality considerations will also be important where substantial changes in air quality levels are expected, even if this does not lead to any breaches of national air quality limits.	The assessment quantifies air quality impacts and determines whether resultant effects are significant or not in line with relevant guidance (Section 4, Section 9 and Section 10).
5.2.11 The IPC should consider whether mitigation measures are needed both for operational and construction emissions over and above any which may form part of the Project	The assessment process identifies where additional mitigation measures are required. The significance of any effect is then determined from the predicted residual impacts (Section 9).

Table 14.2 Compliance with NPS (EN-1)	
NPS EN-1 Section	Where this is covered in the ES
application. A construction management plan may help codify mitigation at this stage.	Air quality related mitigation measures applicable to the construction phase are also included within the CEMP (**Document 7.4**).

Planning Policy Wales, Edition 9 (2016)

2.3.3 Published in November 2016 (Ref 14.13), the current version of Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government.

2.3.4 With regards to local air quality, paragraph 13.10.4 of the document states that local authorities in Wales are to review and assess air quality in their areas, to determine whether air quality objectives are likely to be met, under the requirements of Part IV of the Environment Act 1995 (Ref 14.8). Where it is found that any of the air quality objectives are unlikely to be met, an AQMA must be declared and an Air Quality Action Plan (AQAP) must be developed.

2.3.5 PPW also states that the Local Air Quality Management reports produced by the Local Authorities of Wales should be used to inform development plan strategies and policies, which also need to be consistent and integrated with the strategies and policies contained within any AQAPs.

2.3.6 Where potential air quality impacts could affect the use and development of land considerations, with reference to the air quality objective values set out in the Air Quality Standards Regulations (2010) (Ref 14.7), and or Environmental Permit or Licence obligations, they can be material planning considerations.

2.3.7 The potential for pollution affecting the use of land will be a material consideration in deciding whether to grant planning permission. Material considerations in determining applications for potentially polluting development are likely to include:

'- location, taking into account such considerations as the reasons for selecting the chosen site itself;

- impact on health and amenity;

- the risk and impact of potential pollution from the development, insofar as this might have an effect on the use of other land and the surrounding environment (the environmental regulatory regime may well have an interest

in these issues, particularly if the development would impact on an Air Quality Management Area or a SAC);

- prevention of nuisance;

- impact on the road and other transport networks, and in particular on traffic generation; and

- the need, where relevant, and feasibility of restoring the land (and water resources) to standards sufficient for an appropriate after use. (Powers under the Pollution Prevention and Control Act 1999 require an operator to return a site to a satisfactory state on surrender of an Integrated Pollution Prevention and Control Permit).'

2.3.8 The weight attached to such considerations would depend on the overall effect on land use and amenity from the development.

Draft Planning Policy Wales, Edition 10 (2018)

2.3.9 Whilst the draft version of the PPW (Ref 14.14) has not been formerly adopted, a draft version was made available for consultation in February 2018. The draft PPW includes the following statement (paragraph 5.126), which is relevant to this assessment and not included within the current PPW (Edition 9) (Ref 14.13):

"'National air quality objectives are not 'safe' levels of air pollution. Rather they represent a pragmatic threshold above which government considers the health risks associated with air pollution are unacceptable. Air just barely compliant with these objectives is not 'clean' and still carries long-term population health risks. Nitrogen dioxide and particulate matter, which are the pollutants of primary national concern from a public health perspective, currently have no safe threshold defined and therefore the lower the concentration of those pollutants the lower the risks of adverse health effects. It is desirable to keep levels of pollution as low as reasonably practicable'

2.3.10 The draft PPW also includes the following statement regarding the combined impact of air quality with other factors, such as noise, which could harm the amenity of a location:

'Air and noise pollution are often, but not exclusively, emitted from the same sources, notably road transport, commercial and industrial activities. Consequently, areas of poor air quality often coincide or overlap with areas subject to high noise levels. Even where they do not, poor air quality at one location and high levels of noise at a neighbouring location may be related to one another, depending on the characteristics of the place in question,

including the way in in which people use and occupy places, the way in which uses and activities are juxtaposed and the way in which traffic is managed in the wider area. Where air and noise pollution are generated from the same source they should be considered and addressed together and links should be made with active travel and other strategies for reducing vehicular use.'

2.4 LOCAL PLANNING POLICY

2.4.1 In July 2017, Gwynedd Council and IACC jointly adopted the Joint Local Development Plan (JLDP). Policies in the JLDP that are relevant to air quality matters are included in Appendix 14.1 (**Document 15.4.2.1)**

2.5 OTHER GUIDANCE

World Health Organisation Guidelines

2.5.1 Whilst Welsh Government law (Ref 14.7) and air quality assessment guidance (Ref 14.15) reflect the air quality objective values set out within the current Air Quality Strategy (Ref.14.10), which is based on EU legislation (Ref.14.1), alternative air quality guidelines are also suggested by the World Health Organisation (WHO) (Ref 14.16). The WHO guidelines of relevance to this assessment are set out in Table 14.3. Notable differences from the air quality objectives are the lower concentrations for particulate and the absence of any allowable exceedances.

Table 14.3 WHO Air Quality Guidelines for the Protection of Human Health

Pollutant	Averaging Period	Objective Value	Maximum Permitted Exceedances
Nitrogen dioxide (NO_2)	Annual mean	40 μg/m^3	None
	Hourly mean	200 μg/m^3	None
Particulate matter (PM_{10})	Annual mean	20 μg/m^3	None
	Daily mean	50 μg/m^3	None
Particulate matter ($PM_{2.5}$)	Annual mean	10 μg/m^3	None
	Daily mean	25 μg/m^3	None

3 Scope of Assessment and Consultation

3.1 INTRODUCTION

3.1.1 This section describes the scope of the EIA, with reference to the Secretary of State's (SoS) Scoping Opinion, as well as other consultation with key consultees that has influenced the scope of the assessment work.

3.2 CONSULTATION

3.2.1 Meetings have been held with IACC, Gwynedd Council and Natural Resources Wales (NRW), to discuss the scope, methodology and assessment results of the air quality assessment, as described within this chapter. Chapter 5, EIA Consultation (**Document 5.5**) lists all the meetings which have taken place and the topics discussed.

3.2.2 Responses to comments from Stage 3 Consultation can be found in Chapter 5 Appendix 5.2 Schedule of responses to the Preliminary Environmental Information Report (**Document 5.5.2.2**) and the Consultation Report (**Document 6.1**). Responses to comments provided during the technical stakeholder review of the draft ES are provided in Chapter 5, Appendix 5.3 Schedule of responses to the technical stakeholder review of the draft Environmental Statement (**Document 5.5.2.3**).

3.3 SECRETARY OF STATE'S SCOPING OPINION

3.3.1 Table 14.4 outlines the issues that were raised in the Scoping Opinion and how these are being addressed in the ES.

Table 14.4: Issues Raised and Responses to the SoS Scoping Opinion

Para-graph	Issue Raised by SoS	Response
3.130	Paragraph 11.5.9 of the Scoping Report states that "*it may be necessary to undertake a baseline survey to monitor existing air quality*	Monitoring has been undertaken in line with an approach discussed with IACC and Gwynedd Council

Table 14.4: Issues Raised and Responses to the SoS Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
	conditions in the study area". The Applicant's attention is drawn to the comments of the Councils (see Appendix 3 of this Opinion) which advises that a year of NO_2, dust deposition or total suspended particulate and particulate matter monitoring should be undertaken.	The approach is discussed in Section 7 of this chapter.
3.131	Section 11.4 of the Scoping Report identifies the study area for dust as being *"the nearest human and/or ecologically sensitive receptors in all directions of any potentially dust generating construction activity…or public roads that link directly to construction site accesses".* However, Appendix 11.1 refers to dust sensitive receptors as those being located within 350m of the construction works or 200m of a road link that experiences cumulative additional traffic flow; the Secretary of State assumes these distances are based on IAQM guidance (Guidance on the assessment of dust from demolition and construction, 2014), and EPUK guidance. The ES should clearly and consistently identify the study area and any departures from the guidance that is referred to should be clearly explained and justified. The Secretary of State also recommends that the study areas are agreed with IACC and Gwynedd Council.	The assessment follows the approach set out in Institute of Air Quality Management Guidance (IAQM) (2014) guidance, as set out in Section 4 and Appendix 14.2 (**Document 5.14.2.2**). The IAQM guidance provide a more detailed approach to that described in the older EPUK guidance. The study area has been discussed with IACC and Gwynedd Council and is defined in Section 6 of this chapter.
3.132	The ES should clearly define what would comprise a *"potentially dust generating construction activity"*.	Described in Section 4 and Appendix 14.2 (**Document 5.14.2.2**).

Table 14.4: Issues Raised and Responses to the SoS Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
3.133	The Secretary of State notes that the relative sensitivity of ecological receptors to air quality impacts, as shown in Table 11.11 and paragraph 11.6.4 of the Scoping Report, would be medium-low. However, the IAQM 2014 guidance identifies ecological receptors as being of high sensitivity, for example locations with an international designation. The Secretary of State therefore advises the Applicant to reconsider the relative sensitivities of receptors.	The sensitivity of ecologically sensitive receptors has been reconsidered and is now informed by the level of designation, as described in Section 4 and Appendix 14.2 (**Document 5.14.2.**2).
3.134	The IAQM 2014 guidance also states that the distance of ecological receptors should be considered 50m from the site boundary; however paragraph 11.6.5 of the Scoping Report refers to 50m from *"construction activity"*. Any departures from guidance should be clearly explained and justified.	The assessment described in this chapter is consistent with the method described in IAQM (2014) guidance, as summarised in section 4 and Appendix 14.2 (**Document 5.14.2.2**).
3.135	The ES should fully assess the potential impacts of air pollution and dust on protected sites. Appropriate cross-reference should be made to the Ecology chapter. The Applicant's attention is drawn to the comments of NRW in this regard (see Appendix 3 of this Opinion).	The potential for significant effects of air quality impacts on protected sites has been discussed with the Project ecologists and is described in Section 9 of this chapter. Any specific effects on individual ecological receptors are reported in Chapter 9 Ecology and Nature Conservation (**Document 5.9**).
3.136	With reference to construction dust, the Scoping Report refers to describing scales of risk (high, medium and low), however does not clearly set out how these will be determined (i.e. by combining the	The assessment methodology is set out in section 4 of this chapter. the methodology is consistent with the method described in IAQM (2014) guidance, as summarised in

Table 14.4: Issues Raised and Responses to the SoS Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
	sensitivity of receptors with the impact magnitude as detailed in the IAQM guidance). Furthermore, it is unclear how the significance of effect (as described in Table 11.12 of the Scoping Report) will be determined. The assessment methodology should be clearly set out in the ES.	Section 4 and Appendix 14.2 (**Document 5.14.2.2**).
3.137	The Secretary of State welcomes the consideration of construction related vehicle emissions. Should a quantitative assessment be required, the Applicant should discuss the modelling with IACC and Gwynedd Council. It is unclear what a qualitative assessment would comprise, should one be undertaken; the ES should set out the methodology used.	A quantitative assessment of construction-related vehicle emissions has been undertaken adjacent to roads where the number of additional vehicles exceed the criteria described in relevant guidance, as set out in Section 4 and Appendix 14.3 (**Document 5.14.2.3**).
3.138	Paragraph 10.7.17 of the Scoping Report has identified the potential for non-road transport to be used. If this is the case, the air quality assessment should consider the potential impacts of emissions from other transportation methods.	The assessment of construction phase road traffic emissions considers the effect of emissions associated with vehicles using access tracks within the Order Limits. Emissions associated with Non-Road Mobile Machinery are considered in line with IAQM and EPUK guidance (2017), as discussed in Section 4. No other non-road transport methods are anticipated.
3.139	It is unclear what level of energy generation would necessitate a quantitative assessment of energy plant emissions; this should be agreed with IACC and Gwynedd Council.	The method of assessment of emergency generator emissions is described in Section 4 and Appendix 14.3 (**Document 5.14.2.3**). This has been

Table 14.4: Issues Raised and Responses to the SoS Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
		discussed with IACC and Gwynedd Council.
3.140	Air quality and dust levels should be considered not only on-site but also off-site, including along access roads, local footpaths and other PRoWs.	The assessment described in this ES is consistent with the method described in IAQM (2014) guidance, as summarised in Section 4 and Appendix 14.2 (**Document 5.14.2.2**).
3.141	Consideration should be given to appropriate mitigation measures and to monitoring dust complaints.	The assessment described in this ES, which defines the mitigation measures required, is consistent with the method described in IAQM (2014) guidance, as summarised in Section 4 and Appendix 14.2 (**Document 5.14.2.2**). Mitigation measures, including monitoring and the dust complaints procedure are described in Section 9 and within the CEMP (**Document 7.4**).
3.39 – 3.41	The Scoping Report proposes to scope out operational air quality effects as operation is not anticipated to generate dust or emissions from vehicles or energy generation plant in sufficient quantities to have a significant effect. Appendix 11.1 states that operational vehicle movements are not likely to be above the 500 light duty vehicle and 100 heavy duty vehicle criterion described in guidance for when a detailed assessment is likely to be required. On this basis, and given the nature of the proposed development, the Secretary of State agrees that	For the Proposed Development operational vehicle movements remain below the criteria given in EPUK and IAQM guidance (2017).

Table 14.4: Issues Raised and Responses to the SoS Scoping Opinion		
Para-graph	Issue Raised by SoS	Response
	operational air quality can be scoped out. However, should it be determined at a later stage that operational vehicle movements are likely to exceed the criterion set out in guidance, an assessment of operational air quality effects should be provided in the ES.	

3.4 UPDATES SINCE SCOPING

3.4.1 A summary of the comments and how they have been dealt with the current version of the assessment are provided in the following Appendices.

- Appendix 5.1 Schedule of responses to the Scoping Opinion;
- Appendix 5.2 Schedule of responses to the Preliminary Environmental Information Report (PEIR); and
- Appendix 5.3 Schedule of responses to the technical stakeholder review of the draft Environmental Statement.

3.5 SCOPE OF ASSESSMENT

3.5.1 The scope of assessment has been discussed with IACC, Gwynedd Council and NRW, and the following section summarises the approach taken.

3.5.2 The assessment includes qualitative assessment of construction (and decommissioning) phase dust impacts in line with IAQM guidance based on the distance of sensitive receptors to the Order Limits (being equivalent to the 'site boundary') and public roads leading to and from the Order Limits access points. (Ref 14.17).

3.5.3 The assessment includes quantitative assessment of construction phase road traffic emissions impacts, using the dispersion modelling software ADMS Roads, at locations where the number of additional vehicle movements as a result of the works has the potential to have an effect of significance, according to current guidance (Ref 14.15).

3.5.4 The assessment also includes quantitative assessment of construction phase emergency generator emissions, using the dispersion modelling software ADMS 5.

3.5.5 IACC has requested that the air quality assessment considers the impact of the Proposed Development against the WHO Guidelines (Ref 14.16) for annual mean concentrations of PM_{10} and $PM_{2.5.}$ Whilst the main assessment reports impacts against the air quality objective values set by the Welsh Government (Ref 14.7), in line with current guidance (Ref. 14.15), the assessment does also compare predicted total annual mean PM_{10} and $PM_{2.5}$ concentrations to the WHO guidelines.

3.5.6 Baseline surveys of nitrogen dioxide have been undertaken to determine existing concentrations at sites that are representative of sensitive locations adjacent to roads likely to be used by construction traffic. Data has been gathered passively over a period of four months and converted to represent an annual mean concentration following Defra guidance (Ref 14.18). The data gathered from this survey has been used to verify the road traffic emissions dispersion model, in line with the same guidance.

Welsh Language and Culture

3.5.7 Consideration has been given to the potential for this topic to impact on the Welsh language or culture in any way, drawing upon the assessment work undertaken for the Welsh Language Impact Assessment (**Document 5.26**). It has been concluded that there is no potential for the sources of effects or affected receptors dealt with in this chapter to have any effects upon the Welsh language or culture.

4 Methodology

4.1 INTRODUCTION

4.1.1 This section outlines the technical methods used to determine the baseline, how it could be affected by the Proposed Development (i.e. the impacts) and how significant the effects of these impacts are likely to be.

4.2 GUIDANCE SPECIFIC TO AIR QUALITY

4.2.1 There is currently no statutory guidance on the method by which an air quality impact assessment should be undertaken. The results of the assessment of air quality impacts have therefore been analysed and interpreted with reference to guidance published by non-statutory bodies:

- Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) Land-Use Planning and Development Control: Planning For Air Quality (Ref 14.15) – Provides guidance on how to screen whether or not a detailed air quality assessment is required, as a result of additional vehicle movements and their associated emissions. It also describes an approach on how to describe the effect of air quality impacts and how to determine if such effects are significant or not.

- IAQM Guidance on the assessment of dust from demolition and construction (Ref 14.17) – Contains guidance on how to undertake a risk-based assessment of dust emissions impacts from demolition and construction-related activities. It includes recommended dust mitigation measures, monitoring methodologies and how to determine whether or not the effects from dust emissions are significant or not. It also includes guidance on determining whether or not there is the need to quantify emissions to air from construction plant and machinery.

4.2.2 The assessment described in this chapter also makes use of appropriate sections within the following guidance, which is published by Government and international bodies:

- Defra Local Air Quality Management, Technical Guidance (TG16) (Ref 14.18) – Defra produced this and earlier versions of this guidance to assist local authorities with their Local Air Quality Management

responsibilities, as described within Part IV of the Environment Act (Ref 14.8). Specifically for this assessment, reference is made to the methods described in the guidance relating to the annualisation of measured period mean survey data and the verification of road traffic emissions dispersion model output. This guidance is applicable to Wales.

- Environment Agency 'Air Emissions Risk Assessment for your Environmental Permit' (Ref 14.19) – Produced by the Environment Agency (EA) and adopted by NRW, this guidance document was published to assist the operators of industrial activities with their application for an Environmental Permit. Specifically for this assessment, reference is made to the method described for the modelling of point source emissions and the determination of whether impacts have the potential to be significant or not at ecologically sensitive locations.

- At the request of IACC, predicted total concentrations of PM_{10} and $PM_{2.5}$ are also considered against the WHO guideline values for these pollutants (Ref 14.16), which are more stringent than the air quality objective values set out by the Welsh Government (Ref 14.7).

4.3 BASELINE DATA GATHERING AND FORECASTING METHODS

Primary Data

4.3.1 A baseline NO_2 diffusion tube (DT) survey has been undertaken to measure levels of NO_2 at selected roadside locations across the air quality study area that are considered representative the construction traffic routes. The purpose of the survey was to ascertain baseline air quality conditions and provide a dataset from which road traffic emissions dispersion model output could be verified.

Secondary Data

4.3.2 Data gathered from the following sources have been used to inform the air quality assessment:

- Hourly sequential meteorological data from the meteorological station at Mona airfield

- Defra background pollutant concentration maps (Ref 14.20)

- Defra's Emission Factor Toolkit, containing Department for Transport (DfT) vehicle emission rates (Ref 14.21)

- IACC pollutant monitoring and measurement data (Ref 14.22)
- Gwynedd Council pollutant monitoring and measurement data (Ref 14.22)

4.4 TECHNICAL ANALYSIS

Construction Phase Particulate Emissions

Overview

4.4.1 Fugitive emissions of airborne particulate matter (including dust) are readily produced through the action of abrasive forces on materials and therefore a wide range of site preparation and construction activities can have the potential to generate this type of emission, including:

- Demolition work;
- Earthworks, including the handling, working and storage of materials;
- Construction activities, such as the erection of buildings and structures; and
- The transfer of dust-making materials from the site onto the local road network, referred to as trackout.

4.4.2 Particulate matter in air is made up of particulates of a variety of sizes, and the concept of a 'size fraction' is used to describe particulates with sizes in a defined range. These definitions are based on the collection efficiency of specific sampling methods and each size fraction is especially associated with different types of particulate impact. In this assessment the term 'dust' is used to describe particulate matter in the size fraction 1 micrometre (µm) – 75 µm in diameter, as defined in BS 6069:1994 (Ref 14.23).

4.4.3 Particulates with an aerodynamic diameter in excess of 75 µm are unlikely to be carried by the wind and are more likely to settle at the source, rather than beyond the site boundary. Dust impacts are considered in terms of the change in airborne concentration and the change in the rate of deposition of dust onto surfaces.

4.4.4 Within the definition of dust, the size fraction called 'PM_{10}'[1] is composed of material with an aerodynamic diameter of less than 10 µm and it overlaps with the size fraction for dust. Air Quality Objectives for PM_{10} have been set for

[1] Which includes all particulate matter with an aerodynamic diameter of 10 µg/m^3 and less, including $PM_{2.5}$.

the protection of human health and the term PM_{10} is only used in this assessment when referring to the potential impact of emissions of particulate matter from demolition and construction activities on human health receptors. The short-term, 24 hour mean objective for airborne concentrations of PM_{10} is the appropriate Air Quality Objective for assessing the potential impact on health of short-term fugitive emissions from demolition and construction sites.

4.4.5 The IAQM adopts a broad description of how dust emission can impact upon the environment that includes the potential for changes in airborne concentration, changes in deposition rates and the risk to human health and public amenity, when considering the significance of effects from emissions of fugitive particulate matter. In this assessment, specific reference is made to the impacts associated with specific size fractions (dust, PM_{10}) within the assessment narrative, before considering the overall effect on receptors using an approach that is consistent with the IAQM's guidance (Ref 14.17).

4.4.6 A summary of potential impact types, receptors and the sensitivity of those receptors are provided in Table 14.5, which is based on information contained within IAQM guidance (Ref 14.17). The assessment uses the sensitivity of individual receptors to specified types of impact (dust soiling, human health and ecology) to determine the overall sensitivity of the study area, based on the number of high, medium and low sensitive receptors to the construction site boundary.

Table 14.5 Types of Impacts from Emissions of Particulate Matter

Nature of Impact	Receptor Types Affected	Relative Sensitivity	Relevant to this Assessment
Change in 24 hour mean PM_{10} concentrations	Residential properties Schools Hospitals and clinics	Receptor sensitivity was considered when Air Quality Objective Value was set	Yes
Change in rate at which air filtration units require maintenance	Hospitals and clinics	High	No
	Hi-tech industries	High	No
	Food processing industries	High	No

Table 14.5 Types of Impacts from Emissions of Particulate Matter			
Nature of Impact	Receptor Types Affected	Relative Sensitivity	Relevant to this Assessment
Change in the rate at which material accumulates on glossy surfaces, such as glass or paint work	Painting and furnishing operations	High	No
	Residential properties	Medium	Yes
	Schools	Medium	Yes
	Food retailers	Medium	Yes
	Offices	Medium	Yes
	Museums and Galleries	Medium	No
	Glasshouses	Medium	No
Change in the rate at which property or products becomes soiled by deposited material	Food processing industries	High	No
	Painting and furnishing operations	High	No
	Museum and galleries	High	No
	Residential Properties	High	Yes
	Food retailers	Medium	Yes
	Offices	Medium	Yes
	Horticultural land	Medium	No
Change in the rate at which mineral material is deposited onto vegetation	Ecological sites	High – Low	Yes
	Horticultural land	Medium – Low	No
	Agricultural land	Low	Yes
Change in chemical composition of	Ecological sites	High – Low	No
	Outdoor Storage	Medium – Low	No

Table 14.5 Types of Impacts from Emissions of Particulate Matter			
Nature of Impact	Receptor Types Affected	Relative Sensitivity	Relevant to this Assessment
mineral material deposited	Horticultural Land	Low	No
	Recreational green space	Low	No

4.4.7 Regarding dust soiling, research suggests that dust complaints may be likely where deposition rates are in excess of 140 milligram per square metre per day (mg/m^2/day) for open countryside and 200 mg/m^2/day for residential areas (Ref 14.24). Research also suggests that for most plant species in the UK, adverse effects are unlikely to be experienced at dust deposition rates of less than 200 mg/m^2/day (Ref 14.24).

4.4.8 Regarding airborne concentrations of PM_{10}, allowable concentrations are set by the national air quality objective values for annual mean and daily mean concentrations. The WHO have also published more stringent criteria for PM_{10} (Ref 14.16), although these are made available as guidelines, rather than legislation.

Assessment Method

4.4.9 The IAQM guidance (Ref 14.17) sets out the following steps for the undertaking of a detailed construction phase particulate matter assessment, which are described in more detail in Appendix 14.2 (**Document 5.14.2.2**):

- **Step 1:** Screen the Requirements for a Detailed Assessment
- **Step 2:** Assess the Risk of Dust Impacts
  - Step 2A: Define the Potential Dust Emissions Magnitude
  - Step 2B: Define the Sensitivity of the Area
  - Step 2C: Define the risk of Dust Impacts
- **Step 3:** Identify the Need for Site-Specific Mitigation
- **Step 4:** Define Impacts and their Significance

4.4.10 The emphasis of the regulation and control of construction particulate emissions should be the adoption of good working practices as standard. Good practice is a process that is informed by the assessment, which seeks

to avoid the potential for adverse effects. This approach assumes that environmental management, beyond those mitigation measures inherent in the proposed design, would be implemented during works to ensure potential significant adverse effects do not occur.

4.4.11 Examples of accepted good working practice include Building Research Establishment (BRE) guidance (Ref 14.25) and the IAQM guidance (Ref 14.17). Those practices that are applicable to the construction of the Proposed Development are set out within the CEMP (**Document 7.4**) for the Proposed Development.

Construction Phase Non-Road Mobile Plant Emissions

4.4.12 Emissions from construction Non-Road Mobile Machinery (NRMM), such as mechanical excavators, have the potential to increase NO_2 and PM_{10} concentrations locally when in use within the Order Limits. Experience of assessing the exhaust emissions from on-site plant (NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, due to the intermittent nature of their use within the confinement of the site boundary; in the vast majority of cases, they do not therefore need to be quantitatively assessed (Ref 14.17).

4.4.13 NRMM associated with the construction of the Overhead Line (OHL) would be limited to a small number of plant, including earth moving equipment required to remove topsoil and lay access tracks, piling equipment for pylon foundations, and a crane to support pylon construction work at height. Whilst OHL construction work would occur close (<100m) to some air quality sensitive locations, the number of such receptors would be limited. Furthermore, the linear nature of the OHL construction works would mean that emissions associated with these plant would be transient and generally only present in any particular location for a period of weeks, rather than months or years.

4.4.14 NRMM associated with the tunnel construction would require a wider variety and a larger number of plant operating at the same location for a longer period of time. However, whilst the tunnel construction work (including enabling works, shaft sinking and tunnelling) would take place over a number of years at the same locations, the duration of time during which the NRMM plant would be operational would vary depending upon the assigned tasks. The NRMM plant, the duration of operation during the tunnel construction works at both Braint Tunnel Compound and Tŷ Fodol Tunnel Compound, and their proximity to the nearest air quality sensitive receptors is summarised in Table 14.6.

Table 14.6 Tunnel Construction NRMM Plant Summary					
Phase of Works	Plant Description	Number of Plant	Approximate Hours of Operation	Approximate Distance to Nearest Air Quality Sensitive Receptor	
				Braint	Tŷ Fodol
Enabling Works	Excavator	2	941 hours over 14 weeks (2352 hours)	-[2]	-
	Dozer	2	941 hours over 14 weeks (2352 hours)	-	-
	Loading Shovel	2	941 hours over 14 weeks (2352 hours)	-	-
	Dumper	2	941 hours over 14 weeks (2352 hours)	-	-
	Vibro Roller	2	471 hours over 7 weeks (1176 hours)	-	-
	Drilling rig	1	269 hours over 4 weeks (672 hours)	-	-
	Grout Mixer	1	269 hours over 4 weeks (672 hours)	-	-
	Grout Pump	1	269 hours over 4 weeks (672 hours)	-	-
	Compressor	1	269 hours over 4 weeks (672 hours)	-	-
	Forklift	1	135 hours over 2 weeks (336 hours)	-	-
	JCB	1	135 hours over 2 weeks (336 hours)	-	-

[2] The distances between plant and receptors during the enabling works cannot be specifically defined, but are likely to be similar to the distances provided for the shaft sinking and tunnelling phases of the works.

Table 14.6 Tunnel Construction NRMM Plant Summary					
Phase of Works	Plant Description	Number of Plant	Approximate Hours of Operation	Approximate Distance to Nearest Air Quality Sensitive Receptor	
				Braint	Tŷ Fodol
	Agricultural Tractor and Trailer	1	101 hours over 2 weeks (336 hours)	-	-
	Mobile Crane (40t)	1	101 hours over 2 weeks (336 hours)	-	-
Shaft Sinking	Gantry Crane	1	2268 hours over 27 weeks (4536 hours)	270m	245m
	Mobile Crane	1	681 hours over 27 weeks (4536 hours)	270m	245m
	Grout Mixer	1	908 hours over 27 weeks (4536 hours)	285m	230m
	Grout Pump	1	908 hours over 27 weeks (4536 hours)	285m	230m
	Compressor	1	908 hours over 27 weeks (4536 hours)	285m	230m
	Loading Shovel	1	1134 hours over 27 weeks (4536 hours)	280m	240m
	Concrete Mixer	1	1815 hours over 27 weeks (4536 hours)	285m	230m
	Concrete Pump	1	908 hours over 27 weeks (4536 hours)	285m	230m
	Dumper	1	1361 hours over 27 weeks (4536 hours)	265m	250m
	Telehandler	1	1134 hours over 27 weeks (4536 hours)	280m	300m
	Forklift Truck	1	1134 hours over 27 weeks (4536 hours)	340m	230m

Table 14.6 Tunnel Construction NRMM Plant Summary					
Phase of Works	Plant Description	Number of Plant	Approximate Hours of Operation	Approximate Distance to Nearest Air Quality Sensitive Receptor	
				Braint	Tŷ Fodol
Tunnelling	Gantry Crane	1	1109 hours over 24 weeks (4032 hours)	270m	245m
	Mobile Crane	1	605 hours over 24 weeks (4032 hours)	330m	310m
	Loading Shovel	1	1613 hours over 24 weeks (4032 hours)	280m	240m
	Grout Mixer	1	1613 hours over 24 weeks (4032 hours)	285m	230m
	Grout Pump	1	1613 hours over 24 weeks (4032 hours)	285m	230m
	Telehandler	1	1210 hours over 24 weeks (4032 hours)	280m	300m
	Forklift Truck	1	1210 hours over 24 weeks (4032 hours)	340m	230m

4.4.15 Table 14.7 demonstrates the likely intermittent nature of the operation of the NRMM plant over the course of the tunnel construction works. It also demonstrates that whilst some air quality sensitive receptors would be located close to the Order Limits, they would be approximately 230-340 m away from the NRMM plant emissions sources. The exact location of NRMM plant during the enabling works is currently unknown, but their location would be likely to be similar to the location of NRMM plant during the shaft sinking and tunnelling phases of the works.

4.4.16 Emissions from NRMM associated with the OHL and tunnel construction would be temporary and localised and would be controlled via the application of emissions standards where appropriate and through best-practice mitigation measures (Ref 14.17), as listed within the CEMP **(Document 7.4)**. For that reason, construction phase NRMM emissions would not be likely to be significant and, therefore, have not been considered further in this assessment.

4.4.17 The assessment of road traffic emissions described within this chapter also considers emissions associated with vehicle movements on access racks.

Construction Phase Road Traffic Emissions

Overview

4.4.18 The incomplete combustion of fuel in vehicle engines results in the presence of a variety of pollutants including hydrocarbons (HC), such as benzene, 1,3-butadiene, sulphur dioxide (SO_2) and carbon monoxide (CO) in the exhaust emissions. However, it is the emission of NO_X (mainly in the form of nitric oxide (NO), which is then converted to nitrogen dioxide (NO_2) in the atmosphere) and particulate matter (PM_{10} and $PM_{2.5}$) in exhaust emissions that are the main pollutants of concern, due to their association with adverse effects on human health.

4.4.19 Although SO_2, CO, benzene and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated impacts on local air quality is not considered relevant in the context of the Proposed Development. Road traffic emissions of these substances have been reviewed by IACC and Gwynedd Council and nowhere within these administrative areas is at risk of exceeding the air quality objectives for these pollutants (Ref 14.22). Road traffic emissions of SO_2, CO and HC associated with the Proposed Development would not be capable of compromising the achievement of the relevant Air Quality Objectives for the protection of human health. Emissions of SO_2, CO and HC from road traffic emissions are therefore not considered further within this assessment.

4.4.20 Exhaust emissions from road vehicles could affect the concentrations of the principal pollutants of concern, i.e. NO_2 PM_{10} and $PM_{2.5}$, at sensitive receptors in the vicinity of the Proposed Development. Therefore, it is these pollutants that are the focus of the assessment of the significance of road traffic related air quality impacts.

Assessment Method

4.4.21 The assessment of impacts of construction phase road traffic emissions is required at locations where there is the potential for a significant effect to occur. The potential for a significant effect to occur has been determined by applying the screening criteria described in relevant guidance (Ref 14.15) to projected changes in traffic flow on the local road network.

4.4.22 Due to the duration of the construction phase, which is anticipated to extend just over 6 years, the potential for a significant effect to occur has been derived using the EPUK and IAQM guidance, which states that a detailed assessment is required where:

'The development will…

1) Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight).'

(Where a change of 500 or more LDV as Annual Average Daily Traffic flow (AADT) is considered to represent a significant change in the air quality study area.)

'2) Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).'

(Where a change of 100 or more HDV as AADT is considered to represent a significant change in the air quality study area.)

4.4.23 The traffic data used to inform the air quality assessment are summarised in Appendix 14.3 (**Document 5.14.2.3**). The data are based on the average daily number of additional vehicle movements associated with the Proposed Development for the peak construction year. Average daily movements are used, instead of the peak weekly movements discussed in Chapter 13 Traffic and Transport **(Document 5.13)**, in line with current guidance (Ref 14.15) and to allow comparison against the annual mean air quality objective values. Traffic data values are provided for two different options, one that assumes

tunnel construction using a Tunnel Boring Machine (TBM), and one that assumes tunnel construction using a Drill and Blast (Drill and Blast) method.

4.4.24 Table 14.7 shows the increase in average daily vehicle movements over the course of the peak year of construction on the road links affected, and which road links would exceed the criteria set by EPUK and IAQM (Ref 14.15). The location of the road Links is shown on Figure 14.1. It shows that the guidance criteria are exceeded on the A55 on Anglesey (Link refs: AQ2, AQ3, AQ4, AQ5 and 21) and in Gwynedd (Link refs: 21, AQ6, AQ7 and AQ8). The criteria are also exceeded on roads between the A55 and Langefni (Link refs: 8, 8.1 and 8.2), the access road at Tŷ Fodol (Link ref: F14), and roads linking the access track to the A55 (Link refs: 18, 19 and 20). Elsewhere, on the majority of the road links within the study area (77%) construction phase vehicle flows are below the guidance criteria, which suggest that any air quality effects at locations adjacent to them are unlikely to be significant.

Table 14.7: Screening of construction traffic routes

Link Ref	Traffic Route/Link	Increase in AADT (TBM)		Increase in AADT (Drill and Blast)		EPUK and IAQM Guidance Criteria Exceeded (Yes / No)
		LGV[1]	HGV[2]	LGV[1]	HGV[2]	
1	A5025 between A5 at Valley Crossroads and Wylfa.	48	39	48	39	No
2	A5 between A55 J3 and Valley Crossroads.	48	39	48	39	No
3	Unnamed Road (UR) 4 between B5111 and B2	6	13	6	13	No
4	B5111 between B5110 and Llanerchymedd	21	49	21	49	No
4.1	B5111 between Llanerchymedd access B8	21	49	21	49	No
5	B5110 between B5111 and access C8	11	31	11	31	No
6	B5420 / B5109 / Ffordd Cae Sel between LLR and B5111	36	87	36	87	No
7	B5420 between Llangefni Link Road and Access D4	22	16	22	16	No

Table 14.7: Screening of construction traffic routes						
Link Ref	Traffic Route/Link	Increase in AADT (TBM)		Increase in AADT (Drill and Blast)		EPUK and IAQM Guidance Criteria Exceeded (Yes / No)
		LGV[1]	HGV[2]	LGV[1]	HGV[2]	
7.1	B5420 between Access D4 and Four Crosses Roundabout.	22	16	22	16	No
8	A5114 between A55 J6 Llangefni Link Road.	44	**103**	44	**103**	**Yes**
8.1	Llangefni Industrial Estate Road between A5114 via existing carriageway to Llangefni Link Road	44	**103**	44	**103**	**Yes**
8.2	Llangefni Link Road between A5114 and the B5420.	44	**103**	44	**103**	**Yes**
9	A5025 between A55 J8 and Four Crosses Roundabout	22	16	22	16	No
11	UR 21 between Star and access E5.	5	10	5	10	No
11.1	UR 21 between Star Crossroads and Unnamed Road Star	5	10	5	10	No
12	A5152 between A55 J7 and A5.	78	57	85	77	No
13	A5 between A5152 and A55 J7a.	78	57	85	77	No
14	A4080 NCR8 / Llanddaniel Road between A5 and access E7	77	53	84	75	No
15	Pony Rhonwy Link between A5 and access F1	77	53	84	75	No
16	A4080 between A5 at Tollgate and F2.	77	53	84	75	No
17	A5 Between A55 J8a and A4080	77	53	84	75	No

Table 14.7: Screening of construction traffic routes						
Link Ref	Traffic Route/Link	Increase in AADT (TBM)		Increase in AADT (Drill and Blast)		EPUK and IAQM Guidance Criteria Exceeded (Yes / No)
		LGV[1]	HGV[2]	LGV[1]	HGV[2]	
18	A487 between B4547 and A55 J9.	113	**102**	108	91	**Yes**
18.1	A4087 between A55 J10 and A487	57	51	54	45	No
19	B4547 between A4244 and A487.	113	**102**	108	91	**Yes**
20	A4244 between A5 and B4547	113	**102**	108	91	**Yes**
AQ1	A55 west of J6	48	39	48	39	No
AQ2	A55 between J6 and J7	44	**103**	44	**103**	**Yes**
AQ3	A55 between J7 and J7a	131	**159**	139	**156**	**Yes**
AQ4	A55 between J7a and J8	131	**159**	139	**156**	**Yes**
AQ5	A55 between J8 and J8a	131	**159**	139	**156**	**Yes**
21	A55 Britannia Bridge between J8a and A55 J9	131	**159**	139	**156**	**Yes**
AQ6	A55 between J9 and J10	131	**159**	139	**156**	**Yes**
AQ7	A55 between J10 and J11	131	**159**	139	**156**	**Yes**
AQ8	A55 East of J11	113	**102**	108	91	**Yes**
22	B5109 between LLR and access D2	10	0	10	0	No
23	A5025 / Ffordd y Felin between Wylfa Access and Brynddu Road	12	0	12	0	No
24	B5110 between access C8 and UR 19	21	0	21	0	No
25	Brynddu Road Between Fordd y Felin and access B2	12	0	12	0	No
26	B5112 between A55 J5 and B5111	36	0	36	0	No

Table 14.7: Screening of construction traffic routes						
Link Ref	Traffic Route/Link	Increase in AADT (TBM)		Increase in AADT (Drill and Blast)		EPUK and IAQM Guidance Criteria Exceeded (Yes / No)
		LGV[1]	HGV[2]	LGV[1]	HGV[2]	
27	UR 1 between Brynddu Road and UR 4	12	0	12	0	No
28	UR8 between B5111 and access B11	36	0	36	0	No
29	UR9 between B5111 UR 10	36	0	36	0	No
30	Fodolydd Lane between B4547 and access F3	74	0	74	0	No
31	UR10 between B5111 and UR 9	36	0	36	0	No
32	UR 16 between B5420 and access E1	8	0	8	0	No
33	UR 19 between B5110 and access C6	10	0	10	0	No
34	Fodolydd Lane between B4547 and access F4 (enabling works only)	0	0	0	0	No
35	UR 3 between Brynddu Road and access A9	12	0	12	0	No
36	UR 3 between Brynddu Road and access A10	5	10	5	10	No
A4 - A2 - A1	access road A4 - A2 - A1	6	12	6	12	No
A3	access road A3	2	2	6	12	No
A5 - B2	access road A5 - B2	18	44	18	44	No
B5 - B4	access road B5 - B4	8	20	8	20	No
B7 - B8	access road B7 - B8	10	20	10	20	No

Table 14.7: Screening of construction traffic routes

Link Ref	Traffic Route/Link	Increase in AADT (TBM)		Increase in AADT (Drill and Blast)		EPUK and IAQM Guidance Criteria Exceeded (Yes / No)
		LGV[1]	HGV[2]	LGV[1]	HGV[2]	
B9 - C3	access road B9 - C3	12	32	12	32	No
C4 - C8	access road C4 - C8	14	38	14	38	No
C9	access road C9	2	2	2	2	No
C10 - D2	access road C10 - D2	2	6	2	6	No
D3 - D2	access road D3 - D2	6	18	6	18	No
D3 - D2	access road D4 - E2	2	6	2	6	No
E5 - E5A	access road E5 - E5A	6	18	6	18	No
E6	access road E6	4	6	4	6	No
E7	access road E7 - Braint SEC	77	53	84	75	No
F1C	access road F1C - Braint SEC	77	53	84	75	No
F1	access road F1 - Braint SEC	77	53	84	75	No
F14	Access Road Tŷ Fodol SEC - F14	113	**102**	108	91	**Yes**

[1] LGV (Light Goods Vehicles) have been used in this assessment to represent Light Duty Vehicles (LDV) which are vehicles that weigh less than 3.5 tonnes.

[2] HGV (Heavy Goods Vehicles) have been used in this assessment to represent Heavy Duty Vehicles (HDV) which are vehicles that weigh 3.5 tonnes or more.

4.4.25 The method by which the impact of additional vehicle emissions is quantified on the links that exceed the criteria, at selected representative air quality sensitive receptors located within 200 m of those links, is described in Appendix 14.3 (**Document 5.14.2.3**).

Construction Phase Emergency Generator Emissions

Overview

4.4.26 The construction of the shafts and tunnel for the crossing of the Menai Strait would require an energy demand of around 9.6 MW, mostly to power the tunnelling activity and associated ventilation fans. For the TBM option, the crossing would require the sinking of a drive shaft from which the TBM would be launched (with an energy demand for both the TBM and other shaft activities of 7.2 megawatt (MW)) and a reception shaft at the other end where the TBM would be retrieved (the activities at the reception shaft having an energy demand of 2.4 MW). Both tunnel drive from Braint and tunnel drive from Tŷ Fodol are considered in this assessment. For the Drill and Blast option, the energy demand is assumed to be distributed in the same manner between the Braint and Tŷ Fodol compounds. For both TBM and Drill and Blast options, it is proposed that the primary energy demand would be met by a low voltage power supply sourced from the Distribution Network Operator (Scottish Power Energy Networks).

4.4.27 In the event of power failure to the low voltage supply, the tunnelling works would be supported by eight emergency diesel-fired generators. For the TBM option, six generators would be sited at the drive shaft and two generators would be sited at the reception shaft. For the Drill and Blast option, four generators will be sited at both shaft sites. The generators would only operate as and when the low voltage supply could not meet the required energy demand, as well as for limited periods as part of a regular testing regime, to ensure that each generator is fit for purpose when required. The actual emergency generator that would be used on-site cannot be confirmed at this stage. For this assessment, therefore, the use of Caterpillar 3500 series diesel-fired generators has been assumed, as they are considered typical of the plant required to meet the energy demand anticipated.

4.4.28 The diesel-fired generators would have the potential to generate emissions of particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), hydrocarbons and sulphur dioxide (depending on the sulphur content of the fuel). However, it is emissions of NO_X that that are generally considered to be the most likely source of air quality impacts. Emergency generator emissions could impact on annual mean, daily mean and hourly mean concentrations of NO_X and NO_2, as a result of the generator testing regime and from any potential operation of the generators in the event of a power failure to the low voltage supply. At this stage, the generator testing regime is unknown and would only be devised as and when the generator specification is confirmed. It has been assumed for this assessment that each generator would be tested in isolation at 70 - 80% load (the load assumed for the generators to meet the energy

demand required for the Proposed Development) for a period of one hour per week, which is considered typical of a diesel emergency generator testing regime.

4.4.29 It is not possible to predict with any certainty the potential impacts associated with the operation of the generators in the event of a power failure to the existing low voltage supply, because it is not possible to predict how many hours per year that there could be a failure to the low voltage power supply, nor when those hours could occur, if at all. For longer term emergency generator emissions (i.e. emissions over the course of a year that would impact on annual mean pollutant concentrations), it has been assumed that eight emergency generators could be operational (six at the drive shaft and two at the reception shaft) simultaneously for up to 500 hours of the year (500 hours being selected as representing an emergency generator in line with the UK interpretation of the Medium Combustion Plant Directive (Ref 14.28)). The uncertainty for short-term emissions (24 hour and 1 hour averages) in the event of a power failure is even greater, in that the variation of hourly meteorological conditions, such as wind speed and direction, influence the efficiency of dispersion. For this assessment it has been assumed that the emergency generators could be operational over any daily or hourly period of the year, and therefore, emergency generator emissions would simultaneously occur with the worst meteorological conditions at each receptor location considered. In reality, this is unlikely to be the case.

4.4.30 Emergency generator emissions of PM_{10}, $PM_{2.5}$ (on human health) and SO_2 (for effects on ecological receptors) are also considered in this assessment.

The Assessment Method

4.4.31 The detailed assessment of emergency generator emissions is based on the method described in current Environment Agency guidance (Ref 14.19), which is applicable in Wales. This approach is summarised in Appendix 14.3 (**Document 5.14.2.3**). The impact of emissions is quantified at selected air quality sensitive receptors surrounding the Braint and Tŷ Fodol Construction Compounds. Where these receptors are located in close proximity to a source of road traffic emissions, the combined impact of emergency generator and road traffic emissions is reported.

4.4.32 To consider the impact on short term NO_2 concentrations, the assessment has also considered the approach set out in the Environment Agency's Briefing Note: *Diesel Generator Short Term NO_2 Impact Assessment* (Ref 14.26).

4.4.33 The Air Quality Modelling & Assessment Unit (AQMAU) of the Environment Agency completed an assessment of short-term NO_2 impacts associated with diesel generator operation. The report described a statistical methodology for assessing air quality impacts (with a focus on NO_2) for establishments with multiple generator sets, where the frequency and timing of operation is uncertain. It describes how a hypergeometric distribution can be used to randomly select multiple hours within a year (each with specific meteorological data) and predict the probability of an exceedance of the relevant air quality standard based on the number of random hours selected. A probability of less than 5% (i.e. a one in 20 year event) can be used as an indicator for "unlikely exceedances". This distribution analysis has been completed for the operation of the emergency generator plant at the Braint and Tŷ Fodol Tunnel Compounds.

4.5 ASSESSMENT CRITERIA

Construction Phase Dust Emissions

4.5.1 For amenity effects from coarser dust (>PM_{10}), the aim of the IAQM guidance is to bring forward a scheme, including mitigation measures if necessary, that would control impacts so that they give rise to effects that are not significant at the closest receptors. Measures that reduce dust emissions could also reduce emissions of finer particles (PM_{10}). In line with IAQM guidance (Ref 14.17), determination of whether an effect is likely to be significant or not is based on professional judgement, taking account of whether effects are permanent or temporary, direct or indirect, constant or intermittent and whether any secondary effects are caused (in this instance, secondary effects refer to dust that is generated and deposited (primary impact) and then re-suspended and deposited again by further activity).

4.5.2 The classification of dust soiling, health and ecological effects on receptors exposed to impacts has been assessed using the relationship between the magnitudes of impact identified, in combination with receptor sensitivity and other related factors where appropriate (as described in Appendix 14.2 (**Document 5.14.2.2**)). Following IAQM guidance (Ref 14.17), the effect of construction phase dust and PM_{10} impacts is classified as either significant or not significant, following the application of mitigation, as set out in Table 14.8.

Table 14.8: Definition of Significance of Fugitive Dust/PM_{10} Effects	
Significance of Effect	Change in Deposition Rate and/or Short-term PM_{10} Concentrations
Significant	Impact could cause annoyance to the extent that complaints are likely, and/or may cause irreversible harm to an ecological habitat. Increase in PM_{10} concentrations at a location where concentrations are already elevated to the extent that the PM_{10} air quality objectives are at risk of being exceeded. A finding of 'significant' for dust and PM_{10} means that the impact would be of such a level that it would have potential to contribute to cumulative effects with other types of effect or other development.
Not Significant	At worst, the impact may be perceptible, but of a magnitude or frequency that is unlikely to cause annoyance to a reasonable person or cause complaints, and/or would result in visible deposits on ecological habitat but would not cause harm. Impact would have a limited increase on short term PM_{10} concentrations at locations where concentrations are well below the annual mean PM_{10} air quality objective. A finding of 'not significant' for dust and PM_{10} means that the impact would be of such a low level that it would have no potential to contribute to cumulative effects with other types of effect or other development

Construction Phase Road Traffic and Emergency Generator Emissions

4.5.3 With regard to road traffic and controlled emissions from emergency generator plant, the change in pollutant concentrations with respect to baseline conditions has been described at receptors that are representative of exposure to impacts on local air quality within the study area. The assessment of the impact of road traffic and emergency generator emissions does not define a graduating scale of human health receptor sensitivity. Instead, human health receptors are considered either sensitive or not, depending on the period of time for which they are exposed to emissions. The absolute magnitude of pollutant concentrations in the baseline and construction phase scenario, in relation to the national air quality objectives, is described and this is used to consider the risk of the air quality objective values being exceeded.

4.5.4 For a change in annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$, of a given magnitude, IAQM and EPUK have published recommendations for describing the effects of such impacts at individual receptors (Ref 14.15).

These are set out in Table 14.9. Again, the shaded cells are those levels of significance considered to be significant in EIA terms.

Table 14.9: Effects Descriptors at Individual Receptors- Annual Mean NO_2, PM_{10} and $PM_{2.5}$ [1]						
Annual Mean NO_2 / PM_{10} Conc. At Receptor in Assessment Year ($\mu g/m^3$)	Change in Annual Mean Concentration of NO_2 / PM_{10}/$PM_{2.5}$ ($\mu g/m^3$ as a Proportion of the Objective Value)					Annual Mean $PM_{2.5}$ Conc. At Receptor in Assessment Year ($\mu g/m^3$)
	>10% Large	5% - 10% Medium	2% - 5% Low	1% - 2% Very Low	<1% Imperceptible	
≥43.8	Substantial	Substantial	Substantial	Moderate	Negligible	≥27.4
41.0 – 43.8	Substantial	Substantial	Moderate	Moderate	Negligible	25.6 – 27.4
37.8 – 41.0	Substantial	Moderate	Moderate	Minor	Negligible	23.6 – 25.6
30.2 – 37.8	Moderate	Moderate	Minor	Negligible	Negligible	18.9 – 23.6
≤30.2	Moderate	Minor	Negligible	Negligible	Negligible	≤18.9
[1] Adapted from EPUK and IAQM guidance (Ref.14.15)						

4.5.5 The IAQM and EPUK guidance (Ref.14.15) includes seven explanatory notes to accompany the terminology for the effect descriptors. In particular it is noted that the descriptors are for individual receptors only and that overall significance is determined using professional judgement. For example, a moderate effect on the worst effected receptors may not mean a moderate adverse effect overall, if the majority of selected receptors and those they represent experience a minor or negligible effect. Additionally, it is noted that it is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the objective value. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the objective value, rather than being exactly equal to it.

4.5.6 It should also be noted that in this instance, impacts associated with the construction of the Proposed Development are temporary and could last for the duration of the construction phase only.

4.5.7 A change in predicted annual mean concentrations of NO_2 or PM_{10} of less than 0.5% (0.2 $\mu g/m^3$) is considered to be so small as to be negligible, as is a change in predicted annual mean concentrations of $PM_{2.5}$ of less than 0.5% (0.12 $\mu g/m^3$). A change (impact) that is negligible, given normal bounds of variation, would not be capable of having a direct effect on local air quality that could be considered to be significant.

4.5.8 For emergency generator emissions, the assessment of potential short-term (daily mean and hourly mean) impacts has been carried out in accordance with the EA guidance for Environmental Permits (Ref 14.19). The short-term impacts reported in this chapter are considered 'insignificant' where:

- The process contribution (impact) is less than 10% of the short-term (daily mean and hourly mean) air quality objective; and/or
- The process contribution (impact) is less than 20% of the short-term (daily mean and hourly mean) air quality objective, minus twice the long-term (annual mean) background concentration.

4.5.9 For potential impacts on ecological habitat, the assessment has been undertaken in line with EA guidance for Environmental Permits (Ref 14.19) and, 'Technical guidance on detailed modelling approach for an appropriate assessment for emissions to air' (Ref.14.27). However, these guidance documents do not provide definitive advice on interpreting the likely effects on different habitats of changes in air quality or their significance. The

determination of whether the effect of the reported impact is significant or not is described in Chapter 9 Ecology and Nature Conservation (**Document 5.9**).

4.5.10 For European sites (Special Protection Areas (SPA), Special Areas of Conservation (SAC) or Ramsar sites), an assessment is made as to whether the 'installation' is 'likely to have a significant effect' (though note that there is no 'installation' as such as part of the Proposed Development). The assessment has considered European Sites located within 10 km of the emergency generators at the Braint and Tŷ Fodol Tunnel Compounds.

4.5.11 For Sites of Special Scientific Interest (SSSIs) the assessment needs to determine whether the Proposed Development is 'likely to damage' the site. The assessment considered SSSI located within 2 km of the emergency generators at the Braint and Tŷ Fodol Tunnel Compounds.

4.5.12 The EA's screening criteria for significance of the emission have been applied to the outcome of the dispersion modelling for both European and SSSI designations. The predicted process contribution (impact) have been compared with the appropriate air quality standards (including relevant ecological air quality objective values not covered by the EPUK/IAQM guidance and Environmental Standards suggested by the EA (Ref14.19)), referred to as Critical Levels and Critical Loads, to determine the significance of the pollutant emission. Critical Loads consist of a lower and upper range value, to reflect the variation in ecosystem response across similar habitats.

4.5.13 The total pollutant emission is defined in the EA's Risk Assessment guidance as being insignificant where:

- The long-term (annual mean) process contribution (impact) at European sites and SSSI is less than 1% of the long-term (annual mean) air quality objective, Critical Load and Critical Level, or where the long-term (annual mean) process contribution is more than 1%, the predicted environmental concentration (total pollutant concentration, including the contribution of the impact) is less than 70%;

- The long-term (annual mean) process contribution (impact) at other ecological sites is less than 100% of long-term (annual mean) air quality objective, Critical Load and Critical Level;

- The short-term process contribution (impact) at European sites and SSSI is less than 10% of the short-term air quality objective, Critical Load and Critical Level; and

- The short-term process contribution (impact) at other ecological sites is less than 100% of long-term (annual mean) air quality objective, Critical Load and Critical Level.

Overall Assessment of Significance

4.5.14 The significance of all of the reported effects is then considered for the development in overall terms. The potential for the Proposed Development to contribute to or interfere with the successful implementation of policies and strategies for the management of local air quality are considered, if relevant, but the principal focus is on any change to the likelihood of future achievement of the air quality objective values and/or other environmental standards, as set out in Table 14.1, for the following pollutants:

- Human Health Sensitive Receptors:
  - Annual NO_2 concentration of 40 µg/m^3;
  - Annual mean particulate matter (PM_{10}) concentration of 40 µg/m^3;
  - Annual mean fine particulate matter ($PM_{2.5}$) concentration of 25 µg/m^3;
  - 24-hour mean PM_{10} concentration of 50 µg/m^3 not to be exceeded on more than 35 times per year;
  - 1-hour mean NO_2 concentration of 200 µg/m^3 not to be exceeded on more than 18 times per year.
- Ecologically Sensitive Receptors
  - Annual mean oxide of nitrogen (NO_X) concentrations of 30 µg/m^3;
  - Annual mean sulphur dioxide (SO_2) concentrations of 10 to 20 µg/m^3;
  - Annual mean nutrient nitrogen deposition (N Dep) rates for the relevant habitats;
  - Annual mean acid deposition (A Dep) rates for the relevant habitats;
  - 24-hour mean NO_X concentration of 75 µg/m^3 not to be exceeded in a year.

4.5.15 Predicted impacts and resultant effects are determined as significant or not, depending on the relationship between the impacts and the total pollutant

concentrations experienced across the study area as a whole, rather than at individual properties. An overall effect across the study area that is moderate or substantial adverse would be considered to be significant.

4.5.16 The assessment also considers annual mean PM_{10} and $PM_{2.5}$ concentrations against the WHO air quality guidelines for these pollutants (Ref 14.16). These are:

- Human Health Sensitive Receptors:
  - Annual mean particulate matter (PM_{10}) concentration of 20 $\mu g/m^3$;
  - Annual mean fine particulate matter ($PM_{2.5}$) concentration of 10 $\mu g/m^3$;

5 Basis of Assessment

5.1 INTRODUCTION

5.1.1 This section sets out the assumptions that have been made in respect of the design flexibility maintained within the draft DCO, and the consideration that has been given to alternative scenarios and the sensitivity of the assessment to changes in the construction commencement year and duration.

5.1.2 Details of the available flexibility are included in Chapter 3 Description of Proposed Development, (**Document 5.3**), Chapter 4 Construction, Operation, Maintenance and Decommissioning (**Document 5.4**) and are also considered in Chapter 6 EIA Methodology (**Document 5.6**).

5.2 FLEXIBILITY ASSUMPTIONS

5.2.1 The main assessment has been undertaken based upon the design shown on the Works Plans (**Document 4.4**), the Construction Plans (**Documents 5.4.1.1 and 5.4.1.2**) and the Design Plans (**Document 4.13**). To take account of the flexibility allowed for in the draft DCO, consideration has been given to the potential for effects to be of greater significance should any of the permanent or temporary infrastructure elements be moved within the Limits of Deviation (LOD) or Order Limits. However the assessment is mostly based upon the proximity of receptors to the Order Limits, and the available flexibility is therefore incorporated in the assessment.

5.2.2 The assumptions made regarding the use of flexibility for the main assessment, and any alternative assessment, are set out in Table 14.10 below.

Table 14.10 Flexibility Assumptions		
Element of flexibility	Proposed Development assumption for initial assessment	Flexibility assumptions considered
Horizontal Limits of Deviation for pylons and conductors	The works are assessed assuming they could be up to the Order Limits i.e. as close as possible to any potential receptors. This assumption only relevant to the assessment of construction dust.	N/A
Vertical Limits of Deviation for pylons.	The height of the pylons is not relevant to any of the air quality impacts assessed.	N/A
Pylon footprint	The flexibility in pylon footprint area is not a factor that would influence the assessment of any of the air quality impacts.	N/A
Tunnel alignment within LOD	The only factors that could affect the assessment are the traffic numbers and routes. These are based on the quantity of rock generated by the indicative alignment, which is a reasonable worst case.	No additional assumptions have been assessed as the indicative alignment represents the longest tunnel alignment likely within the LOD.
Tunnel depth	Shaft/tunnel depths assessed at the depths described in Chapter 3 Description of Proposed Development (**Document 5.3**)	No additional assumptions have needed to be assessed as it is considered highly unlikely that shafts or tunnel gradients leading to a substantially greater depth would be used, as deeper shafts/tunnel than necessary would add engineering operational complexity and cost. Added to the fact that the traffic figures assessed are liberal it has not been necessary to take account

Table 14.10 Flexibility Assumptions		
Element of flexibility	Proposed Development assumption for initial assessment	Flexibility assumptions considered
		of any potential increase in tunnel arisings.
Tunnel construction compounds	Construction work could take place anywhere within the compounds area identified on the Works Plans (**Document 4.4**).	N/A
Braint and Tŷ Fodol THH/CSEC/ and Pentir Substation	The parameters shown on Design Plans (**Document 4.13**) make no difference to the air quality assessment.	N/A
Access tracks and working areas	Where traffic on the access tracks exceeds the criteria used in this assessment to trigger the quantification of road traffic emissions impacts (Section F (F14)), these access tracks have been assessed where they are currently shown on the Construction Plans (**Document 5.4.1.1**). However it was considered that the effect reported would be of no greater significance wherever the access tracks were placed within the Order Limits. Elsewhere, the location of access tracks and working areas are assumed at the worst-case location within the Order Limits for each receptor considered.	N/A

Table 14.10 Flexibility Assumptions		
Element of flexibility	Proposed Development assumption for initial assessment	Flexibility assumptions considered
Penmyndd Road Compound	Construction work could take place anywhere within the compounds area identified on the Works Plans (**Document 4.4**).	N/A
Pentir Construction Compound	Construction work could take place anywhere within the compounds area identified on the Works Plans (**Document 4.4**).	N/A
Third Party Services	It has been assumed that all third party services would be undergrounded within the LOD shown on the Third Party Services Construction Plans (**Document 5.4.1.2**) Associated access tracks would be located where they are currently shown on the Third Party Services Construction Plans (**Document 5.4.1.2**). The location of access tracks for third party services are assumed at the worst-case location within the Order Limits for each receptor considered.	N/A
Access tracks and working areas	The assessment has assumed access tracks and working areas could extend up to the closest point to any particular receptor (**Document 5.4.1.1**).	N/A

Construction Phase Dust Emissions

5.2.3 The assessment of construction phase particulate emissions is based on construction information identified in Section 2 of Chapter 4 Construction, Operation, Maintenance and Decommissioning of the Proposed Development **(Document 5.4)**. The IAQM guidance (Ref. 14.17) suggests a qualitative approach (see Appendix 14.2 (**Document 5.14.2.2**)) whereby the risk of dust impacts is determined via a range of scaled criteria for defined construction elements. Where the construction information does not provide a suitable comparison to the criteria listed in the guidance, the worst-case criteria have been selected for assessment.

5.2.4 The risk of dust impacts occurring is also informed by the proximity of dust sensitive receptors to the potential dust generating activities. In this assessment, this distance has been taken based on the proximity of each receptor to the Order Limits (equivalent to the 'site boundary' as defined by IAQM), thereby accounting for the spatial flexibility, such as that afforded within the LOD, associated with the Proposed Development.

Construction Phase Road Traffic Emissions

5.2.5 The assessment of construction phase road traffic emissions is informed by traffic information extrapolated from that reported in ES Chapter 13 Traffic and Transport **(Document 5.13)**, through the analysis of baseline survey data and projected equipment/material delivery requirements. The data used (as shown in Appendix 14.3 (**Document 5.14.2.3**)) are therefore subject to all flexibility assumptions detailed in section 5 of Chapter 13 Traffic and Transport **(Document 5.13)**.

5.2.6 The assessment was undertaken to consider the following scenarios:

- Existing baseline (2016) – to allow for the description of existing air quality conditions and for the verification of road traffic emissions dispersion model output.
- Future baseline (2023) – to provide benchmark air quality conditions in the study area, against which with-development air quality conditions can be compared to establish air quality impacts.
- Future with-development (TBM) (2023 – year of peak construction traffic) – to allow for the description of future air quality conditions, during construction, assuming the tunnel construction beneath the Menai Strait would be constructed by TBM.

- Future with-development (Drill and Blast) (2023 – year of peak construction traffic) – to allow for the description of future air quality conditions, with the development in construction, assuming the tunnel beneath the Menai Strait would be constructed by drill and blast.

5.3 OTHER ASSUMPTIONS AND LIMITATIONS

5.3.1 The air quality assessment is informed by the level of construction information available at this stage of the Proposed Development scheme design, and the traffic data made available for existing and future baseline and construction phase scenarios; however both are considered to be robust for the purposes of assessment.

5.4 CONSIDERATION OF SCENARIOS

5.4.1 Three sets of scenarios have been considered in the assessment. These are:

- Option A and B, as explained in Chapter 3, Description of the Proposed Development (**Document 5.3**);
- Direction and method of tunnelling (Scenarios 1 and 2 and 3) as explained in Chapter 4, Construction, Operation, Maintenance and Decommissioning (**Document 5.4**); and
- Construction traffic using the existing A5025 (Link 1) alignment or using the new alignment as proposed by Horizon Nuclear Power and as explained in Chapter 4, Construction, Operation, Maintenance and Decommissioning (**Document 5.4**).

5.4.2 Table 14.11 details where these scenarios are relevant to the assessment of ecology and nature conservation and how they have been assessed in section 9 mitigation and residual effects.

Table 14.11 Consideration of Scenarios

Option	How it has been considered within the assessment
Option A and B	The only element that could be influenced by the differences between the options is the construction dust assessment, because of the slight difference in Order Limits, and therefore the number of receptors within the distance bands around them. However, the change in OL does not influence the number of properties to the extent that the Options would report different effects. The assessment presented

Table 14.11 Consideration of Scenarios	
Option	How it has been considered within the assessment
	in section 9 is therefore appropriate for both options.
Direction and method of tunnelling (Scenario 1, 2 and 3)	The assessment in this chapter considers both possible tunnel directions, and a drill and blast scenario. The assessment is considered on a link by link basis and, as a result, links that would be affected differently, depending on tunnel direction, are always reported against the 'worst case' for their individual link. Scenario 3, adopting a drill and blast method, would require excavation of tunnel material at both ends, with the majority being extracted from Braint. Should the traffic levels on a given link under Scenario 3 exceed those that would be generated by either Scenario 1 or 2, the flows from Scenario 3 have been considered. The consideration of tunnelling direction and method also dictates the number of generators at each Tunnel Head House and Cable Sealing End Construction Compound, with the drive shaft having six emergency generators and the reception shaft having two.
Construction traffic using the existing A5025 (Link 1) alignment or using the new alignment as proposed by Horizon Nuclear Power	The offline works as proposed by Horizon Nuclear Power would involve the realignment of sections of the A5025 and the reconstruction and localised widening of the existing pavement. The realignment works would move the A5025 away from the most populated settlements along the A5025 between the A55 junction and Wylfa Newydd Power Station. Therefore inclusion of the A5025 works should be beneficial to the majority of sensitive receptors in the vicinity of the existing A5025, although there is the possibility of construction traffic using the realigned A5025 having a greater effect where isolated sensitive receptors are closer to the realigned route. However, due to the good standard of air quality conditions in both baseline and construction stage scenarios, the effect of construction traffic using the realigned A5025 on

Table 14.11 Consideration of Scenarios	
Option	How it has been considered within the assessment
	air quality impacts would be minimal and would not alter the conclusions of the assessment.

5.5 SENSITIVITY TESTS

Construction Start Date

5.5.1 Under the terms of the Draft DCO (**Document 2.1**), construction could commence in any year up to 2024. Consideration has been given to whether the potential mitigation or residual effects reported in this chapter would differ if construction were to commence in any year up to 2024.

5.5.2 Whilst there is assumed to be some year on year improvement in the future background air quality and vehicle emissions rates, within Defra's background pollutant maps (Ref 14.20) and DfT's vehicle emission factors toolkit (Ref 14.21), it is not anticipated that there would be substantial changes to the baseline air quality within this relatively short time period. Background traffic growth is likely to increase year on year up to and including the final year when construction could commence and therefore baseline traffic conditions are anticipated to increase as time progresses. Increased baseline traffic conditions would be less sensitive to increases in construction traffic and would be reflected by smaller proportional increases. Therefore the assumption that construction commences soon after grant of the DCO is considered to reflect a worst case for assessment.

5.5.3 It has therefore not been necessary to undertake a more detailed assessment for an alternative programme to that set out in Chapter 4, Construction, Operation, Maintenance and Decommissioning of the Proposed Development (**Document 5.4**).

Duration of Construction Activities

5.5.4 It is possible that some construction activities may take a longer or shorter length of time to complete than currently predicted in the construction programme used for the purposes of assessment. Certain assessment methodologies use defined durations when considering effects within the assessment, for example in relation to peak periods of construction, such as that considered for construction traffic effects (consideration is given to the peak week of traffic and the average weekly traffic over the peak year). To ensure a robust assessment, additional consideration has been given to any

difference in the effects as assessed should there be any increase or decreases in the duration of individual construction activities, or indeed the construction programme as a whole.

5.5.5 For air quality, it is considered that there is no potential for changes to the duration of construction activities, or the programme as a whole, to alter the assessment findings as reported in section 9 Mitigation and Residual Effects.

5.5.6 This is because much of the air quality assessment is based on annual average daily traffic data, annual hourly average meteorological data, annual measurement data and the consideration of impacts against annual mean air quality objectives. Furthermore, the assessment is informed by assumptions on vehicle emission rates and background pollutant concentrations that include no improvement upon conditions in 2016 (the existing baseline year used in this assessment). It is considered unlikely that any potential changes to the duration of construction activities or construction programme could influence the peak year annual average daily traffic movements to the extent that it would alter the conclusions of this assessment.

6 Study Area

6.1 INTRODUCTION

6.1.1 The air quality and emissions study area varies depending on the type of air quality impact being considered.

Construction Dust Emissions Study Area

6.1.2 Potential construction dust and particulate matter (particles with an aerodynamic diameter of less than 10 micrometres (PM_{10})) impacts are only likely to occur at locations where there are sensitive human receptors within 350 m of the Order Limits (taken to represent the construction site boundary in this assessment, though noting that construction works for the Proposed Development will not always extend to the full Order Limits), and/or within 50 m of a public road used by construction vehicles that is within 500 m of a site access point. Impacts could occur at ecologically sensitive areas where they are located within 50 m of the Order Limits and/or within 50 m of a public road used by construction vehicles that is within 500 m of a site access point. These assessment study areas are compliant with IAQM guidance (Ref 14.17)

Construction Road Traffic Emissions Study Area

6.1.3 Potential road traffic emissions impacts are only likely to occur where there are sensitive human and/or ecologically sensitive receptors within 200 m of an 'affected' road link (as defined by Highways England guidance (Ref 14.29), which has been adopted by the Welsh Government). For human receptors, an 'affected' road link is one that will experience a change in two-way traffic flow of 500 or more annual average daily LDV (vehicles <3.5 tonnes (referred to in this assessment as LGV)) and/or 100 or more annual average daily HDV (vehicles >3.5 tonnes (referred to in this assessment as HGV)), as defined within Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance (Ref 14.15). For ecology receptors, an affected link is one that could experience a change in two-way traffic flow of 1000 or more annual average daily LDV (LGV) and/or 200 or more annual average daily HDV (HGV) movements, as defined within Highways England guidance (Ref 14.29).

Construction Phase Emergency Generator Emissions Study Area

6.1.4 The area within which potential worst case emergency generator emissions impacts are likely to occur is dependent on the emissions characteristics of the emergency generator (location, height of release, and the volume and temperature of gas released). Although there is no fixed guidance on distances between source to receptor, significant emergency generator emissions impacts are considered unlikely to occur at distances of more than 1 kilometre (km) from individual sources, and this has therefore been set as the study area. The exception to this is the consideration of emergency generator emissions on sensitive ecological site. In line with the EA guidance (Ref 14.19), sensitive ecological sites with an international designation that are located within 10 km of the emergency generators and nationally designated sites located within 2 km of the emergency generators are considered in this assessment.

7 Baseline Conditions

7.1 INTRODUCTION

7.1.1 This section presents a description of baseline air quality within and surrounding the air quality study area that is representative of existing and future baseline conditions.

7.1.2 The existing environment, with regard to local air quality for human receptors, is summarised with reference to data published in IACC and Gwynedd Council Local Air Quality Management documents, the Welsh Air Quality Forum website (Ref 14.30) and background air quality information made available on the Defra air quality website (Ref 14.31). The background pollutant concentrations provided by Defra, which are based on the centre point of each 1 km by 1 km grid square across the UK, are projected to represent future years from a base year of 2013. There is currently some uncertainty in the rate of year on year improvement in background pollutant concentrations projected by Defra. As such, the 2013 data has been used to represent conditions in 2016 and 2023.

7.1.3 The existing environment, with regard to local air quality for ecological receptors, is summarised with reference to data published by the Air Pollution Information System (APIS) (Ref 14.32). These data are based on a base year of 2013 and provide concentrations and deposition rates for the centre point of each 5 km by 5 km grid square across the UK. APIS makes no projection on how the concentrations and deposition rates that they report evolve over future years. Due to the uncertainty in the rate of year on year improvement in background pollutant concentrations, the 2013 data provided by APIS has been used to represent conditions in 2016 and 2023.

7.1.4 A baseline survey to monitor existing concentrations of NO_2 at locations in the study area has also been undertaken. The survey consisted of a number of diffusion tubes situated at roadside locations on routes that (at the time of survey setup) were considered likely to facilitate Proposed Development construction traffic. The locations of the diffusion tubes are shown in Figure 14.2. The survey duration was 12 months, between March 2017 and March 2018, and the data gathered have been annualised to represent a projected annual mean concentration for the 2016 calendar year, following a method

described in Defra guidance (Ref 14.18). This process is summarised in Appendix 14.3 (**Document 5.14.2.3**).

7.1.5 A further survey to gather baseline particulate data will be undertaken prior to construction works commencing, at site boundary locations at the Penmynydd Road Construction Compound and Braint and Tŷ Fodol Construction Compounds, nearest to relevant dust sensitive receptors. Further details of this survey are provided in section 9 and within the CEMP (**Document 7.4**).

7.1.6 Advanced dispersion modelling software has been used to predict existing and future baseline concentrations at relevant air quality sensitive human and ecological receptor locations where there is the potential for the construction of the Proposed Development to have a significant effect on local air quality. The method of assessment is described in Appendix 14.3 (**Document 5.14.2.3**).

7.1.7 Baseline conditions are summarised for each Section of the Proposed Development in the sub-sections below.

7.2 SECTION A WYLFA TO RHOSGOCH

Air Quality Sensitive Receptors

7.2.1 Within Section A there are 244 receptors that are highly sensitive to dust soiling impacts and 242 receptors that are highly sensitive to human health impacts associated with construction dust, which are within 350 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There is one statutory, and two non-statutory ecological sites within 50 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There are also several Public Rights of Way (PRoW). These sensitive locations are shown on Figure 14.3 (**Document 5.14.1.3**).

7.2.2 The number of additional vehicles on the construction traffic routes and Access Tracks within and leading to Section A would not meet the screening criteria described in current guidance to suggest that a significant effect could occur (see Table 14.7), nor are the potential receptors in Section A located close enough to the Braint Tunnel Head House and Cable Sealing End Construction Compound to experience a significant impact from emergency generator emissions. Therefore, no air quality sensitive receptors with relation to road traffic and emergency energy generation emissions are considered in Section A.

Baseline Air Quality

IACC Sourced Monitoring Data

7.2.3 Existing data are available for some locations in the vicinity of and on the approach to Section A. These are summarised in Table 14.12.

7.2.4 The pollutant concentration data presented suggests that IACC consider air quality is of a good standard in and on the approach to Section A, and that there is little risk of the relevant air quality objective values being exceeded in the existing baseline scenario. The PM_{10} concentration measured at Felin Cafnan is elevated for such a rural location, but well below the air quality objective value. It is likely that elevated concentrations here are at least in part due to airborne concentrations of sea salt, blown in off the sea.

Table 14.12 Measurement and Monitoring Data – Section A Wylfa to Rhosgoch

Monitoring ID	Averaging Period	Concentration (µg/m3)					
		2011	2012	2013	2014	2015	2016
Nitrogen Dioxide (NO2)							
DT13 – Maes Cynfor, Cemaes (Roadside)1	Annual	6.9	7.2	-	-	-	6.7
DT12 – Ffordd Caergybi, Cemaes (Roadside)	Annual	-	-	-	-	-	9.0
DT11 – A5025, Tregele1	Annual	6.2	6.8	-	-	-	10.2
DT10 – A5025, Llanfellech Crossroads	Annual	-	-	-	-	-	7.0
DT9 – A5025, Llanfaethlu	Annual	6.2	6.8	-	-	-	9.5
DT8 – A5025, Llanfachraeth	Annual	6.2	6.8	-	-	-	9.9
DT7 – A5025, Valley	Annual	-	-	-	-	-	15.3
DT6 – A55 Junction 4	Annual	-	-	-	-	-	11.3
DT5 – Bridge over A55	Annual	-	-	-	-	-	9.5

Table 14.12 Measurement and Monitoring Data – Section A Wylfa to Rhosgoch							
Monitoring ID	Averaging Period	Concentration (μg/m3)					
		2011	2012	2013	2014	2015	2016
Particulate Matter (PM10)							
CM3 – Felin Cafnan	Annual	-	-	-	-	34.8	14.9
	Daily Exc.						
Particulate Matter (PM2.5)							
CM3 – Felin Cafnan	Annual	-	-	-	-	-	7.4
1 Measurement locations moved after 2012							

7.2.5 Some data gathered by IACC are also available for the rate of dust deposition within this Section of the study area. IACC has measured dust deposition over the past few years at several locations in the vicinity of the existing Magnox site. These data are summarised in Table 14.13.

7.2.6 The dust deposition data shown in Table 14.13, which are typical of background conditions across much of the island, are well below the rates that research suggests are likely to cause complaints from members of the public (Ref 14.24) or long-term harm to ecological habitats (Ref 14.29).

Table 14.13 Existing Background Dust Deposition Data – Section A Wylfa to Rhosgoch						
Description	Dust Deposition Rate (mg/m^2/day)					
	2010	2011	2012	2013	2014	2015
Henwaith	96.0	66.4	33.3	-	-	-
Cafnan	-	-	33.9	-	-	-
Clovelley	-	-	26.4	-	-	-
Douglas Inn	-	-	26.1	-	-	-
Wylfa	-	-	-	33.3	-	-
Felin Cafnan	-	-	-	-	-	35.4
Tyddyn Sydney	-	-	-	-	-	43.8

Defra Sourced Background Data

7.2.7 Existing background pollutant concentration data for the centre point of the 1 km by 1 km grid squares through which Section A passes have been sourced from Defra background pollutant concentration data maps. These projected data are summarised in Table 14.14 for 2016 (to represent conditions in 2016 and 2023). Annual mean background pollutant concentrations in Section A are well below the respective national air quality objectives.

Table 14.14 Existing Defra Background Pollutant Concentration Data – Section A Wylfa to Rhosgoch

Statistic Across All 1 km by 1 km Grid Squares in Section A	Averaging Period Concentration (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
Maximum	5.7	10.2	6.9
Minimum	3.2	7.6	4.8
Average	3.5	8.6	5.5
Air Quality Objective Value	**40**	**40**	**25**

Proposed Development Specific Measurement Data

7.2.8 Construction traffic would access Section A via the A5025 from Valley (Link 1). Two NO_2 diffusion tubes were located on this route, one adjacent to the A5 (Link 2), on the approach to the crossroads with the A5025 in Valley, and a second adjacent to the A5025 at Llanfachraeth (Link 1). The projected annual mean concentrations for 2016 at these locations are summarised in Table 14.15 and show that concentrations in Valley (A1) are well below the national air quality objective value for NO_2 (40 µg/m^3). Concentrations are lower in Llanfachraeth (A2), where traffic flows are generally lower and more free-flowing.

Table 14.15 Proposed Development NO_2 Measurement Data – Section A Wylfa to Rhosgoch

Monitoring ID	Grid Reference		Averaging Period	2016 Concentration (µg/m^3)
	X	y		
A1 – Valley	229473	379249	Annual	17.2
A2 – Llanfachraeth	231640	382129	Annual	6.7
Air Quality Objective Value				**40**

7.3 SECTION B, RHOSGOCH TO LLANDYFRYDOG

Air Quality Sensitive Receptors

7.3.1 Within Section B there are 108 receptors that are highly sensitive to dust soiling impacts and 107 receptors that are highly sensitive to human health impacts associated with construction dust, which are within 350 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There are no statutory or non-statutory ecological sites within 50 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There are several PRoW that cross or pass near to this section. These sensitive locations are shown on Figure 14.3.

7.3.2 The number of additional vehicles on the construction traffic routes and Access Tracks within and leading to Section B would not meet the screening criteria described in current guidance to suggest that a significant effect could occur (see Table 14.7). Nor are the potential receptors in Section B located close enough to the Braint Tunnel Head House and Cable Sealing End Construction Compound to experience a significant impact from emergency generator emissions. Therefore, no air quality sensitive receptors with relation to road traffic and emergency energy generation emissions are considered in Section B.

Baseline Air Quality

IACC Sourced Monitoring Data

7.3.3 No existing, publicly available IACC sourced monitoring or measurement data is available for Section B of the OHL. The absence of data collection in the area suggests that IACC consider air quality is of a good standard in the vicinity of Section B.

7.3.4 The rural characteristics of Section B are similar to those in Section A. As such, existing baseline air quality and dust deposition conditions are likely to be similar to that reported for that section.

Defra Sourced Background Data

7.3.5 Background pollutant concentration data for the centre point of the 1 km by 1 km grid squares through which Section B passes have been sourced from Defra background pollutant concentration data maps. The data are summarised in Table 14.16 for 2016 (to represent conditions in 2016 and 2023). Annual mean background pollutant concentrations in Section B are

well below the relevant national air quality objective values and are similar to the values reported for Section B.

Table 14.16 Existing Background Pollutant Concentration Data – Section B Rhosgoch to Llandyfrydog			
Statistic Across All 1 km by 1 km Grid Squares in Section B	Averaging Period Concentration (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
Maximum	3.7	9.8	6.4
Minimum	3.2	8.3	5.3
Average	3.4	8.7	5.6
Air Quality Objective Value	**40**	**40**	**25**

Project Specific Measurement Data

7.3.6 Proposed Development construction traffic could access Section B via the A5111 from Llanerchymedd. A single NO_2 diffusion tube was located on this route, adjacent to the A5111 through Llanerchymedd. The projected annual mean concentrations for 2016 at this location is summarised in Table 14.17, which shows that concentrations at roadside locations in Llanerchymedd (A3) are well below the national air quality objective value for NO_2.

Table 14.17 Proposed Development NO_2 Measurement Data – Section B Rhosgoch to Llandyfrydog				
Monitoring ID	Grid Reference		Averaging Period	2016 Concentration (µg/m^3)
	x	Y		
A3 – Llanerchymedd	241842	384303	Annual	14.0

7.4 SECTION C LLANDYFRYDOG TO B5110 NORTH OF TALWRN

Air Quality Sensitive Receptors

7.4.1 Within Section C there are 86 receptors that are highly sensitive to dust soiling impacts and 83 receptors that are highly sensitive to human health impacts associated with construction dust, which are within 350 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There is 1 statutory and 1 non-statutory ecological site within 50 m of the Order Limits and/or 50 m of a Construction Traffic Route that is

within 500 m of a site access point. There are a limited number of PRoW that cross or pass near to this section. These sensitive locations are shown on Figure 14.3.

7.4.2 The number of additional vehicles on the construction traffic routes and Access Tracks within and leading to Section C would not meet the screening criteria set out in current guidance, which are used to determine if a significant effect could occur (see Table 14.7). The potential human health receptors in Section C are not located close enough to the Braint Construction Compound to experience a significant impact from emergency generator emissions. No air quality human health sensitive receptors are therefore considered in Section C in relation to road traffic and emergency energy generation emissions.

7.4.3 There are a limited number of internationally designated ecological receptors in Section C that are located within 10 km of the emergency generators at the Braint Construction Compound (represented by AQ/C/E01 and AQ/C/E02). In line with EA guidance (Ref. 14.19), impacts are quantified at the ecological sites summarised in Table 14.18 and shown in Figure 14.4.

Table 14.18 Selected Ecologically Sensitive Receptors – Section C Llandyfrydog to B5110 north of Talwrn

Receptor ID	Ecological Receptor	Location[1]		APIS Habitat Description
		x	y	
AQ/C/E01	Corsydd Mon SAC at Llanddyfnan (west)	249926	378760	Heathland and fen
AQ/C/E02	Corsydd Mon SAC at Llanddyfnan (east)	251058	378510	Heathland and fen

Baseline Air Quality

IACC Sourced Monitoring Data

7.4.4 Existing data are available for a limited number of locations in the vicinity of Section C of the OHL and are summarised in Table 14.19.

7.4.5 The pollutant concentration data presented and the limited amount of data gathered in the area suggest that IACC consider air quality to be of a 'good' standard in the vicinity of Section C and that there is little risk of the relevant national air quality objective values being exceeded in the existing baseline scenario. The table below indicates some variation in the limited data

gathered; though yearly variation is not unusual, particularly in areas where concentrations are already so low.

Table 14.19 Measurement and Monitoring Data – Section C Llandyfrydog to B5110 north of Talwrn

Monitoring ID	Averaging Period	Concentration (μg/m^3)					
		2011	2012	2013	2014	2015	2016
Nitrogen Dioxide (NO_2)							
Tre-Ysgawen Hall, Capel Coch Diffusion Tube (Background)	Annual	-	4.9	7.3	-	-	-
Particulate Matter (PM_{10})							
CM1 – Llynfaes Continuous Monitoring Station (Industrial)	Annual	14.2	25.4	19.2	13.8	17.2	18.8
	Daily Exc.	-	8	5	2	2	4
CM2 – Brynteg Continuous Monitoring Station (Industrial)	Annual	17.9	15.6	15.2	17.6	13.1	8.1
	Daily Exc.	-	4	0	6	3	-
Fine Particulate Matter ($PM_{2.5}$)							
CM1 – Llynfaes Continuous Monitoring Station (Industrial)	Annual	-	-	-	-	-	6.1
CM2 – Brynteg Continuous Monitoring Station (Industrial)	Annual	9.0	-	7.0	7.0	8.0	4.0

7.4.6 No dust deposition data are available within or near to Section C of the OHL. Background deposition rates in and around Section C (i.e. at locations away from major sources of dust) are likely to be similar to those reported for Section A (see Table 14.13) and are not likely to cause complaints from members of the public or long-term harm to ecological habitats.

Defra Sourced Background Data

7.4.7 Existing background pollutant concentration data has been sourced from Defra background pollutant concentration data maps for the centre point of the 1 km by 1 km grid squares through which Section C passes. These projected data are summarised in Table 14.20 for 2016 (to represent conditions in 2016 and 2023). Annual mean background pollutant concentrations in Section C are well below the respective national air quality objectives.

Table 14.20 Existing Background Pollutant Concentration Data – Section C Llandyfrydog to B5110 north of Talwrn

Statistic Across All 1 km by 1 km Grid Squares in Section C	Averaging Period Concentration (μg/m3)		
	NO_2	PM_{10}	$PM_{2.5}$
Maximum	4.1	9.7	6.1
Minimum	3.3	8.2	5.2
Average	3.5	8.7	5.5
Air Quality Objective Values	**40**	**40**	**25**

APIS Sourced Background Data

7.4.8 Background pollutant concentration data for the centre point of the 5 km by 5 km grid squares nearest to the ecologically sensitive receptors in Section C has been sourced from APIS. The data is summarised in Table 14.21 for the APIS base year of 2016 (to represent conditions in 2016 and 2023).

7.4.9 Annual mean and daily mean background pollutant concentrations in Section C are well below the respective national air quality objectives at the ecological receptor sites considered. Annual mean background deposition rates for nutrient nitrogen and acid as nitrogen are already in excess of the lower Critical Load values, but well below the higher Critical Load Values. Annual mean background deposition rates for acid and acid as sulphur are below the Critical Load values for those pollutants.

Table 14.21 Existing Background Pollutant Concentration Data – Section C Llandyfrydog to B5110 north of Talwrn

Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Deposition Rate			
		Annual mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
AQ/C/E01	Corsydd Mon SAC at Llanddyfnan (west)	6.2	9.3	0.9	15.5	1.23	1.11	0.16
AQ/C/E02	Corsydd Mon SAC at Llanddyfnan (east)	6.3	9.5	0.9	14.0	1.13	1.00	0.17
Air Quality Objective, Critical Level, Critical Load		**30**	**75**	**10**	**15 – 20**	**0.920–8.883**	**0.633–4.283**	**0.287–4.600**

Proposed Development Specific Measurement Data

7.4.10 The route of the OHL in Section C is proposed to pass to the east of the hamlet of Capel Coch. Diffusion tube Capel Coch (A4) was located adjacent to the road that passes through the hamlet. Proposed Development construction HGV traffic is proposed to access Section C via the B5111, north of Llangefni. A single NO_2 diffusion tube was located on this route, at Rhosmeirch.

7.4.11 The projected annual mean concentrations for 2016 at these locations are summarised in Table 14.22. It shows that concentrations in both Capel Coch (A4) and Rhosmeirch (A5) are well below the national air quality objective value for NO_2.

Table 14.22 Proposed Development NO_2 Measurement Data – Section C Llandyfrydog to B5110 north of Talwrn

Monitoring ID	Grid Reference		Averaging Period	2016 Concentration ($\mu g/m^3$)
	x	y		
Capel Coch – A4	245857	382121	Annual	5.1
Rhosmeirch – A5	245717	377178	Annual	8.4
Air Quality Objective Value				**40**

Predicted Existing Baseline Pollutant Concentration Data

7.4.12 Modelled predictions of existing baseline concentrations of annual mean and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition are provided in Table 14.23, for the ecological receptors considered in Section C.

Table 14.23 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section C Llandyfrydog to B5110 north of Talwrn

Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Annual Mean Deposition Rate			
		Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
AQ/C/E01	Corsydd Mon SAC at Llanddyfnan (west)	6.2	9.3	0.9	15.5	1.23	1.11	0.16
AQ/C/E02	Corsydd Mon SAC at Llanddyfnan (east)	6.3	9.5	0.9	14.0	1.13	1.00	0.17
Air Quality Objective, Critical Level, Critical Load		**30**	**75**	**10**	**15 – 20**	**0.920–8.883**	**0.633–4.283**	**0.287–4.600**

Predicted Future Baseline Pollutant Concentration Data

7.4.13 Modelled predictions of future baseline concentrations of annual mean and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition are provided in Table 14.24, for the ecological receptors considered in Section C.

7.4.14 The table shows that the pollutants considered remain at background levels. Again, this is because they are not located in close proximity to any sources that have been modelled in the future baseline scenario.

Table 14.24 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section C Llandyfrydog to B5110 north of Talwrn

Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Annual Mean Deposition Rate			
		Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
AQ/C/E01	Corsydd Mon SAC at Llanddyfnan (west)	6.2	9.3	0.9	15.5	1.23	1.11	0.16
AQ/C/E02	Corsydd Mon SAC at Llanddyfnan (east)	6.3	9.5	0.9	14.0	1.13	1.00	0.17
Air Quality Objective, Critical Level, Critical Load		**30**	**75**	**10**	**15 – 20**	**0.920–8.883**	**0.633–4.283**	**0.287–4.600**

7.5 SECTION D B5110 NORTH OF TALWRN TO THE CEINT

Air Quality Sensitive Receptors

7.5.1 Within Section D there are 55 receptors that are highly sensitive to dust soiling impacts and 55 receptors that are highly sensitive to human health impacts associated with construction dust, which are within 350 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There is 1 statutory and 2 non-statutory ecological sites within 50 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There are also some PRoW located in this section. These receptors are shown in Figure 14.3.

7.5.2 The number of additional vehicles on the construction traffic routes and Access Tracks within and leading to Section D exceed the guidance criteria to suggest that a significant effect could potentially occur on the following links:

- Link Ref 8 – A5114 between A55 and the new Llangefni Link Road;
- Link Ref 8.1 – Llangefni Industrial Estate Road;
- Link Ref 8.2 – Llangefni Link Road, Llangefni; and
- Link Ref AQ2 – A55 east of Jct 6.

7.5.3 The selected air quality human health sensitive receptors in Section D that are located with 200 m of these links are presented in Table 14.25 and shown on Figure 14.4. These receptors are considered to be representative of other receptors located on the construction traffic routes listed.

Table 14.25 Selected Human Health Sensitive Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Location		Description
	X	Y	
RT4/13208	245041	373845	Residential property north of the A55
RT4/13212	245253	374242	Residential property off the A5114

7.5.4 There are a limited number of internationally designated ecological receptors in Section D that are either located within 10 km of the emergency generators at the Braint Tunnel Construction Compound (AQ/D/E01 to AQ/D/E03). Sections of the Cors Ddyga SSSI are located within 200 m of the Construction traffic route on the A55. Impacts are quantified at the ecological sites summarised in Table 14.26 and shown in Figure 14.4 (**Document 5.14.1.4**)

Table 14.26 Selected Ecologically Sensitive Receptors – Section D B5110 north of Talwrn to the Ceint

ID	Ecological Receptor	Location[1]		APIS Habitat Description
		x	y	
AQ/D/E01	Corsydd Mon SAC (west of Talwrn)	247744	376979	Heathland and fen
AQ/D/E02	Corsydd Mon SAC (north of Talwrn)	248995	377636	Heathland and fen
AQ/D/E03	Corsydd Mon SAC (east of Talwrn)	249836	376854	Heathland and fen
AQ/D/E04	Cors Ddyga SSSI	245325	373513	Fen and swamp
[1] The nearest point of the ecological site to the modelled source				

Baseline Air Quality

IACC Sourced Monitoring Data

7.5.5 Existing data are available for a number of locations in the vicinity of Section D and these are summarised in Table 14.27.

7.5.6 The pollutant concentration data presented, as well as the limited amount of data gathered in the area, suggests that IACC consider air quality is of a good standard in Section D and that there is little risk of the relevant air quality objective values being exceeded in the existing baseline scenario.

Table 14.27 Measurement and Monitoring Data – Section D B5110 north of Talwrn to the Ceint

Monitoring ID	Averaging Period	Concentration (µg/m^3)					
		2011	2012	2013	2014	2015	2016
Nitrogen Dioxide (NO_2)							

Table 14.27 Measurement and Monitoring Data – Section D B5110 north of Talwrn to the Ceint							
Monitoring ID	Averaging Period	Concentration (μg/m^3)					
		2011	2012	2013	2014	2015	2016
DT2 – Bulkley Square, Llangefni DT (Roadside)	Annual	-	-	-	21.1	21.3	23.5
DT3 – Penmynydd Road, Llangefni	Annual						9.5
Bryn Cefni Business Park, Llangefni DT (Roadside)	Annual	16.0	12.5	14.6	n/a	-	-
Bryn Cefni Roundabout, Llangefni DT (Roadside)	Annual	-	9.8	11	12.8	10.7	-
Lon Tudur, Llangefni DT (Roadside)	Annual	-	-	-	15.9	12.2	-
Lon Glanhwfa, Llangefni DT (Roadside)	Annual	-	-	-	11.8	12	-
Canolfan Addysg y Bont DT (Background)	Annual	-	-	-	7.5	5.4	-
Lon Cildwrn, Llangefni DT (Roadside)	Annual	-	-	-	10.7	8.9	-
Particulate Matter (PM_{10})							
Llangefni Library (Roadside)	Annual	16.8	14.6	16.8	12.9	14.8	-

7.5.7 No dust deposition data are currently available within or near Section D of the OHL. Background deposition rates in and around Section D (i.e. at locations away from major sources of dust) are likely to be similar to those reported for Sections A (see Table 14.13) and are not likely to cause complaints from members of the public or long-term harm to ecological habitats.

Defra Sourced Background Data

7.5.8 Existing background pollutant concentration data have been sourced from Defra background pollutant concentration data maps for the centre point of the 1 km by 1 km grid squares through which Section D passes. These projected data are summarised in Table 14.28 for 2016 (to represent conditions in 2016 and 2023). Annual mean background pollutant concentrations in Section A are well below the respective national air quality objectives.

Table 14.28 Background Pollutant Concentration Data – Section D B5110 north of Talwrn to the Ceint

Statistic Across All 1 km by 1 km Grid Squares in Section D	Averaging Period Concentration (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
Maximum	6.3	11.5	7.0
Minimum	3.8	8.4	5.4
Average	4.2	9.0	5.7
Air Quality Objective Value	**40**	**40**	**25**

APIS Sourced Background Data

7.5.9 Existing background pollutant concentration data for the centre point of the 5 km by 5 km grid squares nearest to the ecologically sensitive receptors in Section D have been sourced from APIS. The data are summarised in Table 14.29 for the APIS base year of 2016 (to represent conditions in 2016 and 2023).

7.5.10 At these locations at the Corsydd Mon SAC in Section D, annual mean background pollutant concentrations are well below the respective national air quality objectives at the ecological receptor sites considered, as are annual mean background deposition rates of acid as nitrogen. Annual mean deposition rates of nutrient nitrogen, acid, and acid as nitrogen are already in exceedance of the relevant lower Critical Load values for those pollutants, but less than the upper Critical Load values.

7.5.11 At the Cors Ddyga SSSI in Section D, annual mean background pollutant concentrations and deposition rates are well below the respective national air quality objectives and Critical Load values at the ecological receptor site considered, with the exception of annual mean background deposition rates of nutrient nitrogen. The mean background deposition rates of nutrient nitrogen are just below the upper Critical Load value.

Table 14.29 Existing Background Pollutant Concentration Data – Section D B5110 north of Talwrn to the Ceint								
Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Deposition Rate			
		Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
AQ/D/E01	Corsydd Mon SAC (west of Talwrn)	7.0	10.5	1.0	15.5	1.23	1.11	0.16
AQ/D/E02	Corsydd Mon SAC (north of Talwrn)	6.6	9.9	1.0	15.5	1.23	1.11	0.16
AQ/D/E03	Corsydd Mon SAC (east of Talwrn)	6.6	9.9	1.0	15.5	1.23	1.11	0.16
AQ/D/E04	Cors Ddyga SSSI	9.1	13.7	1.3	14.4	1.16	1.03	0.17
Air Quality Objective, Critical Level, Critical Load								
Corsydd Mon SAC		**30**	**75**	**10**	**15 – 20**	**0.920–8.883**	**0.633–4.283**	**0.287–4.600**
Cors Ddyga SSSI		**30**	**75**	**10**	**10 – 15**	**1.920 – 8.773**	**1.130 – 4.273**	**0.790 – 4.500**

AECOM Measurement Data

7.5.12 Proposed Development construction HGV traffic could access Section D via the A5114, the B5420 and the B5111. Three NO_2 diffusion tubes (A6, A7 and A8) were located on these routes, and further tubes (A9 and A10) were located adjacent to roads in the vicinity of Llangefni. The projected annual mean concentrations for 2016 at these locations are summarised in Table 14.30.

7.5.13 Table 14.33 shows that concentrations in the centre of Llangefni (A6 and A7) are well below the national air quality objective value for NO_2, but more elevated than concentrations measured on the outskirts of the town (A8 and A9). This is likely due to the town centre being a hub for a number of routes as well as increased congestion due to junctions and pedestrian crossings. At a location adjacent to the A5 and within 50 m of the A55 (A11), concentrations are similar to those reported in Llangefni town centre, likely due to the number of vehicles on the A55 and the proportion of HDVs on that road.

Table 14.30 Proposed Development NO_2 Measurement Data – Section D B5110 north of Talwrn to the Ceint

Monitoring ID	Grid Reference		Averaging Period	2016 Concentration ($\mu g/m^3$)
	x	y		
Llangefni – A6	245887	375820	Annual	18.5
Llangefni – A7	246020	375718	Annual	15.1
Llangefni – A8	247099	375514	Annual	9.0
Caeau Talwrn SSSI – A9	247750	376991	Annual	6.4
Ceint – A10	248959	374854	Annual	7.7
Fford Caergybi – A11	245410	373462	Annual	15.8
Air Quality Objective Value				40

Predicted Existing Baseline Pollutant Concentration Data

7.5.14 Modelled predictions of existing baseline concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.31, for the human receptors considered in this assessment.

7.5.15 Table 14.31 shows that in the existing baseline scenario, annual mean concentrations of the pollutants reported are well below the respective air quality objective values at the locations considered in Section D. Predictions have been made at locations that are representative of sensitive exposure on the approach to Llangefni, where Proposed Development construction traffic has the potential to have a significant effect (Ref 14.15).

Table 14.31 Predicted Existing Baseline Pollutant Statistics at Human Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
RT4/13208	9.6	9.4	5.9	<1
RT4/13212	14.0	10.6	6.7	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

7.5.16 Modelled predictions of existing baseline concentrations of annual mean and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition are provided in Table 14.32, for the ecological receptors considered in Section D.

7.5.17 The table shows that the pollutants considered are at background levels at the selected locations on the Corsydd Mon SAC (AQ/D/E01 to AQ/D/E03). This is because they are not located adjacent to any sources that need to have been modelled in the existing baseline scenario (i.e. >200 m from an affected road link). At the location closest to the A55, existing baseline pollutant concentrations at the Cors Ddyga SSSI are well below the air quality objective values. Annual mean deposition rates of acid as sulphur are also well below the Critical Load for that pollutant. Annual mean deposition rates of acid and acid as nitrogen are in excess of the lower Critical Loads for those pollutants, but less than the respective upper Critical Loads. Annual mean deposition rates for nutrient nitrogen exceed both the lower and upper Critical Loads for that pollutant.

Table 14.32 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Acid (as Nitrogen) (keq/ha/yr)	Acid (as Sulphur) (keq/ha/yr)
AQ/D/E01	Corsydd Mon SAC (west of Talwrn)	n/a	7.0	10.5	1.0	15.5	1.23	1.11	0.16
AQ/D/E02	Corsydd Mon SAC (north of Talwrn)	n/a	6.6	9.9	1.0	15.5	1.23	1.11	0.16
AQ/D/E03	Corsydd Mon SAC (east of Talwrn)	n/a	6.6	9.9	1.0	15.5	1.23	1.11	0.16
AQ/D/E04	Cors Ddyga SSSI	0	24.9	37.3	1.3	16.24	1.34	1.18	0.16
		5	20.9	31.4	1.3	15.94	1.31	1.15	0.16
		10	18.9	28.4	1.3	15.78	1.30	1.14	0.16
		15	17.6	26.4	1.3	15.68	1.30	1.14	0.16
		20	16.7	25.0	1.3	15.61	1.29	1.13	0.16
		25	16.0	24.0	1.3	15.56	1.29	1.13	0.16
		30	15.4	23.1	1.3	15.51	1.28	1.12	0.16

Table 14.32 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Acid (as Nitrogen) (keq/ha/yr)	Acid (as Sulphur) (keq/ha/yr)
		35	14.9	22.3	1.3	15.47	1.28	1.12	0.16
		40	14.5	21.7	1.3	15.44	1.28	1.12	0.16
		45	14.1	21.2	1.3	15.41	1.28	1.12	0.16
		50	13.8	20.7	1.3	15.38	1.27	1.11	0.16
		100	12.0	17.9	1.3	15.24	1.26	1.10	0.16
		150	11.1	16.7	1.3	15.17	1.26	1.10	0.16
		200	10.7	16.0	1.3	15.13	1.26	1.10	0.16
Air Quality Objective, Critical Level, Critical Load									
Corsydd Mon SAC			**30**	**75**	**10**	**15 – 20**	**0.920–8.883**	**0.633–4.283**	**0.287–4.600**
Cors Ddyga SSSI			**30**	**75**	**10**	**10–15**	**1.920–8.773**	**1.130–4.273**	**0.790–4.500**

Predicted Future Baseline Pollutant Concentration Data

7.5.18 Modelled predictions of future baseline concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.33, for the human receptors considered in this assessment in Section D.

7.5.19 Concentrations are higher than those reported in the existing baseline scenario, due to the anticipated year on year growth in traffic flows from 2016 to 2023 on Anglesey.

Table 14.33 Predicted Future Baseline Pollutant Statistics at Human Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
RT4/13208	9.9	9.4	5.9	<1
RT4/13212	14.6	10.7	6.7	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

7.5.20 Modelled predictions of future baseline concentrations of annual mean and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition are provided in Table 14.34, for the ecological receptors considered in Section D.

7.5.21 The table shows that the pollutants considered remain at background levels. Again, because they are not located adjacent to any sources that have been modelled in the future baseline scenario.

Table 14.34 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
AQ/D/E01	Corsydd Mon SAC (west of Talwrn)	n/a	7.0	10.5	1.0	15.5	1.23	1.11	0.16
AQ/D/E02	Corsydd Mon SAC (north of Talwrn)	n/a	6.6	9.9	1.0	15.5	1.23	1.11	0.16
AQ/D/E03	Corsydd Mon SAC (east of Talwrn)	n/a	6.6	9.9	1.0	15.5	1.23	1.11	0.16
AQ/D/E04	Cors Ddyga SSSI	0	25.7	38.5	1.3	16.30	1.34	1.18	0.16
		5	21.6	32.4	1.3	15.99	1.32	1.16	0.16
		10	19.5	29.2	1.3	15.83	1.31	1.15	0.16
		15	18.1	27.1	1.3	15.72	1.30	1.14	0.16
		20	17.1	25.7	1.3	15.64	1.29	1.13	0.16
		25	16.4	24.6	1.3	15.59	1.29	1.13	0.16
		30	15.8	23.7	1.3	15.54	1.29	1.13	0.16

Table 14.34 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		35	15.2	22.9	1.3	15.50	1.28	1.12	0.16
		40	14.8	22.2	1.3	15.46	1.28	1.12	0.16
		45	14.4	21.6	1.3	15.43	1.28	1.12	0.16
		50	14.1	21.1	1.3	15.41	1.28	1.12	0.16
		100	12.1	18.2	1.3	15.25	1.26	1.10	0.16
		150	11.3	16.9	1.3	15.18	1.26	1.10	0.16
		200	10.8	16.1	1.3	15.14	1.26	1.10	0.16
Air Quality Objective, Critical Level, Critical Load									
Corsydd Mon SAC			**30**	**75**	**10**	**15 – 20**	**0.920–8.883**	**0.633–4.283**	**0.287–4.600**
Cors Ddyga SSSI			**30**	**75**	**10**	**10–15**	**1.920–8.773**	**1.130–4.273**	**0.790–4.500**

7.6 SECTION E CEINT TO THE AFON BRAINT

Air Quality Sensitive Receptors

7.6.1 Within Section E there are 123 receptors that are highly sensitive to dust soiling impacts and 123 receptors that are highly sensitive to human health impacts associated with construction dust, which are within 350 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There are no statutory or non-statutory ecological sites within 50 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There are some PRoW crossing the Order Limits or within 350 m of them in this section. These receptors are shown on Figure 14.4.

7.6.2 The number of additional vehicles on the construction traffic routes within and leading to Section E exceed the guidance criteria to suggest that a significant effect could occur on the following links:

- Link Ref AQ2 – A55 between Llangefni and Llanfairpwll;
- Link Ref AQ3 – A55 east of Jct 7; and
- Link Ref AQ4 – A55 east of Jct 7a

7.6.3 The selected air quality human health sensitive receptors in Section E that are located with 200 m of these links are presented in Table 14.35. The receptors also include sensitive locations where emissions from the emergency generators could also have an effect. The receptors listed are considered representative of other receptors located in their vicinity. The location of the receptors is provided in Figure 14.4.

Table 14.35 Selected Human Health Sensitive Receptors – – Section E Ceint to the Afon Braint

Receptor ID	Location		Description
	X	Y	
R5/00071	246970	372739	Residential property north of the A55
R5/02601	250449	372070	Residential property off the A55, near Star
R5/02641	250640	371023	Residential property 900 m west of the Braint Tunnel Head House and Cable Sealing End Construction Compound

Table 14.35 Selected Human Health Sensitive Receptors – – Section E Ceint to the Afon Braint			
Receptor ID	Location		Description
	X	Y	
R5/02726	251090	372034	Residential property off the A55, at Star

IACC Sourced Monitoring Data

7.6.4 No IACC air quality monitoring or dust deposition data are currently available within or near to Section E of the OHL. Concentrations and background deposition rates in and around Section E are likely to be similar to those reported for previous sections and are dependent on proximity to any emissions source.

Defra Sourced Background Data

7.6.5 Existing background pollutant concentration data have been sourced from Defra background pollutant concentration data maps for the centre point of the 1 km by 1 km grid squares through which Section E passes. These projected data are summarised in Table 14.36 for 2016 (to represent conditions in 2016 and 2023). Annual mean background pollutant concentrations in Section E are well below the respective national air quality objectives. .

Table 14.36 Background Pollutant Concentration Data – Section E Ceint to the Afon Braint			
Statistic Across All 1 km by 1 km Grid Squares in Section E	Averaging Period Concentration (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
Maximum	7.5	11.5	7.9
Minimum	4.1	8.8	5.7
Average	5.2	9.6	6.2
Air Quality Objective Value	**40**	**40**	**25**

Measurement Data

7.6.6 Proposed Development construction HDV traffic may access Section E via the A5 at Star. Multiple diffusion tubes were located on this route (A12, A13 and A14). The projected annual mean concentrations for 2016 at these locations are summarised in Table 14.37.

7.6.7 Table 14.40 shows that all measured annual mean NO_2 concentrations in this section are well below the air quality objective value. At locations adjacent to and downwind of the A5 (but upwind of the A55), west of Star (A12), annual mean concentrations are measured to be around 18 µg/m^3. At locations adjacent to and downwind of the A55 (and downwind of the A5) (A13), measured concentrations are more elevated to over 20 µg/m^3. At locations adjacent to and upwind of the A55 (but downwind of the A5), annual mean concentrations are around 17 µg/m^3.

Table 14.37 Proposed Development NO_2 Measurement Data – Section E Ceint to the Afon Braint

Monitoring ID	Grid Reference		Averaging Period	2016 Concentration (µg/m^3)
	x	y		
Star – (A12)	250102	371995	Annual Mean	15.7
Star – (A13)	251099	371995	Annual Mean	18.2
Star – (A14)	251106	371946	Annual Mean	13.3
Air Quality Objective Value				**40**

Predicted Existing Baseline Pollutant Concentration Data

7.6.8 Modelled predictions of existing baseline concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.38, for the human receptors considered in this assessment in Section E.

7.6.9 Table 14.38 shows that the concentrations and the number of exceedances of the pollutants considered are well below their respective air quality objective values. Proximity to the A55 does see concentrations elevate beyond background conditions, although not to anywhere near the extent that would suggest a risk of an exceedance of any of the air quality objectives considered.

Table 14.38 Predicted Existing Baseline Pollutant Statistics at Human Receptors – Section E Ceint to the Afon Braint

Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/00071	10.4	9.7	6.2	<1

Table 14.38 Predicted Existing Baseline Pollutant Statistics at Human Receptors – Section E Ceint to the Afon Braint				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/02601	10.8	10.0	6.4	<1
R5/02641	5.1	9.5	6.1	<1
R5/02726	8.5	9.9	6.5	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

Predicted Future Baseline Pollutant Concentration Data

7.6.10 Modelled predictions of future baseline concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.39, for the human receptors considered in this assessment in Section E.

7.6.11 The table shows that at receptors located adjacent to the local road network, there is a slight increase in predicted concentrations from those reported in the existing baseline scenario (Table 14.38). This is due to the year on year growth in traffic flows that is anticipated to occur on Anglesey. Away from the local road network, concentrations remain at background conditions.

Table 14.39 Predicted Future Baseline Pollutant Statistics at Human Receptors – Section E Ceint to the Afon Braint				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/00071	10.7	9.7	6.2	<1
R5/02601	11.2	10.1	6.5	<1
R5/02641	5.1	9.5	6.1	<1
R5/02726	8.8	9.9	6.5	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

7.7 SECTION F AFON BRAINT TO PENTIR – IACC SECTION (BRAINT CONSTRUCTION COMPOUND)

Air Quality Sensitive Receptors

7.7.1 Within Section F (on Anglesey) there are 95 receptors that are highly sensitive to dust soiling impacts and 95 receptors that are highly sensitive to human health impacts associated with construction dust, which are within 350 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There are no statutory or non-statutory ecological sites within 50 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There are a limited number of PRoW within 350 m of the Order Limits. The locations of these receptors are provided in Figure 14.3.

7.7.2 The number of additional vehicles on the construction traffic routes within and leading to Section F (IAAC Section) exceed the guidance criteria, or are within 10 % of the guidance criteria, to suggest that a significant effect could occur on the following links:

- Link Ref AQ5 – A55 east of J8; and
- Link Ref 21 – A55 east of J8a

7.7.3 The selected air quality human health sensitive receptors in Section F (IACC Section) that are located with 200 m of these links are presented in Table 14.40. The list of receptors also includes sensitive locations where emissions from the emergency generators could have a combined effect. The receptors listed are considered to be representative of other receptors located on the construction traffic routes listed. The location of the receptors is provided in Figure 14.4.

Table 14.40 Selected Human Health Sensitive Receptors – Section F Afon Braint to Pentir (IACC Section)

Receptor ID	Location		Description
	X	Y	
R5/02815	251334	370703	Residential property, 380 m south of Braint Construction Compound
R5/02878	251642	370384	Residential property, off 550 m south of Braint Construction Compound

Table 14.40 Selected Human Health Sensitive Receptors – Section F Afon Braint to Pentir (IACC Section)			
Receptor ID	Location		Description
	X	Y	
R5/02917	251806	371947	Residential property off the A55, 850 m north of Braint Construction Compound
R5/02987	251914	371174	Residential property, 200 m north of Braint Construction Compound
R5/03134	252023	371437	Residential property, 500 m north of Braint Construction Compound
R5/03353	252165	371764	Residential property off the A5 and A55, 850 m north of Residential property 850 m north of Braint Construction Compound
R5/03423	252216	371121	Residential property off Pont-'Ronwy Link road and 500 m east of Braint Construction Compound
R5/03460	252270	371693	Residential property off the A5, 870 m north-east of Braint Construction Compound
R5/03755	252432	370927	Residential property off the Pont-'Ronwy Link road and A4080, 700 m east of Braint Construction Compound
R5/05159	252970	371423	Residential property off the A4080, 1,300 m north-east of the Braint Construction Compound
R5/05343	253056	372289	Residential property off the A55, 1,850 m north-east of the Braint Construction Compound
R5/05644	253201	372315	Residential property off the A55, 1,870 m north-east of the Braint Construction Compound
R5/05837	253300	372382	Residential property off the A55, 1,890 m north-east of the Braint Construction Compound

Table 14.40 Selected Human Health Sensitive Receptors – Section F Afon Braint to Pentir (IACC Section)			
Receptor ID	Location		Description
	X	Y	
R5/06474	253625	371449	Residential property off the A5, 1,950 m east of the Braint Construction Compound
R5/06661	253719	371524	Residential property off the A5, 2,000 m east of the Braint Construction Compound
R5/06714	253773	371933	Residential property off the A55, 2,250 m north-east of the Braint Construction Compound
R5/06835	253875	371950	Residential property at care home off the A55, 2,275 m north-east of the Braint Construction Compound
R5/06863	253915	371648	Residential property off the A55, 2,280 m east of the Braint Construction Compound
R5/06907	253990	371367	Residential property off the A55, 2,295 m east of the Braint Construction Compound

7.7.4 Section F (IACC section) does include internationally and nationally designated ecological sites (Menai Strait and Conwy Bay SAC and Glannau Porthaethwy SSSI respectively). However, the habitat features of these sites located within Section F (IACC section) are not sensitive to the pollutants considered in this assessment. Air quality impacts have been quantified for a small number of Ancient Woodland sites that are located within 2 km of the Braint Tunnel Construction Compound. These ecological sites are summarised in Table 14.41 and their locations are shown on Figure 14.4.

Table 14.41 Selected Ecologically Sensitive Receptors – Section F Afon Braint to Pentir (IACC Section)				
Receptor ID	Ecological Receptor	Location[1]		Habitat Description[1]
		x	y	

AQ/F(A)/E01	Ancient Semi Natural Woodland (Ref: 25877)	251103	370394	Lowland mixed deciduous woodland
AQ/F(A)/E02	Restored Ancient Woodland Site (Ref: 24261)	252206	370542	Lowland mixed deciduous woodland
AQ/F(A)/E03	Plantation on Ancient Woodland Site (Ref: 43628)	251550	370369	Lowland mixed deciduous woodland
[2] APIS does not provide critical load information for ancient woodland habitat. Instead, a comparable alternative from a nearby location is used as a proxy.				

Baseline Air Quality

IACC Sourced Monitoring Data

7.7.5 Existing data are available for a couple of locations in the vicinity of Braint Construction Compound and are summarised in Table 14.42.

7.7.6 The pollutant concentration data presented suggests that the national air quality objective for NO_2 is exceeded at locations immediately adjacent to the A55, the main route for traffic connecting the mainland to the island and the port at Holyhead. However, there is no relevant sensitive exposure at locations this close to the A55, with the nearest houses being set further back. Analysis undertaken by IACC suggests that concentrations are below the national air quality objective for this pollutant where there is relevant sensitive exposure. Elsewhere, the concentrations measured and the limited amount of data gathered suggests that IACC consider air quality is of a good standard in Section F (IACC Section) and that there is little risk of the relevant air quality objective values being exceeded in the existing baseline scenario.

Table 14.42 Measurement and Monitoring Data – Section F Afon Braint to Pentir (IACC Section)[1]

Monitoring ID	Averaging Period	Concentration (µg/m^3)					
		2011	2012	2013	2014	2015	2016
Nitrogen Dioxide (NO_2)							
DT1 – Llanfairpwll P.G. Bypass, DT (Roadside)	Annual	**44.6**	**42.1**	**44.3**	38.7	38.1	39.7

Table 14.42 Measurement and Monitoring Data – Section F Afon Braint to Pentir (IACC Section)[1]							
Monitoring ID	Averaging Period	Concentration (μg/m^3)					
		2011	2012	2013	2014	2015	2016
DT4 – Llanfairpwll P.G. (A55) – A (Roadside)	Annual	-	-	-	-	-	**45.2**
Tyn Lon Garage Llanfairpwll DT (Background)	Annual	-	-	12.5	12.2	-	-
Particulate Matter (PM_{10})							
CM4 – Penhesgyn Continuous Monitoring Station (Industrial)	Annual	16.2	14.3	-	9.8	10.4	9.1
	Daily	-	1	-	0	0	-
Fine Particulate Matter ($PM_{2.5}$)							
CM4 – Penhesgyn Continuous Monitoring Station (Industrial)	Annual	n/a	n/a	n/a	5.0	7.0	5.4
[1] Exceedances of the air quality objective values shown in **bold**.							

7.7.7 Limited data are also available for the rate of dust deposition within this Section of the study area. IACC have measured dust deposition at a location in the vicinity of the Penhesgyn Recycling Centre. These data are summarised in Table 14.43.

7.7.8 The dust deposition data shown in Table 14.46, which are typical of background conditions across much of the island, are well below the rates that are likely to cause complaints from members of the public (Ref.14.24) or long-term harm to ecological habitats (Ref.14.28).

Table 14.43 Existing Background Dust Deposition Data – Section F Afon Braint to Pentir (IACC Section)						
Description	Dust Deposition Rate (mg/m^2/day)					
	2010	2011	2012	2013	2014	2015
Penhesgyn Frisbee Dust Gauge (Industrial)	-	-	-	-	88.4	-

Defra Sourced Background Data

7.7.9 Existing background pollutant concentration data for the centre point of the 1 km by 1 km grid squares through Section F (IACC section) has been sourced from Defra background pollutant concentration data maps. These projected data are summarised in Table 14.44 for 2016 (to represent conditions in 2016 and 2023). Annual mean background pollutant concentrations in Section F (IACC section) are well below the respective national air quality objectives.

Table 14.44 Background Pollutant Concentration Data – Section F Afon Braint to Pentir (IACC Section)			
Statistic Across All 1 km by 1 km Grid Squares in Section F (IACC Section)	Annual Mean Concentration (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
Maximum	7.5	11.3	7.9
Minimum	4.0	8.7	5.7
Average	5.3	9.5	6.3
Air Quality Objective Value	**40**	**40**	**25**

APIS Sourced Background Data

7.7.10 Existing background pollutant concentration data for the centre point of the 5 km by 5 km grid squares nearest to the ecologically sensitive receptors in Section F (IACC section) has been sourced from APIS. The data is summarised in Table 14.45 for the APIS base year of 2016 (to represent conditions in 2016 and 2023).

7.7.11 Annual and daily mean background pollutant concentrations in Section F (IACC Section) are well below the respective national air quality objectives and critical levels at the ecological receptor sites considered. Annual mean deposition rates for nutrient nitrogen are higher than the upper critical loads and deposition rates for acid as nitrogen are above the lower critical loads.

Table 14.45 Background Pollutant Concentration Data – Section F Afon Braint to Pentir (IACC Section)								
Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Deposition Rate			
		Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(A)/E01	Ancient Semi Natural Woodland (Ref: 25877)	7.1	10.7	1.0	32.2	2.45	2.30	0.20
AQ/F(A)/E02	Restored Ancient Woodland Site (Ref: 24261)	7.3	11.0	1.0	32.2	2.45	2.30	0.20
AQ/F(A)/E03	Plantation on Ancient Woodland Site (Ref: 43628)	7.1	10.7	1.0	32.2	2.45	2.30	0.20
Air Quality Objective, Critical Level, Critical Load		**30**	**75**	**10**	**15 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**

Measurement Data

7.7.12 Proposed Development construction HDV traffic would access Section F (IACC Section) via the A55, A5 and A4080 at Llanfairpwll. Multiple diffusion tubes were located on these routes. The projected annual mean concentrations for 2016 at these locations are summarised in Table 14.49.

7.7.13 Table 14.46 shows that at locations adjacent to the A55 (A15) and A 5025 (A19), projected annual mean concentrations of NO_2 are in excess of the air quality objective value (40 µg/m^3). Diffusion tubes A15 and A19 are sited at roadside locations, with the nearest sensitive receptors set further back from the road. The fall of NO_2 with distance calculator (Ref 14.33) has been used to project the concentration back from the road to represent conditions that are more representative of sensitive exposure. The values are shown in Table 14.46 in parenthesis. At the setback locations, annual mean concentrations are projected to be below the national air quality objective. It is noted that A15 is considered by IACC to be a sensitive location with regard to the hourly NO_2 objective. The kerbside location has not been specifically modelled in this assessment, because the measurement data gathered there provides actual concentrations where the Council feels there is relevant exposure. At other survey locations in Section F (IACC Section), concentrations are well below the air quality objective value.

Table 14.46 Proposed Development NO_2 Measurement Data – Section F Afon Braint to Pentir (IACC Section)[1]

Monitoring ID	Grid Reference		Averaging Period	2016 Concentration (µg/m^3)
	x	y		
Llanfairpwll PG – (A15)	252563	372054	Annual Mean	**43.7** (13.5)[2]
Llanfairpwll PG – (A16)	252923	371397	Annual Mean	12.3
Llanfairpwll PG – (A17)	253751	371519	Annual Mean	16.1
Llanfairpwll PG – (A18)	253800	371918	Annual Mean	19.0
Menai – (A19)	254550	372666	Annual Mean	**44.0** (27.0)[3]
Air Quality Objective Value				**40**

[1] Exceedances of the air quality objective value shown in **bold**.

[2] Assuming the nearest representative receptor is 50 m away from the A55, which is the limit of NO_2 Fall Off With Distance from Roads Calculator tool. In reality, the

Table 14.46 Proposed Development NO_2 Measurement Data – Section F Afon Braint to Pentir (IACC Section)[1]				
Monitoring ID	Grid Reference		Averaging Period	2016 Concentration ($\mu g/m^3$)
	x	y		
nearest receptors are further from the A55 than this. It is noted that this location is considered by IACC to be sensitive with regard to the hourly NO_2 objective. [3] Assuming the nearest representative receptor is 9 m away from the A5025.				

Predicted Existing Baseline Pollutant Concentration Data

7.7.14 Modelled predictions of existing baseline concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.47, for the human receptors considered in this assessment in Section F (IACC Section).

7.7.15 The table shows that the concentrations and the number of exceedances of the pollutants considered are well below their respective air quality objective values. Proximity to the A55 does see concentrations elevate beyond background conditions, although not to anywhere near the extent that would suggest a risk of an exceedance of any of the air quality objectives considered.

Table 14.47 Predicted Existing Baseline Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (IACC Section)				
Receptor ID	Annual Mean Concentration ($\mu g/m^3$)			No. of Days PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/02815	4.1	8.7	5.6	<1
R5/02878	4.1	8.7	5.6	<1
R5/02917	9.0	9.8	6.3	<1
R5/02987	6.2	9.5	6.1	<1
R5/03134	7.7	10.6	7.2	<1
R5/03353	13.3	11.2	7.6	<1
R5/03423	7.0	10.5	7.1	<1
R5/03460	13.8	11.6	7.8	<1

Table 14.47 Predicted Existing Baseline Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (IACC Section)				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/03755	6.2	9.1	5.9	<1
R5/05159	9.8	11.0	7.4	<1
R5/05343	10.6	9.9	6.5	<1
R5/05644	11.2	10.0	6.5	<1
R5/05837	11.3	10.0	6.5	<1
R5/06474	12.4	10.9	7.1	<1
R5/06661	11.0	10.6	7.0	<1
R5/06714	14.8	10.9	7.2	<1
R5/06835	16.1	11.0	7.3	<1
R5/06863	12.2	10.6	7.0	<1
R5/06907	14.0	10.7	7.1	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

7.7.16 Modelled predictions of existing baseline concentrations of annual mean and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition rates are provided in Table 14.48, for the ecological receptors considered in Section F (IACC Section).

7.7.17 The table shows that the pollutants considered are at background levels, due to their distance away from major sources of emissions to air. Annual mean deposition rates for nutrient nitrogen are higher than the upper critical loads and deposition rates for acid as nitrogen are above the lower critical loads.

Table 14.48 Predicted Existing Baseline Pollutant Concentration Data – Section F Afon Braint to Pentir (IACC Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(A)/E01	Ancient Semi Natural Woodland (Ref: 25877)	n/a	7.1	10.7	1.0	32.2	2.45	2.30	0.20
AQ/F(A)/E02	Restored Ancient Woodland Site (Ref: 24261)	n/a	7.3	11.0	1.0	32.2	2.45	2.30	0.20
AQ/F(A)/E03	Plantation on Ancient Woodland Site (Ref: 43628)	n/a	7.1	10.7	1.0	32.2	2.45	2.30	0.20
Air Quality Objective, Critical Level, Critical Load			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**

Predicted Future Baseline Pollutant Concentration Data

7.7.18 Modelled predictions of future baseline concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.49, for the human receptors considered in this assessment in Section F (IACC Section).

7.7.19 The table shows that at receptors located adjacent to the local road network, there is a slight increase in predicted concentrations from those reported in the existing baseline scenario (Table 14.47). This is due to the year on year growth in traffic flows that is anticipated to occur on Anglesey. Away from the local road network, concentrations remain at background conditions.

Table 14.49 Predicted Future Baseline Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (IACC Section)

Receptor ID	Annual Mean Concentration ($\mu g/m^3$)			No. of Days PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/02815	4.1	8.7	5.6	<1
R5/02878	4.1	8.7	5.6	<1
R5/02917	9.2	9.9	6.3	<1
R5/02987	6.2	9.5	6.1	<1
R5/03134	7.8	10.6	7.2	<1
R5/03353	13.7	11.2	7.6	<1
R5/03423	7.0	10.5	7.1	<1
R5/03460	14.3	11.7	7.8	<1
R5/03755	6.3	9.2	5.9	<1
R5/05159	10.0	11.0	7.4	<1
R5/05343	10.9	9.9	6.5	<1
R5/05644	11.6	10.0	6.5	<1
R5/05837	11.7	10.0	6.5	<1
R5/06474	12.7	11.0	7.2	<1
R5/06661	11.2	10.7	7.0	<1
R5/06714	15.3	11.0	7.2	<1
R5/06835	16.6	11.1	7.3	<1

Table 14.49 Predicted Future Baseline Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (IACC Section)				
Receptor ID	Annual Mean Concentration ($\mu g/m^3$)			No. of Days PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/06863	12.5	10.7	7.0	<1
R5/06907	14.5	10.7	7.1	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

7.7.20 Modelled predictions of future baseline concentrations of annual mean and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition are provided in Table 14.50, for the ecological receptor considered in Section F (IACC Section).

7.7.21 The table shows that the pollutants considered remain as background levels at the ecological locations considered, due to their location away from the sources of emissions to air modelled. Annual mean deposition rates for nutrient nitrogen are higher than the upper critical loads and deposition rates for acid as nitrogen are above the representative lower critical loads.

Table 14.50 Predicted Future Baseline Pollutant Concentration Data – Section F Afon Braint to Pentir (IACC Section)									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(A)/E01	Ancient Semi Natural Woodland (Ref: 25877)	n/a	7.1	10.7	1.0	32.2	2.45	2.30	0.20
AQ/F(A)/E02	Restored Ancient Woodland Site (Ref: 24261)	n/a	7.3	11.0	1.0	32.2	2.45	2.30	0.20
AQ/F(A)/E03	Plantation on Ancient Woodland Site (Ref: 43628)	n/a	7.1	10.7	1.0	32.2	2.45	2.30	0.20
Air Quality Objective, Critical Level, Critical Load			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**

7.8 SECTION F AFON BRAINT TO PENTIR – GWYNEDD COUNCIL SECTION (TŶ FODOL CONSTRUCTION COMPOUND)

Air Quality Sensitive Receptors

7.8.1 Within Section F (Gwynedd Council section) there are 31 receptors that are highly sensitive to dust soiling impacts and 31 receptors that are highly sensitive to human health impacts associated with construction dust, which are within 350 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There is no statutory, but five non-statutory ecological sites within 50 m of the Order Limits and/or 50 m of a Construction Traffic Route that is within 500 m of a site access point. There are a limited number of PRoW located within 350 m of the Order Limits in Section F (Gwynedd Council section). These dust sensitive receptors can be seen if Figure 14.3.

7.8.2 The number of additional vehicles on the construction traffic routes within and leading to Section F (IAAC Section) exceed the guidance criteria to suggest that a significant effect could occur on the following links:

- Link Ref 21 – A55 east of J8a
- Link Ref AQ6 – A55 east of Jct 9
- Link Ref AQ7 – A55 east of Jct 10
- Link Ref AQ8 – A55 east of Jct 11
- Link Ref 18 – A487 south of A55 Jct 9
- Link Ref 19 – B4547 east of A487
- Link Ref 20 – A4244 east of B4547

7.8.3 The selected air quality human health sensitive receptors in Section F (Gwynedd Council Section) that are located with 200 m of these links are presented in Table 14.51. The receptors also include sensitive locations where emissions from the emergency generators could have a combined effect. The receptors listed are considered to be representative of other receptors located on the construction traffic routes listed. The location of these receptors can be seen in Figure 14.4.

Table 14.51 Selected Human Health Sensitive Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)			
Receptor ID	Location		Description
	X	Y	
R5/06922	254033	367777	Residential property 800 m south of Tŷ Fodol Construction Compound
R5/07156	254409	368565	Residential property 230 m west of Tŷ Fodol Construction Compound
R5/07180	254463	370354	Residential property off the A55 and 1,900 m north of Tŷ Fodol Construction Compound
R5/07195	254520	370641	Residential property off the A55 and 2,170 m north of Tŷ Fodol Construction Compound
R5/07322	254757	368001	Residential property 310 m south of Tŷ Fodol Construction Compound
R5/07470	254793	370110	Residential property off the A55 and 1,600 m north of Tŷ Fodol Construction Compound
R5/07577	254914	368854	Residential property 480 m north of Tŷ Fodol Construction Compound
R5/07647	254972	368402	Residential property 240 m east of Tŷ Fodol Construction Compound
R5/07783	255041	369631	Residential property adjacent to the A55 and 1,240 m north of Tŷ Fodol Construction Compound
R5/08574	255296	367998	Residential property 690 m east of Tŷ Fodol Construction Compound
R5/11751	257075	369344	Residential property adjacent to the A55 and 2,500 m north-east of Tŷ Fodol Construction Compound
R5/AQ01	260929	370351	Residential property adjacent to the A55 and 6,500 m north-east of Tŷ Fodol Construction Compound

7.8.4 There are a number of internationally designated ecological receptors in Section F (Gwynedd Council Section) that are located within 10 km of the emergency generators at the Tŷ Fodol Tunnel Head House and Cable Sealing End Construction Compound. There are also some nationally designated ecological receptors within 2 km. Impacts are quantified at the ecological sites summarised in Table 14.52.

7.8.5 The Coedydd Afon Menai SSSI is located adjacent to the Menai Strait, close to the A55 at Britannia Bridge. Where the A55 passes the SSSI, it is already elevated above ground level and the sensitive habitat. The elevation of the A55 at this location has been accounted for in the assessment of air quality impacts at this location.

7.8.6 The ancient woodland and Eryri SAC receptors account for a representative number of the total habitats included with these designations, close to the Tŷ Fodol tunnel construction compound.

Table 14.52 Selected Ecologically Sensitive Receptors – Section F Afon Braint to Pentir (Gwynedd Council)

Receptor ID	Ecological Receptor	Location[1]		APIS Habitat Description[2]
		x	y	
AQ/F(G)/E01	Coedydd Afon Menai SSSI (north-east of A55)	254259	370888	Lowland mixed deciduous woodland
AQ/F(G)/E02	Coedydd Afon Menai SSSI (south-west of A55)	254146	370850	Lowland mixed deciduous woodland
AQ/F(G)/E03	Plantation on Ancient Woodland Site (Ref: 43562)	254260	368700	Lowland mixed deciduous woodland
AQ/F(G)/E04	Ancient Semi Natural Woodland (Ref: 25071)	253724	368549	Lowland mixed deciduous woodland
AQ/F(G)/E05	Plantation on Ancient Woodland Site (Ref: 43561)	254306	368426	Lowland mixed deciduous woodland
AQ/F(G)/E06	Ancient Woodland Site of Unknown Category (Ref: 48976)	254580	368248	Lowland mixed deciduous woodland
AQ/F(G)/E07	Plantation on Ancient Woodland Site (Ref: 43552)	254340	368195	Lowland mixed deciduous woodland
AQ/F(G)/E08	Plantation on Ancient Woodland Site (Ref: 43538)	255673	368125	Lowland mixed deciduous woodland

Table 14.52 Selected Ecologically Sensitive Receptors – Section F Afon Braint to Pentir (Gwynedd Council)				
Receptor ID	Ecological Receptor	Location[1]		APIS Habitat Description[2]
		x	y	
AQ/F(G)/E09	Plantation on Ancient Woodland Site (Ref: 43537)	255568	367878	Lowland mixed deciduous woodland
AQ/F(G)/E10	Plantation on Ancient Woodland Site (Ref: 43555)	254534	367580	Lowland mixed deciduous woodland
AQ/F(G)/E11	Eryri SAC (south of Crymlyn)	263433	370150	Siliceous alpine and boreal grasslands
AQ/F(G)/E12	Eryri SAC (north of Bethesda)	262648	367915	Siliceous alpine and boreal grasslands
AQ/F(G)/E13	Eryri SAC (west of Bethesda)	258657	366517	Siliceous alpine and boreal grasslands
AQ/F(G)/E14	Eryri SAC (south of Rhiwlas)	257686	364888	Siliceous alpine and boreal grasslands
AQ/F(G)/E15	Eryri SAC (south of Deiniolen)	258930	362376	Siliceous alpine and boreal grasslands
[1] The nearest point of the ecological site to the modelled source. [2] APIS does not provide critical load information for ancient woodland habitat. Instead, a comparable alternative from a nearby location is used as a proxy.				

Baseline Air Quality

Gwynedd Council Sourced Monitoring Data

7.8.7 There is limited data available for within and in the vicinity of the Proposed Development in Section F (Gwynedd Council). The nearest data have been gathered in Bangor by Gwynedd Council and are summarised in Table 14.53. The data have been sourced from the Welsh Air Quality website (Ref 14.30) and have not been adjusted for diffusion tube bias (as described in Appendix 14.3 (**Document 5.14.2.3**))

7.8.8 The pollutant concentration data presented suggest that the national air quality objective for NO_2 has been exceeded at locations immediately adjacent to the A55, the strategic route for traffic going to and from the main

towns of north-west Wales and the port of Holyhead, on Anglesey. However, there is no 'relevant exposure' at locations this close to the A55 (i.e. air quality sensitive receptors that could be present for the duration of the pollutant averaging periods considered), with the nearest houses being set further back. Concentrations at locations where there is relevant sensitive exposure near to the A55 are likely to be below the national air quality objective for this pollutant. Annual mean NO_2 concentrations are also elevated at locations within and on the approach to the town of Bangor, particularly in close proximity to busy junctions. Elsewhere, the concentrations measured and the limited amount of data gathered suggests that Gwynedd Council considers air quality is not of concern in Section F and that there is little risk of the relevant air quality objective values being exceeded in the existing baseline scenario.

Table 14.53 Measurement and Monitoring Data – Section F Afon Braint to Pentir (Gwynedd Council Section)

Monitoring ID	Averaging Period	Concentration ($\mu g/m^3$)					
		2011	2012	2013	2014	2015	2016
Nitrogen Dioxide (NO_2)							
GCC008 – Caernarfon Rd.- Bangor (B3) (Roadside)	Annual	28.2	30.4	26.6	25.6	23.4	22.8
GCC005 – Fford Caergybi- Bangor (Roadside)	Annual	27.9	34.2	32.0	33.0	29.6	27.6
GCC012 – Faenol Roundabout- Bangor (B6) (Roadside)	Annual	39.4	36.2	28.1	27.5	25..3	26.9
GCC013 – Bangor Road- Bethesda (BETH 1) (Roadside)	Annual	26.1	22.9	20.7	21.0	19.6	21.9
GCC038 – A55- Bangor (Roadside)	Annual	**45.1**	36.2	26.5	28.0	27.7	28.4

GCC039 – A55-Bangor (Roadside)	Annual	**45.2**	25.8	29.1	19.6	18.9	19.1

Defra Sourced Background Data

7.8.9 Existing background pollutant concentration data for the centre point of the 1 km by 1 km grid squares through Section F (Gwynedd Council section) has been sourced from Defra background pollutant concentration data maps. These projected data are summarised in Table 14.54 for 2016 (to represent conditions in 2016 and 2023). Annual mean background pollutant concentrations in Section F (Gwynedd Council section) are well below the respective national air quality objectives.

Table 14.54 Existing Background Pollutant Concentration Data – Section F Afon Braint to Pentir (Gwynedd Council Section)

Statistics	Averaging Period Concentration ($\mu g/m^3$)		
	NO_2	PM_{10}	$PM_{2.5}$
Maximum	7.9	10.2	6.9
Minimum	4.1	8.6	5.6
Average	5.0	9.2	6.1

APIS Sourced Background Data

7.8.10 Existing background pollutant concentration data for the centre point of the 5 km by 5 km grid squares nearest to the ecologically sensitive receptors in Section F (Gwynedd Council section) has been sourced from APIS. The data is summarised in Table 14.55 for the APIS base year of 2016 (to represent conditions in 2016 and 2023).

7.8.11 Annual mean background NO_X concentrations in Section F (Gwynedd Council Section) are well below the respective national air quality objectives at the ecological receptor sites considered. At all sites considered, deposition rates of nutrient nitrogen are above the upper Critical Load for these habitats. At the Coedydd Afon Menai SSSI and nearby ancient woodland, deposition rates for acid as nitrogen are in excess of the lower Critical Load, but total acid and acid as sulphur are below the respective Critical Loads. At the Eryri SAC, total acid, acid as nitrogen and acid as sulphur are below the lower Critical Loads for this habitat.

Table 14.55 APIS Background Pollutant Concentration Data – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Deposition Rate			
		Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E01	Coedydd Afon Menai SSSI (north-east of A55)	11.7	17.6	1.0	32.2	2.45	2.30	0.20
AQ/F(G)/E02	Coedydd Afon Menai SSSI (south-west of A55)	11.7	17.6	1.0	32.2	2.45	2.30	0.20
AQ/F(G)/E03	Plantation on Ancient Woodland Site (Ref: 43562)	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E04	Ancient Semi Natural Woodland (Ref: 25071)	7.7	11.6	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E05	Plantation on Ancient Woodland Site (Ref: 43561)	8.2	12.3	1.2	21.3	1.68	1.52	0.21

Table 14.55 APIS Background Pollutant Concentration Data – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Deposition Rate			
		Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E06	Ancient Woodland Site of Unknown Category (Ref: 48976)	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E07	Plantation on Ancient Woodland Site (Ref: 43552)	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E08	Plantation on Ancient Woodland Site (Ref: 43538)	7.7	11.6	1.2	23.8	1.91	1.70	0.29
AQ/F(G)/E09	Plantation on Ancient Woodland Site (Ref: 43537)	7.1	10.7	1.2	23.8	1.91	1.70	0.29
AQ/F(G)/E10	Plantation on Ancient Woodland Site (Ref: 43555)	7.0	10.5	1.2	21.3	1.68	1.52	0.21

Table 14.55 APIS Background Pollutant Concentration Data – Section F Afon Braint to Pentir (Gwynedd Council Section)								
Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Deposition Rate			
		Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E11	Eryri SAC (south of Crymlyn)	6.9	10.4	1.0	20.4	1.66	1.46	0.28
AQ/F(G)/E12	Eryri SAC (north of Bethesda)	7.2	10.8	1.6	25.9	2.16	1.85	0.42
AQ/F(G)/E13	Eryri SAC (west of Bethesda)	6.6	9.9	1.2	23.8	1.91	1.70	0.29
AQ/F(G)/E14	Eryri SAC (south of Rhiwlas)	6.7	10.1	2.0	23.5	1.95	1.68	0.36
AQ/F(G)/E15	Eryri SAC (south of Deiniolen)	6.5	9.8	2.0	23.5	1.95	1.68	0.36
Air Quality Objective Value, Critical Level and Critical Loads								
Coedydd Afon Menai SSSI		**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**

Table 14.55 APIS Background Pollutant Concentration Data – Section F Afon Braint to Pentir (Gwynedd Council Section)								
Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Deposition Rate			
		Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
Ancient Woodland		**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**
Eryri SAC		**30**	**75**	**10**	**5 – 10**	**0.873–3.993**	**0.633–2.193**	**0.240–1.800**

Proposed Development Specific Measurement Data

7.8.12 Proposed Development construction HDV traffic may access Section F (Gwynedd Council Section), near to the Tŷ Fodol Construction Compound, via the A55, the A487 south of Bangor and the B4547 past Pentir. A number of diffusion tubes were located in this area of Gwynedd to represent these routes, as well as at locations in the town of Bangor. The projected annual mean concentrations for 2016 at these locations are summarised in Table 14.56.

7.8.13 Table 14.56 shows that at locations immediately adjacent to the A55 (G1) and A487 towards Bangor (G7), projected annual mean concentrations of NO_2 are in excess of the air quality objective value (40 µg/m^3). Diffusion tubes G1 and G7 are sited at roadside locations, with the nearest sensitive receptors set further back from the road. The fall of NO_2 with distance calculator (Ref 14.33) has been used to project the concentration back from the road to represent the concentrations that are more representative of sensitive exposure. The values are shown in Table 14.56 in parenthesis. At the setback locations, annual mean concentrations are projected to be below the national air quality objective. The measurement at location G1 is in excess of the 60 µg/m^3 indicator to suggest that the hourly mean NO_2 air quality objective value may be at risk of being exceeded. At other survey locations in Section F (Gwynedd Council Section), annual mean concentrations are generally well below the air quality objective value, but still elevated at locations closer to the A55 (G2).

Table 14.56 AECOM NO_2 Measurement Data – Section F Afon Braint to Pentir (Gwynedd Council Section)[1]

Monitoring ID	Grid Reference		Averaging Period	2016 Concentration (µg/m^3)
	x	y		
A55 Britannia Bridge Approach – (G1)	254571	370431	Annual	**70.3** (21.0)[2]
A55 Britannia Bridge Approach – (G2)	254549	370422	Annual	35.4
Capel-y-Graig – (G3)	254634	369562	Annual	25.9
Treborth – (G4)	254987	370074	Annual	24.3
B4547 – (G5)	255065	367637	Annual	10.4
Tymawr – (G6)	255847	366884	Annual	13.8

Table 14.56 AECOM NO_2 Measurement Data – Section F Afon Braint to Pentir (Gwynedd Council Section)[1]				
Monitoring ID	Grid Reference		Averaging Period	2016 Concentration ($\mu g/m^3$)
	x	y		
Bangor 1 – (G7)	371124	255816	Annual	**41.9** (15.0)[2]
Bangor 2 – (G8)	370613	256911	Annual	26.6
Pentir – (G9)	257336	366901	Annual	13.0
Bangor 3 – (G10)	371522	257563	Annual	28.5
Air Quality Objective Value				**40**

[1]assuming the nearest representative receptor is 50 m away from the A55, which is the limit of NO_2 Fall Off With Distance from Roads Calculator tool. In reality, the nearest receptors are further from the A55 than this. It is noted that these locations are considered by Gwynedd Council to be sensitive with regard to the hourly NO_2 objective.

Predicted Existing Baseline Pollutant Concentration Data

7.8.14 Modelled predictions of existing baseline concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.57, for the human receptors considered in this assessment in Section F (Gwynedd Council Section).

7.8.15 The table shows that the concentrations and the number of exceedances of the pollutants considered are well below their respective air quality objective values. Proximity to the A55 does see concentrations elevate beyond background conditions, although not to anywhere near the extent that would suggest a risk of an exceedance of any of the air quality objectives considered.

Table 14.57 Predicted Existing Baseline Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)				
Receptor ID	Annual Mean Concentration ($\mu g/m^3$)			No. of Days PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/06922	4.2	9.0	5.9	<1

Table 14.57 Predicted Existing Baseline Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/07156	4.9	8.9	5.8	<1
R5/07180	11.2	9.9	6.4	<1
R5/07195	14.8	10.2	6.6	<1
R5/07322	4.9	8.9	5.8	<1
R5/07470	15.8	10.3	6.7	<1
R5/07577	4.9	8.9	5.8	<1
R5/07647	4.9	8.9	5.8	<1
R5/07783	14.6	10.5	6.9	<1
R5/08574	4.2	8.8	5.7	<1
R5/11751	14.1	11.0	7.3	<1
R5/F(G)/AQ01	14.1	11.3	7.6	<1
Air Quality Objective Values	**40**	**40**	**25**	**35**

7.8.16 Modelled predictions of existing baseline concentrations of annual mean and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition rates are provided in Table 14.58, for the ecological receptors considered in Section F (Gwynedd Council Section).

7.8.17 The table shows that the pollutants considered are at background levels at locations located away from the A55. This is because they are not located adjacent to any sources that have been modelled in the existing baseline scenario. The sites adjacent to the A55 (AQ/F(G)/E01 and AQ/F(G)/E02) already experience nutrient nitrogen deposition rates that are in excess of the upper Critical Load for that pollutant, and total acid and acid as nitrogen deposition rates that are in excess of the lower Critical Load, mainly due to elevated background conditions.

Table 14.58 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E01	Coedydd Afon Menai SSSI (north-east of A55)	0	19.1	28.6	1.0	35.59	2.74	2.54	0.20
		5	20.0	30.1	1.0	35.73	2.75	2.55	0.20
		10	20.9	31.4	1.0	35.87	2.76	2.56	0.20
		15	21.6	32.4	1.0	35.98	2.77	2.57	0.20
		20	21.9	32.9	1.0	36.02	2.77	2.57	0.20
		25	22.0	33.0	1.0	36.04	2.77	2.57	0.20
		30	21.8	32.8	1.0	36.01	2.77	2.57	0.20
		35	21.6	32.3	1.0	35.98	2.77	2.57	0.20
		40	21.2	31.9	1.0	35.92	2.77	2.57	0.20
		45	20.9	31.3	1.0	35.87	2.76	2.56	0.20
		50	20.5	30.8	1.0	35.81	2.76	2.56	0.20
		100	17.5	26.3	1.0	35.34	2.72	2.52	0.20

Table 14.58 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		150	15.9	23.9	1.0	35.09	2.71	2.51	0.20
		200	15.0	22.5	1.0	34.95	2.70	2.50	0.20
AQ/F(G)/E02	Coedydd Afon Menai SSSI (south-west of A55)	0	16.6	24.9	1.0	35.20	2.71	2.51	0.20
		5	16.5	24.7	1.0	35.18	2.71	2.51	0.20
		10	16.3	24.4	1.0	35.15	2.71	2.51	0.20
		15	16.1	24.2	1.0	35.12	2.71	2.51	0.20
		20	16.0	24.0	1.0	35.11	2.71	2.51	0.20
		25	15.8	23.8	1.0	35.07	2.71	2.51	0.20
		30	15.7	23.5	1.0	35.06	2.70	2.50	0.20
		35	15.6	23.4	1.0	35.04	2.70	2.50	0.20
		40	15.5	23.2	1.0	35.03	2.70	2.50	0.20
		45	15.3	23.0	1.0	35.00	2.70	2.50	0.20

Table 14.58 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		50	15.2	22.9	1.0	34.98	2.70	2.50	0.20
		100	14.5	21.7	1.0	34.87	2.69	2.49	0.20
		150	13.9	20.8	1.0	34.77	2.68	2.48	0.20
		200	13.5	20.2	1.0	34.71	2.68	2.48	0.20
AQ/F(G)/E03	Plantation on Ancient Woodland Site (Ref: 43562)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E04	Ancient Semi Natural Woodland (Ref: 25071)	n/a	7.7	11.6	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E05	Plantation on Ancient Woodland Site (Ref: 43561)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21

Table 14.58 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E06	Ancient Woodland Site of Unknown Category (Ref: 48976)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E07	Plantation on Ancient Woodland Site (Ref: 43552)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E08	Plantation on Ancient Woodland Site (Ref: 43538)	n/a	7.7	11.6	1.2	23.8	1.91	1.70	0.29
AQ/F(G)/E09	Plantation on Ancient Woodland Site (Ref: 43537)	n/a	7.1	10.7	1.2	23.8	1.91	1.70	0.29

Table 14.58 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E10	Plantation on Ancient Woodland Site (Ref: 43555)	n/a	7.0	10.5	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E11	Eryri SAC (south of Crymlyn)	n/a	6.9	10.4	1.0	20.4	1.66	1.46	0.28
AQ/F(G)/E12	Eryri SAC (north of Bethesda)	n/a	7.2	10.8	1.6	25.9	2.16	1.85	0.42
AQ/F(G)/E13	Eryri SAC (west of Bethesda)	n/a	6.6	9.9	1.2	23.8	1.91	1.70	0.29
AQ/F(G)/E14	Eryri SAC (south of Rhiwlas)	n/a	6.7	10.1	2.0	23.5	1.95	1.68	0.36
AQ/F(G)/E15	Eryri SAC (south of Deiniolen)	n/a	6.5	9.8	2.0	23.5	1.95	1.68	0.36
Air Quality Objective Value, Critical Level and Critical Loads									

Table 14.58 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
Coedydd Afon Menai SSSI			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**
Ancient Woodland			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**
Eryri SAC			**30**	**75**	**10**	**5 – 10**	**0.873–3.993**	**0.633–2.193**	**0.240–1.800**

Predicted Future Baseline Pollutant Concentration Data

7.8.18 Modelled predictions of future baseline concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.59, for the human receptors considered in this assessment in Section F (Gwynedd Council Section).

7.8.19 The table shows that at receptors located adjacent to the local road network, there is a slight increase in predicted concentrations from those reported in the existing baseline scenario (Table 14.57). This is due to the year on year growth in traffic flows that is anticipated to occur in Gwynedd. Away from the local road network, concentrations remain at background conditions.

Table 14.59 Predicted Future Baseline Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/06922	4.2	9.0	5.9	<1
R5/07156	4.9	8.9	5.8	<1
R5/07180	11.5	9.9	6.5	<1
R5/07195	15.3	10.2	6.7	<1
R5/07322	4.9	8.9	5.8	<1
R5/07470	16.4	10.4	6.8	<1
R5/07577	4.9	8.9	5.8	<1
R5/07647	4.9	8.9	5.8	<1
R5/07783	15.2	10.6	6.9	<1
R5/08574	4.2	8.8	5.7	<1
R5/11751	14.7	11.0	7.3	<1
R5/AQ01	14.7	11.3	7.6	<1
Air Quality Objective Values	**40**	**40**	**25**	**35**

7.8.20 Modelled predictions of future baseline concentrations of annual mean and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition

are provided in Table 14.60, for the ecological receptor considered in Section F (Gwynedd Council Section).

7.8.21 The table shows that the pollutants considered remain similar to background and existing baseline levels at the ecological locations considered that are away from modelled road sources. The ecological receptors adjacent to the A55 (AQ/F(G)/E01 and AQ/F(G)/E02), experience a slight increase in annual mean concentrations of NO_X and deposition rates, due to the general growth in traffic flow on that road between 2016 and 2023.

Table 14.61 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E01	Coedydd Afon Menai SSSI (north-east of A55)	0	15.3	23.0	1.0	34.85	2.69	2.49	0.20
		5	16.0	24.0	1.0	34.95	2.70	2.50	0.20
		10	16.7	25.1	1.0	35.05	2.70	2.50	0.20
		15	17.2	25.8	1.0	35.13	2.71	2.51	0.20
		20	17.4	26.1	1.0	35.17	2.71	2.51	0.20
		25	17.4	26.1	1.0	35.17	2.71	2.51	0.20
		30	17.3	26.0	1.0	35.16	2.71	2.51	0.20
		35	17.1	25.7	1.0	35.12	2.71	2.51	0.20
		40	16.9	25.4	1.0	35.09	2.71	2.51	0.20
		45	16.6	24.9	1.0	35.05	2.70	2.50	0.20
		50	16.4	24.6	1.0	35.01	2.70	2.50	0.20
		100	14.2	21.3	1.0	34.67	2.68	2.48	0.20

Table 14.61 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		150	13.1	19.7	1.0	34.49	2.66	2.46	0.20
		200	12.4	18.6	1.0	34.38	2.66	2.46	0.20
AQ/F(G)/E02	Coedydd Afon Menai SSSI (south-west of A55)	0	13.6	20.4	1.0	34.57	2.67	2.47	0.20
		5	13.4	20.1	1.0	34.55	2.67	2.47	0.20
		10	13.3	20.0	1.0	34.53	2.67	2.47	0.20
		15	13.2	19.8	1.0	34.51	2.67	2.47	0.20
		20	13.1	19.7	1.0	34.50	2.66	2.46	0.20
		25	13.0	19.5	1.0	34.48	2.66	2.46	0.20
		30	12.9	19.4	1.0	34.46	2.66	2.46	0.20
		35	12.8	19.2	1.0	34.45	2.66	2.46	0.20
		40	12.7	19.1	1.0	34.44	2.66	2.46	0.20
		45	12.6	18.9	1.0	34.42	2.66	2.46	0.20

Table 14.61 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		50	12.6	18.9	1.0	34.41	2.66	2.46	0.20
		100	12.0	18.0	1.0	34.32	2.65	2.45	0.20
		150	11.6	17.4	1.0	34.25	2.65	2.45	0.20
		200	7.1	10.7	1.0	34.19	2.64	2.44	0.20
AQ/F(G)/E03	Plantation on Ancient Woodland Site (Ref: 43562)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E04	Ancient Semi Natural Woodland (Ref: 25071)	n/a	7.7	11.6	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E05	Plantation on Ancient Woodland Site (Ref: 43561)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21

Table 14.61 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E06	Ancient Woodland Site of Unknown Category (Ref: 48976)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E07	Plantation on Ancient Woodland Site (Ref: 43552)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E08	Plantation on Ancient Woodland Site (Ref: 43538)	n/a	7.7	11.6	1.2	23.8	1.91	1.70	0.29
AQ/F(G)/E09	Plantation on Ancient Woodland Site (Ref: 43537)	n/a	7.1	10.7	1.2	23.8	1.91	1.70	0.29

Table 14.61 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E10	Plantation on Ancient Woodland Site (Ref: 43555)	n/a	7.0	10.5	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E11	Eryri SAC (south of Crymlyn)	n/a	6.9	10.4	1.0	20.4	1.66	1.46	0.28
AQ/F(G)/E12	Eryri SAC (north of Bethesda)	n/a	7.2	10.8	1.6	25.9	2.16	1.85	0.42
AQ/F(G)/E13	Eryri SAC (west of Bethesda)	n/a	6.6	9.9	1.2	23.8	1.91	1.70	0.29
AQ/F(G)/E14	Eryri SAC (south of Rhiwlas)	n/a	6.7	10.1	2.0	23.5	1.95	1.68	0.36
AQ/F(G)/E15	Eryri SAC (south of Deiniolen)	n/a	6.5	9.8	2.0	23.5	1.95	1.68	0.36
Air Quality Objective Value, Critical Level and Critical Loads									

Table 14.61 Predicted Existing Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
Coedydd Afon Menai SSSI			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**
Ancient Woodland			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**
Eryri SAC			**30**	**75**	**10**	**5 – 10**	**0.873–3.993**	**0.633–2.193**	**0.240–1.800**

Table 14.60 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E01	Coedydd Afon Menai SSSI (north-east of A55)	0	19.7	29.5	1.0	35.68	2.75	2.55	0.20
		5	20.7	31.1	1.0	35.84	2.76	2.56	0.20
		10	21.7	32.5	1.0	35.99	2.77	2.57	0.20
		15	22.4	33.6	1.0	36.10	2.78	2.58	0.20
		20	22.8	34.2	1.0	36.16	2.78	2.58	0.20
		25	22.8	34.2	1.0	36.16	2.78	2.58	0.20
		30	22.7	34.0	1.0	36.15	2.78	2.58	0.20
		35	22.4	33.5	1.0	36.10	2.78	2.58	0.20
		40	22.0	33.0	1.0	36.04	2.77	2.57	0.20
		45	21.6	32.5	1.0	35.98	2.77	2.57	0.20
		50	21.2	31.8	1.0	35.92	2.77	2.57	0.20
		100	18.0	27.0	1.0	35.42	2.73	2.53	0.20

Table 14.60 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		150	16.3	24.4	1.0	35.15	2.71	2.51	0.20
		200	15.2	22.9	1.0	34.98	2.70	2.50	0.20
AQ/F(G)/E02	Coedydd Afon Menai SSSI (south-west of A55)	0	17.0	25.5	1.0	35.26	2.72	2.52	0.20
		5	16.8	25.2	1.0	35.23	2.72	2.52	0.20
		10	16.7	25.0	1.0	35.22	2.72	2.52	0.20
		15	16.5	24.7	1.0	35.18	2.71	2.51	0.20
		20	16.3	24.5	1.0	35.15	2.71	2.51	0.20
		25	16.2	24.2	1.0	35.14	2.71	2.51	0.20
		30	16.0	24.0	1.0	35.11	2.71	2.51	0.20
		35	15.9	23.9	1.0	35.09	2.71	2.51	0.20
		40	15.8	23.6	1.0	35.07	2.71	2.51	0.20
		45	15.6	23.5	1.0	35.04	2.70	2.50	0.20

Table 14.60 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		50	15.5	23.3	1.0	35.03	2.70	2.50	0.20
		100	14.7	22.0	1.0	34.90	2.69	2.49	0.20
		150	14.1	21.1	1.0	34.81	2.69	2.49	0.20
		200	13.6	20.4	1.0	34.73	2.68	2.48	0.20
AQ/F(G)/E03	Plantation on Ancient Woodland Site (Ref: 43562)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E04	Ancient Semi Natural Woodland (Ref: 25071)	n/a	7.7	11.6	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E05	Plantation on Ancient Woodland Site (Ref: 43561)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21

Table 14.60 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E06	Ancient Woodland Site of Unknown Category (Ref: 48976)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E07	Plantation on Ancient Woodland Site (Ref: 43552)	n/a	8.2	12.3	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E08	Plantation on Ancient Woodland Site (Ref: 43538)	n/a	7.7	11.6	1.2	23.8	1.91	1.70	0.29
AQ/F(G)/E09	Plantation on Ancient Woodland Site (Ref: 43537)	n/a	7.1	10.7	1.2	23.8	1.91	1.70	0.29

Table 14.60 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E10	Plantation on Ancient Woodland Site (Ref: 43555)	n/a	7.0	10.5	1.2	21.3	1.68	1.52	0.21
AQ/F(G)/E11	Eryri SAC (south of Crymlyn)	n/a	6.9	10.4	1.0	20.4	1.66	1.46	0.28
AQ/F(G)/E12	Eryri SAC (north of Bethesda)	n/a	7.2	10.8	1.6	25.9	2.16	1.85	0.42
AQ/F(G)/E13	Eryri SAC (west of Bethesda)	n/a	6.6	9.9	1.2	23.8	1.91	1.70	0.29
AQ/F(G)/E14	Eryri SAC (south of Rhiwlas)	n/a	6.7	10.1	2.0	23.5	1.95	1.68	0.36
AQ/F(G)/E15	Eryri SAC (south of Deiniolen)	n/a	6.5	9.8	2.0	23.5	1.95	1.68	0.36
Air Quality Objective Value, Critical Level and Critical Loads									

Table 14.60 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
Coedydd Afon Menai SSSI			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**
Ancient Woodland			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**
Eryri SAC			**30**	**75**	**10**	**5 – 10**	**0.873–3.993**	**0.633–2.193**	**0.240–1.800**

7.9 BASELINE SUMMARY

7.9.1 Based on the secondary data that are currently available, neither IACC nor Gwynedd Council has declared any AQMAs within either administrative area. Where monitoring and measurement show that concentrations of a pollutant are above, or at risk of being above, a national air quality objective value, this has only occurred at locations where there is no relevant sensitive exposure to long term air quality objectives. Both IACC and Gwynedd Council have raised concerns over the annual mean NO_2 concentrations measured at layby locations on the A55. Whilst not being representative of relevant exposure to the annual mean NO_2 air quality objective, there is an argument that these locations are representative of relevant exposure to the hourly mean NO_2 air quality objective, due to the layby being used by HGV drivers as a resting point. The hourly mean NO_2 air quality objective value can be considered to be at risk of an exceedance, where annual mean concentrations are well above the annual mean air quality objective value. The limited dust deposition data gathered by IACC suggest that dust deposition rates are typical of rural locations across the UK, with an elevated reading at a location where sea salt is likely to be a large contributor.

7.9.2 The secondary data that are available for pollutant concentrations and deposition rates at the ecologically sensitive sites in the study area suggest that there is already an exceedance of deposition rate Critical Loads for nutrient nitrogen, total acid and acid as nitrogen at some of the sites considered. Exceedances occur where the background contribution to these pollutants is already elevated. Such conditions are common for designated ecological sites across much of the UK.

7.9.3 The primary data gathered by the Proposed Development-specific NO_2 diffusion tube survey and the baseline model predictions align with the findings of IACC and Gwynedd Council monitoring data, in that roadside concentrations across much of the study area are well below the national air quality objective value of 40 µg/m^3. Concentrations are elevated beyond the objective value at locations immediately adjacent to A55 laybys, where there is no relevant exposure to the long term air quality objectives. However, measured long term concentrations are such that there could be a risk of the short term NO_2 air quality objective being exceeded at at least one layby site.

7.9.4 Annual mean concentrations of PM_{10} and $PM_{2.5}$ are below the national air quality objectives and WHO guidelines at all locations in the baseline scenarios considered.

8 Potential Effects

8.1 INTRODUCTION

8.1.1 This section describes the potential unmitigated air quality effects that could occur as a result of the Proposed Development. Potential sources of emissions to air and the sensitive receptors affected are presented in Table 14.61.

Table 14.61 Potential Air Quality Effects Resulting from the Proposed Development

Potential Air Quality Effect	Description	Sensitive Receptors
Dust soiling from construction activity	Construction activity could generate fugitive emissions of coarse material that could deposit beyond the site boundary and soil public and private property.	Sensitive locations within the study area are defined as residential and commercial properties located within 350 m of the Order Limits, and/or 50 m of a public road that is within 500 m of a site access point.
Increase in airborne PM_{10} concentrations that could be a risk to human health	Construction activity could also generate fugitive emissions of finer material that could be small enough to increase short-term airborne concentrations of PM_{10}.	Sensitive locations within the study area are defined as residential properties and areas of public amenity (such as PRoW) located within 350 m of the Order Limits, and/or 50 m of a public road that is within 500 m of a site access point.
Deposition of dust from construction activity causing	Construction activity could generate fugitive emissions of coarse material that could deposit beyond the site boundary and harm the	Sensitive ecological sites, including international, national and local designations, within 50 m of the Order Limits, and/or 50 m of a public road that is within 500 m of a site access point.

Table 14.61 Potential Air Quality Effects Resulting from the Proposed Development		
Potential Air Quality Effect	Description	Sensitive Receptors
ecological harm	ecological health of nearby protected habitats.	
Increase in pollutant concentrations due to construction phase road traffic emissions	Emissions from construction traffic could increase the pollutant concentrations that sensitive receptors are exposed to beyond baseline conditions.	Selected representative residential properties and ecologically sensitive habitat (with an international or a national designation) located within 200 m of a construction traffic route, and/or Access Track, where the number of construction vehicles exceeds, or nearly exceeds the criteria defined in current guidance. This includes selected residential properties and ecological habitat located within 200 m of stretches of the A55, where construction traffic flows exceed the criteria.
Increase in pollutant concentrations due to construction phase emergency generator emissions	Emissions from construction emergency generator plant could increase the pollutant concentrations that sensitive receptors are exposed to beyond baseline conditions	Selected representative residential properties and ecologically sensitive habitat (with an international or a national designation) in the area surrounding the emergency generation plant at Braint and Tŷ Fodol

9 Mitigation and Residual Effects

9.1 INTRODUCTION

9.1.1 This section describes the approach followed to determine appropriate construction phase mitigation, and the effect of the Proposed Development following the application of appropriate mitigation. This section should be read in conjunction with Appendix 14.3 Detailed Air Quality Assessment (**Document 5.14.2.3**) and Figures 14.3 and 14.4.

9.2 CONSTRUCTION

Dust and PM_{10} Emissions

9.2.1 As discussed in Section 4 Methodology, and in line with the IAQM approach, a step by step assessment has been undertaken, which considers the risk of dust impacts occurring and the sensitivity of the study area to such impacts. From this, the appropriate level of mitigation has been determined.

Step 1: Screen the Requirements for a Detailed Assessment

9.2.2 Works associated with the construction of the OHL, tunnel, THH/CSEC and substations have the potential to generate dust and PM_{10} emissions that could impact upon sensitive amenity and human health receptors located within 350 m of the Order Limits and ecologically sensitive receptors located within 50 m of the Order Limits.

9.2.3 There are several dust and PM_{10} sensitive receptors located close enough to the Order Limits such that they could be impacted upon by emissions. This assessment focuses on the highest bands of sensitivity for each section of the works, where the risk of dust and PM_{10} are greatest. The numbers of receptors of high sensitivity within the study area (as defined in Table 14.6 and Appendix14.2) are summarised in Table 14.62.

Table 14.62: Number of High Sensitivity Receptors that could Potentially be Impacted by Construction Dust and PM_{10} Impacts			
Section	Impact Type		
	Dust Soiling	Human Health	Ecology
A (including Wylfa Substation)	244	242	1
B	108	107	0
C	86	83	1
D (including Penmynydd Road Construction Compound)	55	55	2
E	123	123	0
F (IACC Section)	9	9	0
F (Gwynedd Council Section)	23	23	4
Total	**648**	**642**	**8**

Step 2: Assess the Risk of Dust Impacts

(a) Define the Potential Dust Emission Magnitude

9.2.4 A description of the works and the methods of construction is provided in ES Chapter 4 Construction, Operation, Maintenance and Decommissioning of the Proposed Development **(Document 5.4)**. In summary, the works required to construct the Proposed Development, which have the potential to generate air quality impacts (see Table 14.63) include the following elements:

- Earthworks.
- Pylon foundations.
- Pylon erection.
- Building foundations.
- Stockpiling
- Tunnelling.
- Construction (the building and erection of structures, referred to as 'construction proper').
- Structural building works.

- Trackout (construction vehicles leaving all worksites onto the public road network).

9.2.5 Other than the removal of some existing pylons, no demolition works are anticipated as part of the Proposed Development and demolition impacts are therefore not considered separately. The method used to define the magnitude of impact for construction elements (earthworks, construction proper and trackout) is detailed in Appendix 14.2 (**Document 5.14.2.2**). The approach is based upon the nature of the works and site characteristics. A summary of the process undertaken to determine the potential dust emission magnitude is provided in Table 14.66 (note that the factors highlighted in bold are those that are considered the key determining factors.

Table 14.63 Process of Determining Potential Dust Emission Magnitude

Section	Emission Magnitude			Justification
	Earth-works	Construction (proper)	Trackout	
A[1]	**Large**	Small	Small	**Total site area >10,000 m²;** **Potentially dusty soil type;** Construction material with low potential for dust release; <10 HGV outward movements in any one day.
B	**Large**	Small	Small	**Total site area >10,000 m²;** **Potentially dusty soil type;** Construction material with low potential for dust release; <10 HGV outward movements in any one day.
C	**Large**	Small	Small	**Total site area >10,000 m²;** **Potentially dusty soil type;** Construction material with low potential for dust release; <10 HGV outward movements in any one day.
D[2]	**Large**	**Large**	**Large**	**Total site area >10,000 m²;** **Potentially dusty soil type;**

Table 14.63 Process of Determining Potential Dust Emission Magnitude				
Section	Emission Magnitude			Justification
	Earth-works	Construction (proper)	Trackout	
				>50 HGV outward movements in any one day.
E	**Large**	Small	Small	**Total site area >10,000 m²;** **Potentially dusty soil type;** Construction material with low potential for dust release; <10 HGV outward movements in any one day.
F[3]	**Large**	**Large**	**Large**	**Total site area >10,000 m²;** **Potentially dusty soil type;** **Building volume >100,000 m³;** **>50 HGV outward movements in any one day.**

[1] including works to Wylfa Substation, [2] including Penmynydd Road Construction Compound, [3] including THHs, CSECs and Pentir Substation

9.2.6 Whilst the emission magnitude for the earthworks element is defined as 'large' for Sections A to E, emissions of this magnitude would be likely to be limited to short periods of time, and impacts would therefore only affect individual receptors for a period of weeks, rather than months. However, the IAQM guidance (Ref 14.17) does not take into account the temporal nature of construction works in the determination of dust emission magnitude and therefore professional judgement has been applied in concluding the significance of effects.

(b) Define the Sensitivity of the Area

9.2.7 The method used to define the sensitivity of the area to dust and PM_{10} impacts resulting from construction activity is presented in Appendix 14.2 (**Document 5.14.2.2**). It is based on the sensitivity of individual properties to amenity impacts as well as human health impacts, ecological impacts, the quantity of receptors present and the proximity of these receptors to the Order Limits.

9.2.8 The majority of receptor types located within 350 m of the Order Limits are at the higher end of the sensitivity spectrum, as defined in Appendix 14.2 (**Document 5.14.2.2**) for dust soiling, human health and ecological impacts (though note the aggregate of receptors in an area may not be considered high just because an individual receptor type is high). The level of mitigation determined as a result of this assessment should be capable of controlling impacts on receptors of all defined levels of sensitivity.

9.2.9 A summary of the process is provided in Table 14.64. A list of the receptors of high sensitivity within each distance zone is provided in Appendix 14.2 (**Document 5.14.2.2**) and shown in Figure 14.3. There are also numerous dust sensitive receptors of medium and low sensitivity located within 350 m of the Proposed Development Order Limits, including non-residential property, PRoW, and ecological sites with a local designation. However, in all Sections of the Proposed Development, the sensitivity of the area is set by the number and proximity of receptors of high sensitivity to dust. Therefore, the determination of the risk of dust impacts is sufficiently robust to account for the medium and low sensitivity areas.

Table 14.64: Process of Defining the Sensitivity of the Assessment Area

Section	Annual Mean PM_{10} Conc. ($\mu g/m^3$)[a]	Number of Highly Sensitive Receptors within					Sensitivity of the area
		<20 m	<50 m	<100 m	<200 m	<350 m	
Dust Soiling							
A[1]	n/a	5	11	19	n/a	244	Medium
B	n/a	17	39	57	n/a	108	**High**
C	n/a	10	24	34	n/a	86	**High**
D[2]	n/a	3	6	10	n/a	55	**High**
E	n/a	8	21	34	n/a	83	Medium
F[3] IACC	n/a	0	0	0	n/a	9	Low
F[4] Gwynedd Council		6	7	12	n/a	32	Medium
Human Health							
A[1]	<24	5	11	19	50	242	Low
B	<24	16	38	56	41	107	Low
C[2]	<24	10	24	34	50	83	Low

Table 14.64: Process of Defining the Sensitivity of the Assessment Area							
Section	Annual Mean PM_{10} Conc. ($\mu g/m^3$)[a]	Number of Highly Sensitive Receptors within					Sensitivity of the area
		<20 m	<50 m	<100 m	<200 m	<350 m	
D	<24	3	6	10	18	55	Low
E	<24	8	21	34	49	83	Low
F[3] IACC	<24	0	0	0	0	9	Low
F[4] Gwynedd Council	<24	6	7	12	9	32	Low
Ecology							
A[1]	n/a	0	1	n/a	n/a	n/a	Low
B	n/a	0	0	n/a	n/a	n/a	Low
C	n/a	1	0	n/a	n/a	n/a	**High**
D[2]	n/a	1	1	n/a	n/a	n/a	**High**
E	n/a	0	0	n/a	n/a	n/a	Low
F[3] IACC	n/a	0	0	n/a	n/a	n/a	Low
F[4] Gwynedd Council	n/a	4	0	n/a	n/a	n/a	Medium

[1] including Wylfa Substation; [2] including Penmynydd Road Construction Compound; [3] including Braint Construction Compound; [4] including Tŷ Fodol Construction Compound; [a] average of all 1 km by 1 km grid square values in that section.

(c) Define the Risk of Impacts

9.2.10 The overall risk of dust impacts occurring is determined by combining the dust emission magnitude, established in Step 2(a), and the sensitivity of the area, established in Step 2(b). This process is summarised in Table 14.65.

9.2.11 The table shows that there is a high risk of dust soiling impact due to earthworks in Section B and Section C, as a result of the surface area of ground to be worked and the number of highly sensitive receptors in close proximity to the works. High risk dust soiling impacts would also occur due to construction (proper) activities and trackout in Section C,.

9.2.12 There is a low to negligible risk of human health impacts occurring, due to any increase in short-term concentrations of PM_{10}, from earthworks, construction (proper) and trackout, in all Sections of the works. This is mainly due to existing baseline concentrations of annual mean PM_{10} being well below the air quality objective value that was set for the protection of human health.

Table 14.65: Defining the Dust Impact Risk								
Section	Dust Emission Magnitude			Impact Type	Area Sensitivity	Dust Impact Risk		
	E[a]	C[b]	T[c]			E[a]	C[b]	T[d]
A[1]	**Large**	Small	Small	Dust soiling	Medium	Medium	Low	Negligible
				Human Health	Low	Low	Negligible	Negligible
				Ecology	Low	Low	Negligible	Negligible
B	**Large**	Small	Small	Dust soiling	**High**	**High**	Negligible	Negligible
				Human Health	Low	Low	Negligible	Negligible
				Ecology	n/a	n/a	n/a	n/a
C	**Large**	Small	Small	Dust soiling	**High**	**High**	Low	Low
				Human Health	Low	Low	Negligible	Negligible
				Ecology	**High**	**High**	Low	Low
D[2]	**Large**	Large	Large	Dust soiling	**High**	**High**	**High**	**High**
				Human Health	Low	Low	Low	Low
				Ecology	**High**	**High**	**High**	**High**
E	**Large**	Small	Small	Dust soiling	Medium	Medium	Low	Negligible
				Human Health	Low	Low	Negligible	Negligible
				Ecology	n/a	n/a	n/a	n/a

Table 14.65: Defining the Dust Impact Risk								
Section	Dust Emission Magnitude			Impact Type	Area Sensitivity	Dust Impact Risk		
	E[a]	C[b]	T[c]			E[a]	C[b]	T[d]
F[3] IACC	**Large**	**Large**	**Large**	Dust soiling	Low	Low	Low	Low
				Human Health	Low	Low	Low	Low
				Ecology	n/a	n/a	n/a	n/a
F[4] Gwynedd Council	**Large**	**Large**	**Large**	Dust soiling	Medium	Medium	Medium	Medium
				Human Health	Low	Low	Low	Low
				Ecology	Medium	Medium	Medium	Medium

[1] including Wylfa Substation; [2] including Penmynydd Road Construction Compound; [3] including Braint Construction Compound; [4] including Tŷ Fodol Construction Compound; [a] E = Earthworks; [b] C = Construction (proper); [c] T = Trackout

9.2.13 The number of dust soiling sensitive receptors and their proximity to the Order Limits of the Proposed Development varies between sections, with area sensitivity considered high in Section B, Section C and Section D, and medium in Section A, Section E and Section F (IACC section) and Section F (Gwynedd Council section). Where the highly sensitive locations coincide with construction activity that would have a large dust emission magnitude, the risk of a dust soiling impact occurring would be high (Section B, Section C and Section D). The risk would then reduce as the sensitivity of the area and the dust emission magnitude lessened.

9.2.14 Whilst the number of human health sensitive receptors is similar to the number of dust soiling receptors, the sensitivity of the area to human health impacts is low in all sections of the Proposed Development, due to the low annual mean PM_{10} concentrations. Even where the dust emission magnitude would be high, the risk of a human health impact occurring would be low to negligible.

9.2.15 There are a limited number of ecological receptors of high sensitivity located in close enough proximity to the Order Limits such that dust impacts would be possible, with parts of the Corsydd Mon SAC located within 50 m of Section C and Section D. In Section C, the large dust emission magnitude associated with earthworks would have a high dust impact risk at this location. In Section D, the large dust emission magnitude associated with earthworks, construction and trackout would have a high dust impact risk at this location. In Section A, dust emissions from earthworks would have a low risk of ecology impact, affecting the Tre'r Gof SSSI. In Section F (Gwynedd Council section), Ancient Woodland sites are located with 50 m of the Order Limits, resulting in a dust impact risk of medium, due to the large dust emission magnitude likely at this location.

Step 3: Identify the Need for Site-Specific Mitigation

9.2.16 The dust risk categories for each of the four activities determined in Step 2C have been used to define the appropriate, site-specific, mitigation measures to be adopted for the works. The IAQM sets out mitigation measures that should be considered, using the terms 'highly recommended', 'desirable' and 'not required', dependent upon the impact risk identified.

9.2.17 The full list of mitigation measures set out by the IAQM is provided in Appendix 14.3 (**Document 5.14.2.3**). The majority of these measures are standard practice on all well managed construction sites across the UK.

9.2.18 The measures that are specifically applicable to the construction works associated with the Proposed Development are set out within the CEMP (**Document 7.4**) as summarised in the box below.

The Mitigation measures relevant to construction dust and particulate emissions set out within the CEMP (**Document 7.4**) are listed as follows:

- AE11:General commitment to the application of control measures and visual assessment
- AE12: Implementation of a Dust Management Plan
- AE13: General dust control measures (e.g. Water available for dust suppression at all times, enforcement of speed limits for surfaced and unsurfaced site roads, public cleaning of public roads on the approach to main site access and egress points, and wheel washing facility at main site egress points)
- AE14: Site layout (e.g. Locating high risk dust generating activities as far from sensitive receptors as practical and hard surfacing of access and egress points)
- AE15: Storage and handling of materials (e.g. Minimise the handling of dusty materials, minimise drop heights, enclosing vehicles that carry potentially dusty material to and from site, and stabilise earthworked areas and long-term stockpiles as soon as practical (i.e. seeding))
- AE31: Communication and record keeping (e.g. Make site contact details available to the public, record dust complaints and remediation measures, and record any exceptional incidents, irrespective of if they relate to a complaint or not)
- AE41: Monitoring (e.g. passive and real-time dust monitoring at main construction compounds)

Step 4: Define Impacts and their Significance

9.2.19 The assessment of construction dust and PM_{10} emissions defines the level of risk associated with the Proposed Development construction works, and in turn, suggests which standard control measures are required in order to mitigate emissions to the extent that a significant impact does not occur.

9.2.20 The dust and PM_{10} control measures described in the CEMP (**Document 7.4**), which are standard practice on all well managed construction sites, mean that residual effects as a result of construction dust and PM_{10} emissions would be **not significant**.

9.2.21 Monitoring of airborne dust and dust deposition would be undertaken at site boundary locations at the Penmynydd Road Construction Compound and

Braint and Tŷ Fodol Construction Compounds. Monitoring would be undertaken using a 'Frisbee' style dust gauge. Monitoring of airborne concentrations of PM_{10} would be undertaken using an electronic light scattering device. Data gathered during the works would provide evidence on the effectiveness of the dust control measures. Should the monitoring identify elevated dust deposition rates and/or concentrtions of PM_{10}, then additional mitigation measures may be required. Monitoring would be undertaken throughout the works, as well as for a period of at least three months prior to the works commencing. The data gathered prior to the works would be used as a benchmark against which data gathered during the works would be compared. The data gathered during the monitoring surveys would be shared with IACC and Gwynedd Council (as set out in the Enhancement Strategy (**Document 7.13**)).

Construction Phase Road Traffic and Emergency Generator Emissions

9.2.22 Measures to reduce the impacts of emergency generator emissions are described in the CEMP (**Document 7.4**) as summarised in the box below.

The Mitigation measures relevant to construction road traffic and emergency generator emissions are set out within the CEMP (**Document 7.4**) are listed as follows:

- AE21:Road traffic and emergency generator emissions (e.g. Use of low emission vehicles and plant, vehicle and plant idling prohibited, enforcement of a Outline Construction Traffic Management Plan (**Document 7.5**) to direct construction traffic on planned construction routes and encourage sustainable travel

9.2.23 The residual impact of construction phase road traffic emissions and the combined impact of construction phase road traffic and emergency generator emissions on human and ecological receptors, where appropriate, are reported below for each section of the Proposed Development.

9.2.24 The residual impact and resultant effects are reported at the same locations for scenarios that assume TBM drive from Braint, TBM drive from Tŷ Fodol and drill and blast.

Section A Wylfa to Rhosgoch

9.2.25 Proposed Development construction traffic flows in Section A would not exceed the criteria defined in guidance (Ref 14.15) that indicate that a significant effect could occur. In addition, the sensitive locations in Section A are not close enough to the emergency generators at the tunnel compounds

to experience effects that are likely to be significant. It is therefore considered that the effect would be **not significant**.

Section B Rhosgoch to Llandyfrydog

9.2.26 Proposed Development construction traffic flows in Section B would not exceed the criteria defined in guidance (Ref 14.15) that indicate that a significant effect could occur. In addition, the sensitive locations in Section B are not close enough to the emergency generators at the tunnel compounds to experience effects that are likely to be significant. It is therefore considered that the effect would be **not significant**.

Section C Llandyfrydog to B5110 North of Talwrn

9.2.27 Proposed Development construction traffic flows in Section C would not exceed the criteria defined in guidance (Ref 14.15) that indicate that a significant effect could occur. However, there are sensitive internationally designated ecological sites in Section C that are close enough to be affected by the emissions from the emergency generators, such that there is some potential to experience significant effects.

9.2.28 Predicted annual and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition rates are provided in Table 14.66 for the selected ecological receptors located in Section C. The impact of construction phase emissions, as a percentage of the air quality objective value, critical level and critical loads, are provided in parenthesis.

9.2.29 Table 14.66 shows that at sensitive ecological locations within 10 km of the emergency generators (i.e. AQ/C/E01 and AQ/C/E02), annual mean impacts of all pollutants considered, under all tunnelling scenarios, are less than 1% of the relevant air quality objective values and Critical Loads. Daily mean NO_X impacts are also less than 10% of the relevant Critical Level. In line with EA guidance (Ref 14.19), such an impact is considered insignificant (**not significant**).

Table 14.66 Predicted Construction Phase Pollutant Statistics at Ecological Receptors – Section C Llandyfrydog to B5110 north of Talwrn

Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Deposition Rate			
		Annual mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
TBM Drive from Braint								
AQ/C/E01	Corsydd Mon SAC at Llanddyfnan (west)	6.2 (0.1%)	9.3 (0.1%)	0.9 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
AQ/C/E02	Corsydd Mon SAC at Llanddyfnan (east)	6.3 (0.1%)	9.5 (0.1%)	0.9 (0.1%)	14.00 (0.1%)	1.17 (0.1%)	1.00 (0.1%)	0.17 (0.1%)
TBM Drive from Tŷ Fodol								
AQ/C/E01	Corsydd Mon SAC at Llanddyfnan (west)	6.2 (0.1%)	9.3 (0.1%)	0.9 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
AQ/C/E02	Corsydd Mon SAC at Llanddyfnan (east)	6.3 (0.1%)	9.5 (0.1%)	0.9 (0.1%)	14.00 (0.1%)	1.17 (0.1%)	1.00 (0.1%)	0.17 (0.1%)
Drill and Blast								
AQ/C/E01	Corsydd Mon SAC at Llanddyfnan (west)	6.2 (0.1%)	9.3 (0.1%)	0.9 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)

Table 14.66 Predicted Construction Phase Pollutant Statistics at Ecological Receptors – Section C Llandyfrydog to B5110 north of Talwrn

Receptor ID	Ecological Receptor	Concentration (μg/m^3)			Deposition Rate			
		Annual mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
AQ/C/E02	Corsydd Mon SAC at Llanddyfnan (east)	6.3 (0.1%)	9.5 (0.1%)	0.9 (0.1%)	14.00 (0.1%)	1.17 (0.1%)	1.00 (0.1%)	0.17 (0.1%)
Air Quality Objective Value, Critical Level and Critical Loads		**30**	**75**	**10**	**15 – 20**	**0.920–8.883**	**0.633–4.283**	**0.287–4.600**

Section D B5110 North of Talwrn to the Ceint

9.2.30 Modelled predictions of construction phase concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective value are provided in Table 14.67, for the human receptors considered in this assessment in Section D. The impacts are summarised in Table 14.68.

9.2.31 The tables show that predicted pollutant concentrations and the number of exceedances reported are well below the national air quality objective values during the Proposed Development construction phase. At the location with the largest increase (RT4/13212), EPUK and IAQM guidance states that a very low impact at an area where total concentrations are less than 30.2 µg/m^3 represents a negligible effect, which is considered to be **not significant**. Any difference in flows on the construction traffic routes between the two TBM drive options and drill and blast does not influence the predictions made in Section D.

Table 14.67 Predicted Construction Phase Pollutant Statistics at Human Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Predicted Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
TBM Drive from Braint				
RT4/13208	10.0	9.4	6.1	<1
RT4/13212	14.9	10.6	7.3	<1
TBM Drive from Tŷ Fodol				
RT4/13208	10.0	9.4	6.1	<1
RT4/13212	14.9	10.6	7.3	<1
Drill and Blast				
RT4/13208	10.0	9.4	6.1	<1
RT4/13212	14.9	10.6	7.3	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

Table 14.68 Impacts at Human Receptors – Section D B5110 north of Talwrn to the Ceint				
Receptor ID	Increase in Annual Mean Concentration ($\mu g/m^3$) over baseline			Increase in No. of Days when PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
TBM Drive from Braint				
RT4/13208	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
RT4/13212	0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
TBM Drive from Tŷ Fodol				
RT4/13208	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
RT4/13212	0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
Drill and Blast				
RT4/13208	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
RT4/13212	0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
Change in concentration descriptor: (I) = Imperceptible, (VL) = Very Low, (L) = Low, (M) = Medium, (La) = Large				

9.2.32 Modelled predictions of construction phase concentrations of annual and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition rates are provided in Table 14.69, for the ecological receptors considered in Section D. Sensitive receptors here are either located within 10 km of the Braint Tunnel Construction Compound (AQ/D/E01 to AQ/D/E03), or within 200 m of a construction traffic route (AQ/D/E04). The impact of construction phase emissions as a percentage of the air quality objective value and critical loads are provided in parenthesis.

9.2.33 The table shows that for all tunnel options considered, the impact on annual mean concentrations of NO_X, annual mean nutrient nitrogen deposition and acid deposition are less than 1% of the relevant air quality objective value and Critical Loads, and therefore do not meet the significance criteria set out in EA guidance (Ref 14.19) and are considered insignificant (**not significant**). The impact on daily mean concentrations of NO_X is less than 10% of the Critical Level, which, in line with the same guidance, is also considered insignificant (**not significant**).

Table 14.69 Predicted Construction Phase Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
TBM Drive from Braint									
AQ/D/E01	Corsydd Mon SAC (west of Talwrn)	n/a	7.0 (0.1%)	10.5 (0.1%)	1.0 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
AQ/D/E02	Corsydd Mon SAC (north of Talwrn)	n/a	6.6 (0.1%)	9.9 (0.1%)	1.0 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
AQ/D/E03	Corsydd Mon SAC (east of Talwrn)	n/a	6.6 (0.1%)	9.9 (0.1%)	1.0 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
AQ/D/E04	Cors Ddyga SSSI	0	25.8 (0.4%)	38.7 (0.2%)	1.3 (0.1%)	16.31 (0.1%)	1.34 (0.1%)	1.18 (0.1%)	0.16 (0.1%)
		5	21.7 (0.3%)	32.5 (0.2%)	1.3 (0.1%)	16.00 (0.1%)	1.32 0.1 (%)	1.16 (0.1%)	0.16 (0.1%)
		10	19.5 (0.3%)	29.3 (0.2%)	1.3 (0.1%)	15.83 (0.1%)	1.31 (0.1%)	1.15 (0.1%)	0.16 (0.1%)

Table 14.69 Predicted Construction Phase Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		15	18.2 (0.3%)	27.2 (0.2%)	1.3 (0.1%)	15.73 (0.1%)	1.30 (0.1%)	1.14 (0.1%)	0.16 (0.1%)
		20	17.2 (0.2%)	25.8 (0.1%)	1.3 (0.1%)	15.65 (0.1%)	1.29 (0.1%)	1.13 (0.1%)	0.16 (0.1%)
		25	16.4 (0.2%)	24.7 (0.1%)	1.3 (0.1%)	15.59 (0.1%)	1.29 (0.1%)	1.13 (0.1%)	0.16 (0.1%)
		30	15.8 (0.2%)	23.7 (0.1%)	1.3 (0.1%)	15.54 (0.1%)	1.29 (0.1%)	1.13 (0.1%)	0.16 (0.1%)
		35	15.3 (0.2%)	23.0 (0.1%)	1.3 (0.1%)	15.50 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)
		40	14.9 (0.2%)	22.3 (0.1%)	1.3 (0.1%)	15.47 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)
		45	14.5 (0.2%)	21.7 (0.1%)	1.3 (0.1%)	15.44 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)

Table 14.69 Predicted Construction Phase Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		50	14.1 (0.2%)	21.2 (0.1%)	1.3 (0.1%)	15.41 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)
		100	12.2 (0.1%)	18.2 (0.1%)	1.3 (0.1%)	15.25 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
		150	11.3 (0.1%)	16.9 (0.1%)	1.3 (0.1%)	15.18 (0.1%)	1.26 (0.1%)	1.10 (0.1%)	0.16 (0.1%)
		200	10.8 (0.1%)	16.2 (0.1%)	1.3 (0.1%)	15.14 (0.1%)	1.26 (0.1%)	1.10 (0.1%)	0.16 (0.1%)
TBM Drive from Tŷ Fodol									
AQ/D/E01	Corsydd Mon SAC (west of Talwrn)	n/a	7.0 (0.1%)	10.5 (0.1%)	1.0 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
AQ/D/E02	Corsydd Mon SAC (north of Talwrn)	n/a	6.6 (0.1%)	9.9 (0.1%)	1.0 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)

Table 14.69 Predicted Construction Phase Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
AQ/D/E03	Corsydd Mon SAC (east of Talwrn)	n/a	6.6 (0.1%)	9.9 (0.1%)	1.0 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
AQ/D/E04	Cors Ddyga SSSI	0	25.8 (0.4%)	38.7 (0.2%)	1.3 (0.1%)	16.31 (0.1%)	1.34 (0.1%)	1.18 (0.1%)	0.16 (0.1%)
		5	21.7 (0.3%)	32.5 (0.2%)	1.3 (0.1%)	16.00 (0.1%)	1.32 0.1 (%)	1.16 (0.1%)	0.16 (0.1%)
		10	19.5 (0.3%)	29.3 (0.2%)	1.3 (0.1%)	15.83 (0.1%)	1.31 (0.1%)	1.15 (0.1%)	0.16 (0.1%)
		15	18.2 (0.3%)	27.2 (0.2%)	1.3 (0.1%)	15.73 (0.1%)	1.30 (0.1%)	1.14 (0.1%)	0.16 (0.1%)
		20	17.2 (0.2%)	25.8 (0.1%)	1.3 (0.1%)	15.65 (0.1%)	1.29 (0.1%)	1.13 (0.1%)	0.16 (0.1%)
		25	16.4 (0.2%)	24.7 (0.1%)	1.3 (0.1%)	15.59 (0.1%)	1.29 (0.1%)	1.13 (0.1%)	0.16 (0.1%)

Table 14.69 Predicted Construction Phase Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		30	15.8 (0.2%)	23.7 (0.1%)	1.3 (0.1%)	15.54 (0.1%)	1.29 (0.1%)	1.13 (0.1%)	0.16 (0.1%)
		35	15.3 (0.2%)	23.0 (0.1%)	1.3 (0.1%)	15.50 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)
		40	14.9 (0.2%)	22.3 (0.1%)	1.3 (0.1%)	15.47 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)
		45	14.5 (0.2%)	21.7 (0.1%)	1.3 (0.1%)	15.44 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)
		50	14.1 (0.2%)	21.2 (0.1%)	1.3 (0.1%)	15.41 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)
		100	12.2 (0.1%)	18.2 (0.1%)	1.3 (0.1%)	15.25 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
		150	11.3 (0.1%)	16.9 (0.1%)	1.3 (0.1%)	15.18 (0.1%)	1.26 (0.1%)	1.10 (0.1%)	0.16 (0.1%)

Table 14.69 Predicted Construction Phase Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		200	10.8 (0.1%)	16.2 (0.1%)	1.3 (0.1%)	15.14 (0.1%)	1.26 (0.1%)	1.10 (0.1%)	0.16 (0.1%)
Drill and Blast									
AQ/D/E01	Corsydd Mon SAC (west of Talwrn)	n/a	7.0 (0.1%)	10.5 (0.1%)	1.0 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
AQ/D/E02	Corsydd Mon SAC (north of Talwrn)	n/a	6.6 (0.1%)	9.9 (0.1%)	1.0 (0.1%)	15.50 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
AQ/D/E03	Corsydd Mon SAC (east of Talwrn)	n/a	6.6 (0.1%)	9.9 (0.1%)	1.0 (0.1%)	15.50 (%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
AQ/D/E04	Cors Ddyga SSSI	0	25.8 (0.4%)	38.7 (0.2%)	1.3 (0.1%)	16.31 (0.1%)	1.34 (0.1%)	1.18 (0.1%)	0.16 (0.1%)
		5	21.7 (0.3%)	32.5 (0.2%)	1.3 (0.1%)	16.00 (0.1%)	1.32 0.1 (%)	1.16 (0.1%)	0.16 (0.1%)

Table 14.69 Predicted Construction Phase Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		10	19.5 (0.3%)	29.3 (0.2%)	1.3 (0.1%)	15.83 (0.1%)	1.31 (0.1%)	1.15 (0.1%)	0.16 (0.1%)
		15	18.2 (0.3%)	27.2 (0.2%)	1.3 (0.1%)	15.73 (0.1%)	1.30 (0.1%)	1.14 (0.1%)	0.16 (0.1%)
		20	17.2 (0.2%)	25.8 (0.1%)	1.3 (0.1%)	15.65 (0.1%)	1.29 (0.1%)	1.13 (0.1%)	0.16 (0.1%)
		25	16.4 (0.2%)	24.7 (0.1%)	1.3 (0.1%)	15.59 (0.1%)	1.29 (0.1%)	1.13 (0.1%)	0.16 (0.1%)
		30	15.8 (0.2%)	23.7 (0.1%)	1.3 (0.1%)	15.54 (0.1%)	1.29 (0.1%)	1.13 (0.1%)	0.16 (0.1%)
		35	15.3 (0.2%)	23.0 (0.1%)	1.3 (0.1%)	15.50 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)
		40	14.9 (0.2%)	22.3 (0.1%)	1.3 (0.1%)	15.47 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)

Table 14.69 Predicted Construction Phase Pollutant Statistics at Ecological Receptors – Section D B5110 north of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		45	14.5 (0.2%)	21.7 (0.1%)	1.3 (0.1%)	15.44 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)
		50	14.1 (0.2%)	21.2 (0.1%)	1.3 (0.1%)	15.41 (0.1%)	1.28 (0.1%)	1.12 (0.1%)	0.16 (0.1%)
		100	12.2 (0.1%)	18.2 (0.1%)	1.3 (0.1%)	15.25 (0.1%)	1.27 (0.1%)	1.11 (0.1%)	0.16 (0.1%)
		150	11.3 (0.1%)	16.9 (0.1%)	1.3 (0.1%)	15.18 (0.1%)	1.26 (0.1%)	1.10 (0.1%)	0.16 (0.1%)
		200	10.8 (0.1%)	16.2 (0.1%)	1.3 (0.1%)	15.14 (0.1%)	1.26 (0.1%)	1.10 (0.1%)	0.16 (0.1%)
Air Quality Objective, Critical Level, Critical Load									
Corsydd Mon SAC			**30**	**75**	**10**	**15 – 20**	**0.920–8.883**	**0.633–4.283**	**0.287–4.600**
Cors Ddyga SSSI			**30**	**75**	**10**	**10–15**	**1.920–8.773**	**1.130–4.273**	**0.790–4.500**

Section E Ceint to the Afon Braint

9.2.34 Modelled predictions of construction phase concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.70, for the human health receptors considered in this assessment in Section E. The potential impacts are summarised in Table 14.71.

9.2.35 The tables show that predicted pollutant concentrations and the number of exceedances reported are well below the national air quality objective values during the Proposed Development construction phase, for all tunnel options considered. In line with EPUK and IAQM guidance (Ref 14.15), impacts reported are imperceptible, representing a negligible effect, which is considered to be **not significant**.

Table 14.70 Predicted Construction Phase Pollutant Statistics at Human Receptors – Section E Ceint to the Afon Braint

Receptor ID	Predicted Annual Mean Concentration ($\mu g/m^3$)			No. of Days PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
TBM Drive from Braint				
R5/00071	10.8	9.7	6.4	<1
R5/02601	11.3	10.0	6.6	<1
R5/02641	5.2	9.5	6.1	<1
R5/02726	8.9	9.9	6.6	<1
TBM Drive from Tŷ Fodol				
R5/00071	10.8	9.7	6.4	<1
R5/02601	11.3	10.0	6.6	<1
R5/02641	5.1	9.5	6.1	<1
R5/02726	8.9	9.9	6.6	<1
Drill and Blast				
R5/00071	10.8	9.7	6.4	<1
R5/02601	11.3	10.0	6.6	<1
R5/02641	5.2	9.5	6.1	<1
R5/02726	8.9	9.9	6.6	<1

Table 14.70 Predicted Construction Phase Pollutant Statistics at Human Receptors – Section E Ceint to the Afon Braint				
Receptor ID	Predicted Annual Mean Concentration ($\mu g/m^3$)			No. of Days PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Air Quality Objective Value	**40**	**40**	**25**	**35**

Table 14.71 Impact on Human Receptors – Section E Ceint to the Afon Braint				
Receptor ID	Increase in Annual Mean Concentration ($\mu g/m^3$) over baseline			Increase in No. of Days when PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
TBM Drive from Braint				
R5/00071	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/02601	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/02641	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/02726	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
TBM Drive from Tŷ Fodol				
R5/00071	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/02601	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/02641	<0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/02726	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
Drill and Blast				
R5/00071	0.1 (I)	<0.1 (I)	<0.01 (I)	<1
R5/02601	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/02641	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/02726	0.1 (I)	<0.1 (I)	<0.1 (I)	<1
Change in concentration descriptor: (I) = Imperceptible, (VL) = Very Low, (L) = Low, (M) = Medium, (La) = Large				

9.2.36 Table 14.72 presents predicted hourly mean NO_X and daily mean PM_{10} concentrations and impacts at selected human health sensitive receptors in Section E, located in close proximity (within 1km) to the emergency generators at the Braint construction compound, where impacts are likely to be greatest.

9.2.37 The table shows that impacts to hourly mean NO_2 and daily mean PM_{10} are less than 10% of the relevant air quality objectives at the closest properties in Section E to the emergency generator plant, which, in line with EA guidance (Ref 14.19), is considered insignificant (**not significant**).

9.2.38 It should also be noted that the assessment of short-term emergency generator emissions assumes that each generator could be operational at any hour of the year, and therefore could coincide with the worst meteorological conditions experienced at each receptor. In reality, each generator would be operational for less than 52 hours per year (<1%) for testing (which is also likely to be carried out for periods of less than 1 hour). Whilst the number of hours of operation required for emergency running during an outage of the primary source cannot be predicted, it is unlikely to exceed the 500 hours per year (<6%) assumed in this assessment. Therefore, the likelihood of emergency generator operation coinciding with the worst meteorological conditions at each receptor is low and the results presented represent a robust estimate of hourly mean NO_X and daily mean PM_{10} impacts during construction.

9.2.39 Further scrutiny of hourly mean NO_2 impacts at the worst affected receptor location in Section E is required due to their proximity to the Braint Tunnel Construction Compound, and has been undertaken using hypergeometric analysis. The analysis has shown that if the generators were to operate over every hour of each of the meteorological years considered (2012 to 2016), the probability of an exceedance of the hourly mean NO_2 air quality objective would be less than 5% (i.e. a one in 20 year event).

Table 14.72 Predicted short-term Pollutant Statistics at Human Receptors – Section E Ceint to the Afon Braint								
Receptor ID	Hourly Mean NO_2				Daily Mean PM_{10}			
	Impact $\mu g/m^3$	% of Air Quality Obj.	Total Conc. $\mu g/m^3$	% of Air Quality Obj.	Impact $\mu g/m^3$	% of Air Quality Obj.	Total Conc. $\mu g/m^3$	% of Air Quality Obj.
TBM Drive from Braint								
R5/02641	11.1	5.6	21.3	10.7	<0.1	<0.1	14.3	28.6
R5/02725	10.2	5.1	22.7	11.3	<0.1	<0.1	14.3	28.6
TBM Drive from Tŷ Fodol								
R5/02641	10.9	5.5	21.1	10.6	<0.1	<0.1	14.3	28.6
R5/02725	10	5.0	22.5	11.2	<0.1	<0.1	14.3	28.6
Drill and Blast								
R5/02641	11.1	5.6	21.3	10.7	<0.1	<0.1	14.3	28.6
R5/02641	11.1	5.6	21.3	10.7	<0.1	<0.1	14.3	28.6
Air Quality Objective Value	**200**				**50**			

Section F Afon Braint to Pentir – IACC Section

9.2.40 Modelled predictions of construction phase concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.73, for the human receptors considered in this assessment in Section F (IACC section). The impact and effects are summarised in Tables 14.74. These predictions include combined traffic and emergency generator sources.

9.2.41 The tables show that predicted pollutant concentrations and the number of exceedances reported are well below the national air quality objective values during the Proposed Development construction phase. Concentrations, exceedances and impacts differ slightly between the tunnel options and scenarios considered, due to the relative variation in energy demand at the Tunnel Construction Compounds. The majority of representative receptors in Section F (IACC section) would experience a very low to low impact. The worst affected selected receptor (R5/02987) is located predominantly down

wind of the emergency generator plant at the Braint tunnel construction compound, and would experience a medium impact. In line with EPUK and IAQM guidance (Ref 14.15), a medium impact at an area where total concentrations are less than 30.2 µg/m^3 represents a minor adverse effect, which is considered to be **not significant**.

Table 14.73 Predicted Construction Phase Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (IACC Section)

Receptor ID	Predicted Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
TBM Drive from Braint				
R5/02815	4.7	8.7	5.6	<1
R5/02878	4.3	8.7	5.6	<1
R5/02917	9.5	9.8	6.4	<1
R5/02987	8.9	9.5	6.1	<1
R5/03134	9.0	10.6	7.2	<1
R5/03353	14.4	11.2	7.8	<1
R5/03423	7.6	10.5	7.1	<1
R5/03460	14.9	11.6	8.2	<1
R5/03755	7.0	9.1	6.0	<1
R5/05159	10.4	11.0	7.6	<1
R5/05343	11.1	9.9	6.6	<1
R5/05644	11.8	10.0	6.6	<1
R5/05837	11.9	10.0	6.6	<1
R5/06474	13.0	10.9	7.5	<1
R5/06661	11.4	10.6	7.2	<1
R5/06714	15.5	10.9	7.5	<1
R5/06835	16.9	11.0	7.6	<1
R5/06863	12.7	10.6	7.2	<1
R5/06907	14.7	10.7	7.2	<1
TBM Drive from Tŷ Fodol				

Table 14.73 Predicted Construction Phase Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (IACC Section)				
Receptor ID	Predicted Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/02815	4.3	8.7	5.6	<1
R5/02878	4.2	8.7	5.6	<1
R5/02917	9.3	9.8	6.4	<1
R5/02987	7.1	9.5	6.1	<1
R5/03134	8.4	10.6	7.2	<1
R5/03353	14.1	11.2	7.8	<1
R5/03423	7.3	10.5	7.1	<1
R5/03460	14.6	11.6	8.2	<1
R5/03755	6.8	9.1	6.0	<1
R5/05159	10.4	11.0	7.6	<1
R5/05343	11.0	9.9	6.6	<1
R5/05644	11.7	10.0	6.6	<1
R5/05837	11.8	10.0	6.6	<1
R5/06474	12.9	10.9	7.5	<1
R5/06661	11.3	10.6	7.2	<1
R5/06714	15.4	10.9	7.5	<1
R5/06835	16.8	11.0	7.6	<1
R5/06863	12.6	10.6	7.2	<1
R5/06907	14.6	10.7	7.2	<1
Drill and Blast				
R5/02815	4.7	8.7	5.6	<1
R5/02878	4.3	8.7	5.6	<1
R5/02917	9.6	9.8	6.4	<1
R5/02987	8.9	9.5	6.1	<1
R5/03134	9.0	10.6	7.2	<1

Table 14.73 Predicted Construction Phase Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (IACC Section)				
Receptor ID	Predicted Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/03353	14.4	11.2	7.8	<1
R5/03423	7.7	10.5	7.1	<1
R5/03460	15.0	11.6	8.2	<1
R5/03755	7.1	9.1	6.0	<1
R5/05159	10.4	11.0	7.6	<1
R5/05343	11.1	9.9	6.6	<1
R5/05644	11.8	10.0	6.6	<1
R5/05837	11.9	10.0	6.6	<1
R5/06474	13.1	10.9	7.5	<1
R5/06661	11.4	10.6	7.2	<1
R5/06714	15.5	10.9	7.5	<1
R5/06835	16.9	11.0	7.6	<1
R5/06863	12.7	10.6	7.2	<1
R5/06907	14.7	10.7	7.2	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

Table 14.74 Impacts at Human Receptors – Section F Afon Braint to Pentir (IACC Section)				
Receptor ID	Increase in Annual Mean Concentration (µg/m^3) over baseline			Increase in No. of Days when PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
TBM Drive from Braint				
R5/02815	+0.6 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/02878	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1

Table 14.74 Impacts at Human Receptors – Section F Afon Braint to Pentir (IACC Section)				
Receptor ID	Increase in Annual Mean Concentration ($\mu g/m^3$) over baseline			Increase in No. of Days when PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/02917	+0.3 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/02987	+2.7 (M)	+<0.1 (I)	+<0.1 (I)	<1
R5/03134	+1.2 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/03353	+0.7 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/03423	+0.6 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/03460	+0.6 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/03755	+0.7 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/05159	+0.4 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/05343	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/05644	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/05837	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/06474	+0.3 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/06661	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/06714	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/06835	+0.3 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/06863	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/06907	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1
TBM Drive from Tŷ Fodol				
R5/02815	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/02878	+0.1 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/02917	+0.1 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/02987	+0.9 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/03134	+0.6 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/03353	+0.4 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/03423	+0.3 (VL)	+<0.1 (I)	+<0.1 (I)	<1

Table 14.74 Impacts at Human Receptors – Section F Afon Braint to Pentir (IACC Section)				
Receptor ID	Increase in Annual Mean Concentration ($\mu g/m^3$) over baseline			Increase in No. of Days when PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/03460	+0.3 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/03755	+0.5 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/05159	+0.4 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/05343	+0.1 (I)	+<0.1 (I)	+<0.1 (I)	<1
R5/05644	+0.1 (I)	+<0.1 (I)	+<0.1 (I)	<1
R5/05837	+0.1 (I)	+<0.1 (I)	+<0.1 (I)	<1
R5/06474	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/06661	+0.1 (I)	+<0.1 (I)	+<0.1 (I)	<1
R5/06714	+0.1 (I)	+<0.1 (I)	+<0.1 (I)	<1
R5/06835	+0.2 (VL)	+<0.1 (I)	+<0.1 (I)	<1
R5/06863	+0.1 (I)	+<0.1 (I)	+<0.1 (I)	<1
Drill and Blast				
R5/02815	+0.6 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/02878	+0.2 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/02917	+0.4 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/02987	+2.7 (M)	+<0.1 (I)	+<0.1 (I)	<1
R5/03134	+1.2 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/03353	+0.7 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/03423	+0.7 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/03460	+0.7 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/03755	+0.8 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/05159	+0.4 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/05343	+0.2 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/05644	+0.2 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/05837	+0.2 (L)	+<0.1 (I)	+<0.1 (I)	<1

Table 14.74 Impacts at Human Receptors – Section F Afon Braint to Pentir (IACC Section)				
Receptor ID	Increase in Annual Mean Concentration ($\mu g/m^3$) over baseline			Increase in No. of Days when PM_{10} Exceeds 50 $\mu g/m^3$ (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/06474	+0.4 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/06661	+0.2 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/06714	+0.2 (L)	+<0.1 (I)	+<0.1 (I)	<1
R5/06835	+0.3 (L)	+<0.1 (I)	+<0.1 (I)	<1
Change in concentration descriptor: (I) = Imperceptible, (VL) = Very Low, (L) = Low, (M) = Medium, (La) = Large				

9.2.42 Table 14.75 presents predicted hourly mean NO_X and daily mean PM_{10} concentrations and impacts at selected human health sensitive receptors in Section F (IACC section), located in close proximity (within 1km) to the emergency generators at the Braint construction compound, where impacts are likely to be greatest.

9.2.43 The table shows that at the closest properties in Section F (IACC section) to the emergency generators, impacts to hourly mean concentrations of NO_2 are greater than 10% of the national air quality objective (R5/02815, R5/02987 and R5/03425). At receptors R5/02815 and R5/03425, impacts are less than 20% of the hourly mean air quality objective, minus twice the annual mean background concentration. In line with EA guidance (Ref 14.19), the impact at these locations can be screened as insignificant (**not significant**). At the other location (R5/02987), impacts are greater than 20% of the hourly mean air quality objective, minus twice the annual mean background concentration, and this impact cannot be screened as insignificant. However, at this location, total hourly mean concentrations account for less than 30% of the air quality objective value, leaving a 'headroom' of 70%. This suggests that there is little to no risk of an exceedance of the air quality objective and the impact would not constrain future development in the area. It is therefore considered **not significant**. Impacts on hourly mean NO_2 at other locations are less than 10% of the air quality objective, as are impacts on daily mean PM_{10} concentrations at all receptors, which are also considered to be insignificant (**not significant**).

9.2.44 It is reiterated that the assessment of hourly mean NO_2 concentrations from emergency generator emissions is conservative, due to assumptions on operational hours coinciding with worst meteorological conditions, as described in paragraph 9.2.38.

9.2.45 Further scrutiny of hourly mean NO_2 impacts at the worst affected receptor location in Section F (IACC section) is required due to their proximity to the Braint Tunnel Construction Compound, and has been undertaken using hypergeometric analysis. The analysis has shown that if the generators were to operate over every hour of each of the meteorological years considered (2012 to 2016), the probability of an exceedance of the hourly mean NO_2 air quality objective would be less than 5% (i.e. a one in 20 year event).

Table 14.75 Predicted short-term Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (IACC Section)

Receptor ID	Hourly Mean NO_2				Daily Mean PM_{10}			
	Impact µg/m^3	% of Air Quality Obj.	Total Conc. µg/m^3	% of Air Quality Obj.	Impact µg/m^3	% of Air Quality Obj.	Total Conc. µg/m^3	% of Air Quality Obj.
TBM Drive from Braint								
R5/02815	21.3	10.7	29.6	14.8	<0.1	<0.1	13.0	26.0
R5/02878	14.3	7.2	22.6	11.3	<0.1	<0.1	13.0	26.0
R5/02917	13.7	6.9	26.2	13.1	<0.1	<0.1	14.3	28.6
R5/02987	47.6	23.8	60.1	30.0	0.1	0.2	14.4	28.8
R5/03425	20.1	10.1	33.0	16.5	<0.1	<0.1	15.7	31.3
R5/03460	12.6	6.3	25.5	12.8	<0.1	<0.1	15.7	31.3
R5/03755	16.7	8.4	25.3	12.7	<0.1	<0.1	13.3	26.6
TBM Drive from Tŷ Fodol								
R5/02815	21.3	10.7	29.6	14.8	<0.1	<0.1	13.0	26.0
R5/02878	14.1	7.1	22.4	11.2	<0.1	<0.1	13.0	26.0
R5/02917	13.5	6.8	26.0	13.0	<0.1	<0.1	14.3	28.6
R5/02987	47.3	23.7	59.8	29.9	0.1	0.2	14.4	28.8
R5/03425	20.1	10.1	33.0	16.5	<0.1	<0.1	15.7	31.3
R5/03460	12.6	6.3	25.5	12.8	<0.1	<0.1	15.7	31.3

Table 14.75 Predicted short-term Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (IACC Section)								
Receptor ID	Hourly Mean NO_2				Daily Mean PM_{10}			
	Impact $\mu g/m^3$	% of Air Quality Obj.	Total Conc. $\mu g/m^3$	% of Air Quality Obj.	Impact $\mu g/m^3$	% of Air Quality Obj.	Total Conc. $\mu g/m^3$	% of Air Quality Obj.
R5/03755	16.7	8.4	25.3	12.7	<0.1	<0.1	13.3	26.6
Drill and Blast								
R5/02815	21.3	10.7	29.6	14.8	<0.1	<0.1	13.0	26.0
R5/02878	14.3	7.2	22.6	11.3	<0.1	<0.1	13.0	26.0
R5/02917	13.7	6.9	26.2	13.1	<0.1	<0.1	14.3	28.6
R5/02987	47.6	23.8	60.1	30.0	0.1	0.2	14.4	28.8
R5/03425	20.1	10.1	33.0	16.5	<0.1	<0.1	15.7	31.3
R5/03460	12.6	6.3	25.5	12.8	<0.1	<0.1	15.7	31.3
R5/03755	16.7	8.4	25.3	12.7	<0.1	<0.1	13.3	26.6
Air Quality Objective Value	**200**				**50**			

9.2.46 Table 14.76 provides annual and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition rates for the selected designated ecological receptors located in Section F (IACC section), which are within 2 km of emergency generators at the Braint Tunnel Construction Compound. The impact of construction phase emissions as a percentage of the air quality objective value, critical level and critical loads are provided in parenthesis.

9.2.47 The table shows that there is an exceedance of the upper critical load for nutrient nitrogen deposition, and an exceedance of the lower critical load for acid as nitrogen deposition, at the ecological sites considered in Section F (IACC section). Impacts at these locations are greater for the TBM with the tunnel drive from Braint and the Drill and Blast option, rather than TBM with the drive from Tŷ Fodol, due to the greater power demand that would be required at the Braint tunnel construction compound. The table shows that the Proposed Development contributes less than 100% of the annual mean air quality objective value for NO_X and Critical Loads for nutrient nitrogen deposition and acid deposition, and the daily mean air quality objective value

for NO_X. In line with EA guidance, these impacts are considered insignificant (**not significant**).

Table 14.76 Predicted Future Baseline Pollutant Concentration Data – Section F Afon Braint to Pentir (IACC Section)									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
TBM Drive from Braint									
AQ/F(A)/E01	Ancient Semi Natural Woodland (Ref: 25877)	n/a	7.5 (0.4%)	18.3 (10.1%)	1.0 (0.1%)	32.3 (0.8%)	2.51 (0.2%)	2.30 (0.4%)	0.20 (0.1%)
AQ/F(A)/E02	Restored Ancient Woodland Site (Ref: 24261)	n/a	7.5 (0.2%)	18.7 (10.3%)	1.0 (0.1%)	32.2 (0.4%)	2.50 (0.1%)	2.30 (0.2%)	0.20 (0.1%)
AQ/F(A)/E03	Plantation on Ancient Woodland Site (Ref: 43628)	n/a	7.4 (0.3%)	18.4 (10.3%)	1.0 (0.1%)	32.3 (0.6%)	2.50 (0.2%)	2.30 (0.3%)	0.20 (0.1%)
TBM Drive from Tŷ Fodol									
AQ/F(A)/E01	Ancient Semi Natural Woodland (Ref: 25877)	n/a	7.2 (0.1%)	18.0 (10.1%)	1.0 (0.1%)	32.2 (0.2%)	2.50 (0.1%)	2.31 (0.1%)	0.2 (0.1%)

Table 14.76 Predicted Future Baseline Pollutant Concentration Data – Section F Afon Braint to Pentir (IACC Section)									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(A)/ E02	Restored Ancient Woodland Site (Ref: 24261)	n/a	7.4 (0.1%)	18.7 (10.3%)	1.0 (0.1%)	32.2 (0.20%)	2.50 (0.1%)	2.30 (0.1%)	0.20 (0.1%)
AQ/F(A)/ E03	Plantation on Ancient Woodland Site (Ref: 43628)	n/a	7.2 (0.1%)	18.4 (10.3%)	1.0 (0.1%)	32.2 (0.2%)	3.50 (0.1%)	2.30 (0.1%)	0.2 (0.1%)
Drill and Blast									
AQ/F(A)/ E01	Ancient Semi Natural Woodland (Ref: 25877)	n/a	7.5 (0.4%)	18.3 (10.1%)	1.0 (0.1%)	32.3 (0.8%)	2.51 (0.2%)	2.30 (0.4%)	0.20 (0.1%)
AQ/F(A)/ E02	Restored Ancient Woodland Site (Ref: 24261)	n/a	7.5 (0.2%)	18.7 (10.3%)	1.0 (0.1%)	32.2 (0.4%)	2.50 (0.1%)	2.30 (0.2%)	0.20 (0.1%)

Table 14.76 Predicted Future Baseline Pollutant Concentration Data – Section F Afon Braint to Pentir (IACC Section)									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(A)/ E03	Plantation on Ancient Woodland Site (Ref: 43628)	n/a	7.4 (0.3%)	18.4 (10.3%)	1.0 (0.1%)	32.3 (0.6%)	2.50 (0.2%)	2.30 (0.3%)	0.20 (0.1%)
Air Quality Objective, Critical Level, Critical Load									
Ancient Woodland			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**

Section F Afon Braint to Pentir – Gwynedd Council Section

9.2.48 Modelled predictions of construction phase concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.77, for the human receptors considered in this assessment in Section F (Gwynedd Council section). The impact and effects are summarised in Tables 14.78. These predictions include combined traffic and emergency generator sources.

9.2.49 The tables show that predicted pollutant concentrations and the number of exceedances reported are well below the national air quality objective values during the Proposed Development construction phase. Concentrations, exceedances and impacts differ slightly between the tunnel options and scenarios considered, due to the relative variation in energy demand at the tunnel construction compounds. Representative receptors in Section F (IACC section) would experience a low to negligible impact. In line with EPUK and IAQM guidance (Ref 14.15), such impacts at locations where total concentrations are so low are considered negligible and **not significant**.

Table 14.77 Predicted Construction Phase Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Predicted Annual Mean Concentration (µg/m3)			Predicted No. of Days when PM10 Exceeds 50 µg/m3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
TBM Drive from Braint				
R5/06922	4.3	9.0	5.9	<1
R5/07156	5.0	8.9	5.8	<1
R5/07180	11.7	9.9	6.5	<1
R5/07195	15.5	10.2	6.8	<1
R5/07322	5.0	8.9	5.8	<1
R5/07470	16.6	10.3	6.9	<1
R5/07577	5.2	8.9	5.8	<1
R5/07647	5.1	8.9	5.8	<1
R5/07783	15.4	10.5	7.1	<1
R5/08574	4.3	8.8	5.7	<1
R5/11751	14.8	11.0	7.5	<1

Table 14.77 Predicted Construction Phase Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)				
Receptor ID	Predicted Annual Mean Concentration (µg/m3)			Predicted No. of Days when PM10 Exceeds 50 µg/m3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/AQ01	14.8	11.3	7.8	<1
TBM Drive from Tŷ Fodol				
R5/06922	4.5	9.0	5.9	<1
R5/07156	5.2	8.9	5.8	<1
R5/07180	11.7	9.9	6.5	<1
R5/07195	15.5	10.2	6.8	<1
R5/07322	5.2	8.9	5.8	<1
R5/07470	16.6	10.3	6.9	<1
R5/07577	5.7	8.9	5.8	<1
R5/07647	5.6	8.9	5.8	<1
R5/07783	15.5	10.5	7.1	<1
R5/08574	4.4	8.8	5.7	<1
R5/11751	14.9	11.0	7.5	<1
R5/AQ01	14.8	11.3	7.8	<1
Drill and Blast				
R5/06922	4.5	9.0	5.9	<1
R5/07156	5.2	8.9	5.8	<1
R5/07180	11.7	9.9	6.5	<1
R5/07195	15.5	10.2	6.8	<1
R5/07322	5.2	8.9	5.8	<1
R5/07470	16.6	10.3	6.9	<1
R5/07577	5.7	8.9	5.8	<1
R5/07647	5.6	8.9	5.8	<1
R5/07783	15.5	10.5	7.1	<1
R5/08574	4.4	8.8	5.7	<1

Table 14.77 Predicted Construction Phase Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)				
Receptor ID	Predicted Annual Mean Concentration (µg/m3)			Predicted No. of Days when PM10 Exceeds 50 µg/m3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/11751	14.9	11.0	7.5	<1
R5/AQ01	14.8	11.3	7.8	<1
Air Quality Objective Values	**40**	**40**	**25**	**35**

Table 14.78 Impacts and Effects at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)				
Receptor ID	Increase in Annual Mean Concentration (µg/m^3) above baseline			Increase in the No. of Days when PM_{10} Exceeds 50 µg/m^3 (days) above baseline
	NO_2	PM_{10}	$PM_{2.5}$	
TBM Drive from Braint				
R5/06922	+0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/07156	+0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/07180	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07195	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07322	+0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/07470	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07577	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07647	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07783	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/08574	+0.1 (I)	<0.1 (I)	<0.1 (I)	<1
R5/11751	+0.1 (I)	<0.1 (I)	<0.1 (I)	<1

Table 14.78 Impacts and Effects at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)				
Receptor ID	Increase in Annual Mean Concentration ($\mu g/m^3$) above baseline			Increase in the No. of Days when PM_{10} Exceeds 50 $\mu g/m^3$ (days) above baseline
	NO_2	PM_{10}	$PM_{2.5}$	
R5/AQ01	+0.1 (I)	<0.1 (I)	<0.1 (I)	<1
TBM Drive from Tŷ Fodol				
R5/06922	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07156	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07180	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07195	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07322	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07470	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07577	+0.8 (L)	<0.1 (I)	<0.1 (I)	<1
R5/07647	+0.7 (L)	<0.1 (I)	<0.1 (I)	<1
R5/07783	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/08574	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/11751	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/AQ01	+0.1 (I)	<0.1 (I)	<0.1 (I)	<1
Drill and Blast				
R5/06922	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07156	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07180	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07195	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07322	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07470	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/07577	+0.8 (L)	<0.1 (I)	<0.1 (I)	<1
R5/07647	+0.7 (L)	<0.1 (I)	<0.1 (I)	<1

Table 14.78 Impacts and Effects at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)				
Receptor ID	Increase in Annual Mean Concentration ($\mu g/m^3$) above baseline			Increase in the No. of Days when PM_{10} Exceeds 50 $\mu g/m^3$ (days) above baseline
	NO_2	PM_{10}	$PM_{2.5}$	
R5/07783	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/08574	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/11751	+0.2 (VL)	<0.1 (I)	<0.1 (I)	<1
R5/AQ01	+0.1 (I)	<0.1 (I)	<0.1 (I)	<1
Air Quality Objective Values	**40**	**40**	**25**	**35**

9.2.50 Table 14.79 presents predicted hourly mean NO_X and daily mean PM_{10} concentrations and impacts at selected human health sensitive receptors in Section F (Gwynedd Council section), located in close proximity (within 1km) to the emergency generators at the Tŷ Fodol tunnel construction compound, where impacts are likely to be greatest.

9.2.51 The table shows that at the closest properties in Section F (Gwynedd Council section) to the emergency generators, impacts to hourly mean concentrations of NO_2 are greater than 10% of the national air quality objective (R5/07079, R5/07156, R5/07322 and R5/07647). At receptors R5/07322 and R5/07647, impacts are less than 20% of the hourly mean air quality objective, minus twice the annual mean background concentration. In line with EA guidance (Ref 14.19), the impact at these locations can be screened as insignificant (**not significant**). At receptors R5/07079 and R5/07156, impacts are greater than 20% of the hourly mean air quality objective, minus twice the annual mean background concentration, and such impacts cannot be screened as insignificant. However, at these locations, total hourly mean concentrations account for just 27% of the air quality objective value. A 'headroom' of 73% suggests there is little to no risk of an exceedance of the air quality objective value and that the impact would not constrain future development in the area. It is therefore considered **not significant**. Impacts on hourly mean NO_2 at other locations are less than 10% of the air quality objective, as are impacts on daily mean PM_{10} concentrations at all receptors, which are also considered to be insignificant (**not significant**).

9.2.52 It is reiterated that the assessment of short-term emergency generator emissions is conservative, due to assumptions on operational hours coinciding with worst meteorological conditions, as described in paragraph 9.2.38.

9.2.53 Further scrutiny of hourly mean NO_2 impacts at the worst affected receptor in Section F (Gwynedd Council section) locations has been undertaken using hypergeometric analysis. The analysis has shown that if the generators were to operate over every hour of each of the meteorological years considered (2012 to 2016), the probability of an exceedance of the hourly mean NO_2 air quality objective would be less than 5% (i.e. a one in 20 year event).

Table 14.79 Predicted short-term Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Hourly Mean NO_2				Daily Mean PM_{10}			
	Impact µg/m^3	% of Air Quality Obj.	Total Conc. µg/m^3	% of Air Quality Obj.	Impact µg/m^3	% of Air Quality Obj.	Total Conc. µg/m^3	% of Air Quality Obj.
TBM Drive from Braint								
R5/06868	15.5	7.8	24.8	12.4	<0.1	<0.1	13.4	26.8
R5/06922	15.9	8.0	24.2	12.1	<0.1	<0.1	13.4	26.9
R5/07079	32.8	16.4	42.7	21.3	<0.1	<0.1	13.4	26.8
R5/07156	44.8	22.4	54.7	27.3	<0.1	<0.1	13.4	26.8
R5/07236	17.7	8.9	26.0	13.0	<0.1	<0.1	13.4	26.9
R5/07322	20.4	10.2	30.3	15.1	<0.1	<0.1	13.4	26.8
R5/07524	19.1	9.6	29.0	14.5	<0.1	<0.1	13.4	26.8
R5/07577	17.9	9.0	27.8	13.9	<0.1	<0.1	13.4	26.8
R5/07647	25.9	13.0	35.8	17.9	<0.1	<0.1	13.4	26.8
R5/08346	14.5	7.3	23.6	11.8	<0.1	<0.1	13.3	26.5
R5/08574	14.0	7.0	22.4	11.2	<0.1	<0.1	13.2	26.4
TBM Drive from Tŷ Fodol								
R5/06868	16	8.0	25.3	12.6	<0.1	<0.1	13.4	26.8
R5/06922	15.9	8.0	24.2	12.1	<0.1	<0.1	13.4	26.9
R5/07079	32.8	16.4	42.7	21.3	<0.1	<0.1	13.4	26.8

Table 14.79 Predicted short-term Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)								
Receptor ID	Hourly Mean NO_2				Daily Mean PM_{10}			
	Impact $\mu g/m^3$	% of Air Quality Obj.	Total Conc. $\mu g/m^3$	% of Air Quality Obj.	Impact $\mu g/m^3$	% of Air Quality Obj.	Total Conc. $\mu g/m^3$	% of Air Quality Obj.
R5/07156	44.8	22.4	54.7	27.3	<0.1	<0.1	13.4	26.8
R5/07236	18.6	9.3	26.9	13.5	<0.1	<0.1	13.4	26.9
R5/07322	21.2	10.6	31.1	15.5	<0.1	<0.1	13.4	26.8
R5/07524	19.7	9.9	29.6	14.8	<0.1	<0.1	13.4	26.8
R5/07577	17.9	9.0	27.8	13.9	<0.1	<0.1	13.4	26.8
R5/07647	27.2	13.6	37.1	18.5	<0.1	<0.1	13.4	26.8
R5/08346	14.9	7.5	24.0	12.0	<0.1	<0.1	13.3	26.5
R5/08574	14.2	7.1	22.6	11.3	<0.1	<0.1	13.2	26.4
Drill and Blast								
R5/06868	16.0	8.0	25.3	12.6	<0.1	<0.1	13.4	26.8
R5/06922	15.9	8.0	24.2	12.1	<0.1	<0.1	13.4	26.9
R5/07079	32.8	16.4	42.7	21.3	<0.1	<0.1	13.4	26.8
R5/07156	44.8	22.4	54.7	27.3	<0.1	<0.1	13.4	26.8
R5/07236	18.6	9.3	26.9	13.5	<0.1	<0.1	13.4	26.9
R5/07322	21.2	10.6	31.1	15.5	<0.1	<0.1	13.4	26.8
R5/07524	19.7	9.9	29.6	14.8	<0.1	<0.1	13.4	26.8
R5/07577	17.9	9.0	27.8	13.9	<0.1	<0.1	13.4	26.8
R5/07647	27.2	13.6	37.1	18.5	<0.1	<0.1	13.4	26.8
R5/08346	14.9	7.5	24.0	12.0	<0.1	<0.1	13.3	26.5
R5/08574	14.2	7.1	22.6	11.3	<0.1	<0.1	13.2	26.4
Air Quality Objective Value	**200**				**50**			

9.2.54 Table 14.80 provides annual and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition rates for the selected internationally designated ecological receptors located in Section F (IACC section) that are within 10 km of the Tŷ Fodol tunnel construction compound, and sites with national and other designations that are within 2 km of emergency generators at the Tŷ Fodol Tunnel Construction Compound. The impact of construction phase emissions as a percentage of the air quality objective value, critical level and critical loads are provided in parenthesis.

9.2.55 The table shows that there is an exceedance of the upper critical load for nutrient nitrogen deposition, and an exceedance of the lower critical load for total acid and acid as nitrogen deposition, at the majority of ecological sites considered in Section F (Gwynedd section). Impacts at these locations are greater for the TBM with the tunnel drive from Tŷ Fodol and the Drill and Blast option, rather than TBM with the drive from Braint, due to the greater power demand that would be required at the Braint tunnel construction compound. The table shows that the Proposed Development contributes less than 1% of the annual mean air quality objective value for NO_X and Critical Loads for nutrient nitrogen deposition and acid deposition, and less than 10% of the daily mean air quality objective value for NO_X, at the internationally and nationally designated ecological sites. In line with EA guidance, these impacts are considered insignificant (**not significant**). The table also shows that the Proposed Development contributes less than 100% of the annual mean air quality objective value for NO_X and Critical Loads for nutrient nitrogen deposition and acid deposition, and the daily mean air quality objective value for NO_X at the other designated ecological sites considered. In line with EA guidance, these impacts are considered insignificant (**not significant**).

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
TBM Drive from Braint									
AQ/F(G)/E01	Coedydd Afon Menai SSSI (north-east of A55)	0	19.9 (0.6%)	29.8 (0.4%)	1.0 (0.1%)	35.70 (0.1%)	2.75 (0.1%)	2.55 (0.1%)	0.20 (0.1%)
		5	21.0 (0.7%)	31.4 (0.4%)	1.0 (0.1%)	35.87 (0.3%)	2.76 (0.1%)	2.56 (0.2%)	0.20 (0.1%)
		10	21.9 (0.8%)	32.9 (0.5%)	1.0 (0.1%)	36.01 (0.1%)	2.77 (0.1%)	2.57 (0.1%)	0.20 (0.1%)
		15	22.7 (0.8%)	34.0 (0.5%)	1.0 (0.1%)	36.13 (0.3%)	2.78 (0.1%)	2.58 (0.2%)	0.20 (0.1%)
		20	23.0 (0.8%)	34.5 (0.5%)	1.0 (0.1%)	36.18 (0.2%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		25	23.0 (0.8%)	34.6 (0.5%)	1.0 (0.1%)	36.18 (0.2%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		30	22.9 (0.8%)	34.3 (0.5%)	1.0 (0.1%)	36.16 (0.1%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		35	22.6 (0.7%)	33.9 (0.4%)	1.0 (0.1%)	36.11 (0.1%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		40	22.2 (0.7%)	33.3 (0.4%)	1.0 (0.1%)	36.05 (0.1%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		45	21.9 (0.7%)	32.8 (0.4%)	1.0 (0.1%)	36.01 (0.3%)	2.77 (0.1%)	2.57 (0.2%)	0.20 (0.1%)
		50	21.5 (0.7%)	32.2 (0.4%)	1.0 (0.1%)	35.95 (0.3%)	2.77 (0.1%)	2.57 (0.2%)	0.20 (0.1%)
		100	18.2 (0.6%)	27.3 (0.4%)	1.0 (0.1%)	35.43 (0.1%)	2.73 (0.1%)	2.53 (0.1%)	0.20 (0.1%)
		150	16.4 (0.5%)	24.7 (0.3%)	1.0 (0.1%)	35.15 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		200	15.4 (0.5%)	23.1 (0.3%)	1.0 (0.1%)	35.00 (0.2%)	2.70 (0.1%)	2.50 (0.1%)	0.20 (0.1%)
AQ/F(G)/E02	Coedydd Afon Menai SSSI (south-west of A55)	0	17.2 (0.5%)	25.8 (0.3%)	1.0 (0.1%)	35.28 (0.1%)	2.72 (0.1%)	2.52 (0.1%)	0.20 (0.1%)
		5	17.0 (0.6%)	25.5 (0.4%)	1.0 (0.1%)	35.25 (0.1%)	2.72 (0.1%)	2.52 (0.1%)	0.20 (0.1%)
		10	16.8 (0.5%)	25.2 (0.3%)	1.0 (0.1%)	35.22 (0.1%)	2.72 (0.1%)	2.52 (0.1%)	0.20 (0.1%)
		15	16.6 (0.5%)	25.0 (0.3%)	1.0 (0.1%)	35.18 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		20	16.5 (0.5%)	24.7 (0.3%)	1.0 (0.1%)	35.17 (0.2%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		25	16.3 (0.5%)	24.5 (0.3%)	1.0 (0.1%)	35.14 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		30	16.2 (0.5%)	24.3 (0.3%)	1.0 (0.1%)	35.12 (0.2%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		35	16.1 (0.5%)	24.1 (0.3%)	1.0 (0.1%)	35.11 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		40	15.9 (0.5%)	23.9 (0.3%)	1.0 (0.1%)	35.07 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		45	15.8 (0.4%)	23.7 (0.3%)	1.0 (0.1%)	35.06 (0.2%)	2.70 (0.1%)	2.50 (0.1%)	0.20 (0.1%)
		50	15.7 (0.4%)	23.5 (0.3%)	1.0 (0.1%)	35.04 (0.1%)	2.70 (0.1%)	2.50 (0.1%)	0.20 (0.1%)
		100	14.8 (0.4%)	22.2 (0.3%)	1.0 (0.1%)	34.90 (0.1%)	2.69 (0.1%)	2.49 (0.1%)	0.20 (0.1%)
		150	14.2 (0.4%)	21.3 (0.3%)	1.0 (0.1%)	34.81 (0.1%)	2.69 (0.1%)	2.49 (0.1%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		200	13.7 (0.4%)	20.6 (0.2%)	1.0 (0.1%)	34.73 (0.1%)	2.68 (0.1%)	2.48 (0.1%)	0.20 (0.1%)
AQ/F(G)/E03	Plantation on Ancient Woodland Site (Ref: 43562)	n/a	8.3 (0.3%)	22.6 (13.7%)	1.2 (0.1%)	21.3 (0.2%)	1.68 (0.1%)	1.52 (0.1%)	0.21 (0.1%)
AQ/F(G)/E04	Ancient Semi Natural Woodland (Ref: 25071)	n/a	7.8 (0.3%)	15.5 (5.2%)	1.2 (0.1%)	21.3 (0.2%)	1.68 (0.1%)	1.52 (0.1%)	0.21 (0.1%)
AQ/F(G)/E05	Plantation on Ancient Woodland Site (Ref: 43561)	n/a	8.5 (1.0%)	38.1 (34.4%)	1.2 (0.1%)	21.4 (0.6%)	1.68 (0.2%)	1.52 (0.3%)	0.21 (0.1%)
AQ/F(G)/E06	Ancient Woodland Site of Unknown Category (Ref: 48976)	n/a	8.8 (2.0%)	65.5 (70.9%)	1.2 (0.1%)	21.4 (1.2%)	1.69 (0.3%)	1.53 (0.6%)	0.21 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E07	Plantation on Ancient Woodland Site (Ref: 43552)	n/a	8.7 (1.7%)	37.5 (33.6%)	1.2 (0.1%)	21.4 (1%)	1.69 (0.3%)	1.53 (0.5%)	0.21 (0.1%)
AQ/F(G)/E08	Plantation on Ancient Woodland Site (Ref: 43538)	n/a	7.8 (0.3%)	15.6 (5.3%)	1.2 (0.1%)	23.8 (0.2%)	1.91 (0.1%)	1.7 (0.1%)	0.29 (0.1%)
AQ/F(G)/E09	Plantation on Ancient Woodland Site (Ref: 43537)	n/a	7.2 (0.3%)	13.6 (3.9%)	1.2 (0.1%)	23.8 (0.2%)	1.91 (0.1%)	1.7 (0.1%)	0.29 (0.1%)
AQ/F(G)/E10	Plantation on Ancient Woodland Site (Ref: 43555)	n/a	7.1 (0.3%)	16.2 (7.6%)	1.2 (0.1%)	21.3 (0.2%)	1.68 (0.1%)	1.52 (0.1%)	0.21 (0.1%)
AQ/F(G)/E11	Eryri SAC (south of Crymlyn)	n/a	6.9 (0.1%)	10.7 (0.4%)	1.0 (0.1%)	20.4 (0.1%)	1.66 (0.1%)	1.46 (0.1%)	0.28 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E12	Eryri SAC (north of Bethesda)	n/a	7.2 (0.1%)	11.2 (0.5%)	1.6 (0.1%)	25.9 (0.1%)	2.16 (0.1%)	1.85 (0.1%)	0.42 (0.1%)
AQ/F(G)/E13	Eryri SAC (west of Bethesda)	n/a	6.6 (0.1%)	10.7 (1.1%)	1.2 (0.1%)	23.8 (0%)	1.91 (0%)	1.7 (0%)	0.29 (0.1%)
AQ/F(G)/E14	Eryri SAC (south of Rhiwlas)	n/a	6.7 (0.1%)	10.8 (0.9%)	2.0 (0.1%)	23.5 0.1%)	1.95 (0.1%)	1.68 0.1%)	0.36 (0.1%)
AQ/F(G)/E15	Eryri SAC (south of Deiniolen)	n/a	6.5 (0.1%)	10.1 (0.4%)	2.0 (0.1%)	23.5 (0.1%)	1.95 (0.1%)	1.68 (0.1%)	0.36 (0.1%)
TBM Drive from Tŷ Fodol									
AQ/F(G)/E01	Coedydd Afon Menai SSSI (north-east of A55)	0	19.9 (0.6%)	29.8 (0.4%)	1.0 (0.1%)	35.70 (0.1%)	2.75 (0.1%)	2.55 (0.1%)	0.20 (0.1%)
		5	21.0 (0.7%)	31.4 (0.4%)	1.0 (0.1%)	35.87 (0.3%)	2.76 (0.1%)	2.56 (0.2%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		10	21.9 (0.8%)	32.9 (0.5%)	1.0 (0.1%)	36.01 (0.1%)	2.77 (0.1%)	2.57 (0.1%)	0.20 (0.1%)
		15	22.7 (0.8%)	34.0 (0.5%)	1.0 (0.1%)	36.13 (0.3%)	2.78 (0.1%)	2.58 (0.2%)	0.20 (0.1%)
		20	23.0 (0.8%)	34.5 (0.5%)	1.0 (0.1%)	36.18 (0.2%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		25	23.0 (0.8%)	34.6 (0.5%)	1.0 (0.1%)	36.18 (0.2%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		30	22.9 (0.8%)	34.3 (0.4%)	1.0 (0.1%)	36.16 (0.1%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		35	22.6 (0.7%)	33.9 (0.4%)	1.0 (0.1%)	36.11 (0.1%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		40	22.2 (0.7%)	33.3 (0.4%)	1.0 (0.1%)	36.05 (0.1%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		45	21.9 (0.7%)	32.8 (0.5%)	1.0 (0.1%)	36.01 (0.3%)	2.77 (0.1%)	2.57 (0.2%)	0.20 (0.1%)
		50	21.5 (0.8%)	32.2 (0.4%)	1.0 (0.1%)	35.95 (0.3%)	2.77 (0.1%)	2.57 (0.2%)	0.20 (0.1%)
		100	18.2 (0.6%)	27.3 (0.3%)	1.0 (0.1%)	35.43 (0.1%)	2.73 (0.1%)	2.53 (0.1%)	0.20 (0.1%)
		150	16.4 (0.5%)	24.7 (0.3%)	1.0 (0.1%)	35.15 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		200	15.4 (0.5%)	23.1 (0.3%)	1.0 (0.1%)	35.00 (0.2%)	2.70 (0.1%)	2.50 (0.1%)	0.20 (0.1%)
AQ/F(G)/E02	Coedydd Afon Menai SSSI (south-west of A55)	0	17.2 (0.5%)	25.8 (0.4%)	1.0 (0.1%)	35.28 (0.1%)	2.72 (0.1%)	2.52 (0.1%)	0.20 (0.1%)
		5	17.0 (0.6%)	25.5 (0.3%)	1.0 (0.1%)	35.25 (0.1%)	2.72 (0.1%)	2.52 (0.1%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		10	16.8 (0.5%)	25.2 (0.3%)	1.0 (0.1%)	35.22 (0.1%)	2.72 (0.1%)	2.52 (0.1%)	0.20 (0.1%)
		15	16.6 (0.5%)	25.0 (0.3%)	1.0 (0.1%)	35.18 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		20	16.5 (0.5%)	24.7 (0.3%)	1.0 (0.1%)	35.17 (0.2%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		25	16.3 (0.5%)	24.5 (0.3%)	1.0 (0.1%)	35.14 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		30	16.2 (0.5%)	24.3 (0.3%)	1.0 (0.1%)	35.12 (0.2%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		35	16.1 (0.5%)	24.1 (0.3%)	1.0 (0.1%)	35.11 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		40	15.9 (0.5%)	23.9 (0.3%)	1.0 (0.1%)	35.07 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		45	15.8 (0.4%)	23.7 (0.3%)	1.0 (0.1%)	35.06 (0.2%)	2.70 (0.1%)	2.50 (0.1%)	0.20 (0.1%)
		50	15.7 (0.4%)	23.5 (0.3%)	1.0 (0.1%)	35.04 (0.1%)	2.70 (0.1%)	2.50 (0.1%)	0.20 (0.1%)
		100	14.8 (0.4%)	22.2 (0.3%)	1.0 (0.1%)	34.90 (0.1%)	2.69 (0.1%)	2.49 (0.1%)	0.20 (0.1%)
		150	14.2 (0.4%)	21.3 (0.3%)	1.0 (0.1%)	34.81 (0.1%)	2.69 (0.1%)	2.49 (0.1%)	0.20 (0.1%)
		200	13.7 (0.4%)	20.6 (0.2%)	1.0 (0.1%)	34.73 (0.1%)	2.68 (0.1%)	2.48 (0.1%)	0.20 (0.1%)
AQ/F(G)/E03	Plantation on Ancient Woodland Site (Ref: 43562)	n/a	8.4 (0.7%)	22.6 (13.7%)	1.2 (0.1%)	21.3 (0.4%)	1.68 (0.1%)	1.52 (0.2%)	0.21 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E04	Ancient Semi Natural Woodland (Ref: 25071)	n/a	7.8 (0.3%)	15.5 (5.2%)	1.2 (0.1%)	21.3 (0.2%)	1.68 (0.1%)	1.52 (0.1%)	0.21 (0.1%)
AQ/F(G)/E05	Plantation on Ancient Woodland Site (Ref: 43561)	n/a	8.9 (2.3%)	38.1 (34.4%)	1.2 (0.1%)	21.4 (1.4%)	1.69 (0.4%)	1.53 (0.7%)	0.21 (0.1%)
AQ/F(G)/E06	Ancient Woodland Site of Unknown Category (Ref: 48976)	n/a	10.2 (6.7%)	73.2 (81.2%)	1.2 (0.1%)	21.7 (4.0%)	1.71 (1.1%)	1.55 (2.1%)	0.21 (0.1%)
AQ/F(G)/E07	Plantation on Ancient Woodland Site (Ref: 43552)	n/a	9.7 (5%)	37.5 (33.6%)	1.2 (0.1%)	21.6 (3.0%)	1.7 (0.8%)	1.54 (1.6%)	0.21 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E08	Plantation on Ancient Woodland Site (Ref: 43538)	n/a	7.9 (0.7%)	15.7 (5.5%)	1.2 (0.1%)	23.8 (0.4%)	1.91 (0.1%)	1.7 (0.2%)	0.29 (0.1%)
AQ/F(G)/E09	Plantation on Ancient Woodland Site (Ref: 43537)	n/a	7.2 (0.3%)	13.6 (3.9%)	1.2 (0.1%)	23.8 (0.2%)	1.91 (0.1%)	1.7 (0.1%)	0.29 (0.1%)
AQ/F(G)/E10	Plantation on Ancient Woodland Site (Ref: 43555)	n/a	7.2 (0.7%)	16.3 (7.7%)	1.2 (0.1%)	21.3 (0.4%)	1.68 (0.1%)	1.52 (0.2%)	0.21 (0.1%)
AQ/F(G)/E11	Eryri SAC (south of Crymlyn)	n/a	6.9 (0.1%)	10.7 (0.4%)	1.0 (0.1%)	20.4 (0.1%)	1.66 (0.1%)	1.46 (0.1%)	0.28 (0.1%)
AQ/F(G)/E12	Eryri SAC (north of Bethesda)	n/a	7.2 (0.1%)	11.2 (0.5%)	1.6 (0.1%)	25.9 (0.1%)	2.16 (0.1%)	1.85 (0.1%)	0.42 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E13	Eryri SAC (west of Bethesda)	n/a	6.6 (0.1%)	10.7 (1.1%)	1.2 (0.1%)	23.8 (0.1%)	1.91 (0.1%)	1.7.0 (0.1%)	0.29 (0.1%)
AQ/F(G)/E14	Eryri SAC (south of Rhiwlas)	n/a	6.7 (0.1%)	10.8 (0.9%)	2.0 (0.1%)	23.5 (0.1%)	1.95 (0.1%)	1.68 (0.1%)	0.36 (0.1%)
AQ/F(G)/E15	Eryri SAC (south of Deiniolen)	n/a	6.5 (0.1%)	10.1 (0.4%)	2.0 (0.1%)	23.5 (0.1%)	1.95 (0.1%)	1.68 (0.1%)	0.36 (0.1%)
Drill and Blast									
AQ/F(G)/E01	Coedydd Afon Menai SSSI (north-east of A55)	0	19.9 (0.6%)	29.8 (0.4%)	1.0 (0.1%)	35.70 (0.1%)	2.75 (0.1%)	2.55 (0.1%)	0.20 (0.1%)
		5	21.0 (0.7%)	31.4 (0.4%)	1.0 (0.1%)	35.87 (0.3%)	2.76 (0.1%)	2.56 (0.2%)	0.20 (0.1%)
		10	21.9 (0.8%)	32.9 (0.5%)	1.0 (0.1%)	36.01 (0.1%)	2.77 (0.1%)	2.57 (0.1%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		15	22.7 (0.8%)	34.0 (0.5%)	1.0 (0.1%)	36.13 (0.3%)	2.78 (0.1%)	2.58 (0.2%)	0.20 (0.1%)
		20	23.0 (0.8%)	34.5 (0.5%)	1.0 (0.1%)	36.18 (0.2%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		25	23.0 (0.8%)	34.6 (0.5%)	1.0 (0.1%)	36.18 (0.2%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		30	22.9 (0.8%)	34.3 (0.5%)	1.0 (0.1%)	36.16 (0.1%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		35	22.6 (0.7%)	33.9 (0.4%)	1.0 (0.1%)	36.11 (0.1%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		40	22.2 (0.7%)	33.3 (0.4%)	1.0 (0.1%)	36.05 (0.1%)	2.78 (0.1%)	2.58 (0.1%)	0.20 (0.1%)
		45	21.9 (0.7%)	32.8 (0.4%)	1.0 (0.1%)	36.01 (0.3%)	2.77 (0.1%)	2.57 (0.2%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		50	21.5 (0.8%)	32.2 (0.5%)	1.0 (0.1%)	35.95 (0.3%)	2.77 (0.1%)	2.57 (0.2%)	0.20 (0.1%)
		100	18.2 (0.6%)	27.3 (0.4%)	1.0 (0.1%)	35.43 (0.1%)	2.73 (0.1%)	2.53 (0.1%)	0.20 (0.1%)
		150	16.4 (0.5%)	24.7 (0.3%)	1.0 (0.1%)	35.15 (0.1%)	2.71 (0.1%)	2.51 (0.1%)	0.20 (0.1%)
		200	15.4 (0.5%)	23.1 (0.3%)	1.0 (0.1%)	35.00 (0.2%)	2.70 (0.1%)	2.50 (0.1%)	0.20 (0.1%)
AQ/F(G)/E02	Coedydd Afon Menai SSSI (south-west of A55)	0	17.2 (0.5%)	25.8 (0.3%)	1.0 (0.1%)	35.28 (0.1%)	2.72 (0.1%)	2.52 (%)	0.20 (0.1%)
		5	17.0 (0.6%)	25.5 (0.4%)	1.0 (0.1%)	35.25 (0.1%)	2.72 (0.1%)	2.52 (%)	0.20 (0.1%)
		10	16.8 (0.5%)	25.2 (0.3%)	1.0 (0.1%)	35.22 (0.1%)	2.72 (0.1%)	2.52 (%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		15	16.7 (0.6%)	25.0 (0.4%)	1.0 (0.1%)	35.20 (0.2%)	2.71 (0.1%)	2.51 (%)	0.20 (0.1%)
		20	16.5 (0.5%)	24.7 (0.3%)	1.0 (0.1%)	35.17 (0.2%)	2.71 (0.1%)	2.51 (%)	0.20 (0.1%)
		25	16.3 (0.5%)	24.5 (0.3%)	1.0 (0.1%)	35.14 (0.1%)	2.71 (0.1%)	2.51 (%)	0.20 (0.1%)
		30	16.2 (0.5%)	24.3 (0.3%)	1.0 (0.1%)	35.12 (0.2%)	2.71 (0.1%)	2.51 (%)	0.20 (0.1%)
		35	16.1 (0.5%)	24.1 (0.3%)	1.0 (0.1%)	35.11 (0.1%)	2.71 (0.1%)	2.51 (%)	0.20 (0.1%)
		40	15.9 (0.5%)	23.9 (0.3%)	1.0 (0.1%)	35.07 (0.1%)	2.71 (0.1%)	2.51 (%)	0.20 (0.1%)
		45	15.8 (0.4%)	23.7 (0.3%)	1.0 (0.1%)	35.06 (0.2%)	2.70 (0.1%)	2.50 (%)	0.20 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
		50	15.7 (0.4%)	23.5 (0.3%)	1.0 (0.1%)	35.04 (0.1%)	2.70 (0.1%)	2.50 (%)	0.20 (0.1%)
		100	14.8 (0.4%)	22.2 (0.3%)	1.0 (0.1%)	34.90 (0.1%)	2.69 (0.1%)	2.49 (%)	0.2 (0.1%)
		150	14.2 (0.4%)	21.3 (0.3%)	1.0 (0.1%)	34.81 (0.1%)	2.69 (0.1%)	2.49 (%)	0.2 (0.1%)
		200	13.7 (0.4%)	20.6 (0.2%)	1.0 (0.1%)	34.73 (0.1%)	2.68 (0.1%)	2.48 (%)	0.2 (0.1%)
AQ/F(G)/E03	Plantation on Ancient Woodland Site (Ref: 43562)	n/a	8.4 (0.7%)	22.6 (13.7%)	1.2 (0.1%)	21.3 (0.4%)	1.68 (0.1%)	1.52 (0.2%)	0.21 (0.1%)
AQ/F(G)/E04	Ancient Semi Natural Woodland (Ref: 25071)	n/a	7.8 (0.3%)	15.5 (5.2%)	1.2 (0.1%)	21.3 (0.2%)	1.68 (0.1%)	1.52 (0.1%)	0.21 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E05	Plantation on Ancient Woodland Site (Ref: 43561)	n/a	8.9 (2.3%)	38.1 (34.4%)	1.2 (0.1%)	21.4 (1.4%)	1.69 (0.4%)	1.53 (0.7%)	0.21 (0.1%)
AQ/F(G)/E06	Ancient Woodland Site of Unknown Category (Ref: 48976)	n/a	10.2 (6.7%)	73.2 (81.2%)	1.2 (0.1%)	21.7 (4.0%)	1.71 (1.1%)	1.55 (2.1%)	0.21 (0.1%)
AQ/F(G)/E07	Plantation on Ancient Woodland Site (Ref: 43552)	n/a	9.7 (5.0%)	37.5 (33.6%)	1.2 (0.1%)	21.6 (3.0%)	1.70 (0.8%)	1.54 (1.6%)	0.21 (0.1%)
AQ/F(G)/E08	Plantation on Ancient Woodland Site (Ref: 43538)	n/a	7.9 (0.7%)	15.7 (5.5%)	1.2 (0.1%)	23.8 (0.4%)	1.91 (0.1%)	1.70 (0.2%)	0.29 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E09	Plantation on Ancient Woodland Site (Ref: 43537)	n/a	7.2 (0.3%)	13.6 (3.9%)	1.2 (0.1%)	23.8 (0.2%)	1.91 (0.1%)	1.70 (0.1%)	0.29 (0.1%)
AQ/F(G)/E10	Plantation on Ancient Woodland Site (Ref: 43555)	n/a	7.2 (0.7%)	16.3 (7.7%)	1.2 (0.1%)	21.3 (0.4%)	1.68 (0.1%)	1.52 (0.2%)	0.21 (0.1%)
AQ/F(G)/E11	Eryri SAC (south of Crymlyn)	n/a	6.9 (0%)	10.7 (0.4%)	1.0 (0.1%)	20.4 (0.1%)	1.66 (0.1%)	1.46 (0.1%)	0.28 (0.1%)
AQ/F(G)/E12	Eryri SAC (north of Bethesda)	n/a	7.2 (0.1%)	11.2 (0.5%)	1.6 (0.1%)	25.9 (0.1%)	2.16 (0.1%)	1.85 (0.1%)	0.42 (0.1%)
AQ/F(G)/E13	Eryri SAC (west of Bethesda)	n/a	6.6 (0.1%)	10.7 (1.1%)	1.2 (0.1%)	23.8 (0.1%)	1.91 (0.1%)	1.7 (0.1%)	0.29 (0.1%)
AQ/F(G)/E14	Eryri SAC (south of Rhiwlas)	n/a	6.7 (0.1%)	10.8 (0.9%)	2 (0.1%)	23.5 (0.1%)	1.95 (0.1%)	1.68 (0.1%)	0.36 (0.1%)

Table 14.80 Predicted Future Baseline Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir (Gwynedd Council Section)									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (μg/m^3)			Deposition Rate			
			Annual mean NO_X	Daily Mean NO_X	Annual mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid as N (keq/ha/yr)	Annual Mean Acid as S (keq/ha/yr)
AQ/F(G)/E15	Eryri SAC (south of Deiniolen)	n/a	6.5 (0.1%)	10.1 (0.4%)	2 (0.1%)	23.5 (0.1%)	1.95 (0.1%)	1.68 (0.1%)	0.36 (0.1%)
Air Quality Objective Value, Critical Level and Critical Loads									
Coedydd Afon Menai SSSI			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**
Ancient Woodland			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**
Eryri SAC			**30**	**75**	**10**	**5 – 10**	**0.873–3.993**	**0.633–2.193**	**0.240–1.800**

9.3 OPERATION

9.3.1 The operation of Proposed Development elements would have a limited impact on local air quality, which is considered unlikely to cause an effect of significance.

9.4 MAINTENANCE

9.4.1 The maintenance of the Proposed Development could range from reasonably frequent checks and minor repairs to very infrequent major refurbishment works. Minor maintenance work is not likely to generate emissions to air that would result in a significant effect. Major refurbishment works could generate levels similar to the construction effects, and these can therefore be considered a proxy for maintenance effects, though in reality they would be likely to be shorter term and more localised.. However, such works would be subject to similar emissions control measures proposed in the CEMP (**Document 7.4**).

9.5 DECOMMISSIONING

9.5.1 Potential air quality impacts associated with decommissioning of Proposed Development elements would be similar, but ultimately less than those associated with the construction phase, and as such the assessment of construction air quality effects can be taken as a proxy for decommissioning stage effects. Decommissioning works would be subject to similar emissions control measures proposed in the CEMP (**Document 7.4**).

9.6 RESIDUAL EFFECTS SUMMARY

9.6.1 The assessment of potential effects across the study area has determined the level of mitigation required to ensure that any residual effects associated with construction dust would be reduced to a level that would not be significant.

9.6.2 The assessment of residual effects associated with construction phase road traffic and emergency generator plant emissions identified that there would be an imperceptible to low impact on annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the majority of sensitive human health receptors, with a medium impact on annual mean NO_2 predicted at a small number of residential properties located close to the Braint Tunnel Compound. In line with the EPUK and IAQM guidance used in this assessment (Ref 14.15), the negligible to low impacts and the medium impact predicted at locations where total pollutant concentrations are predicted to be less than 30.2 $\mu g/m^3$ corresponds to negligible and minor adverse effects respectively, which are **not significant**. The assessment has confirmed that there would be no exceedance of any air quality objective values considered at the human

health sensitive receptors, nor is there an exceedance of the WHO guideline values for PM_{10} and $PM_{2.5}$, anywhere within the study area

9.6.3 At human health receptors in close proximity to the Braint and Tŷ Fodol Tunnel Condtruction Compounds, impacts on hourly mean NO_2 and daily mean PM_{10} concentrations are such that they don't meet the short-term significance criteria suggested in EA guidance (Ref 14.19) and are therefore insignificant (**not significant**).

9.6.4 At the international and national designated ecological sites, the impact to annual mean concentrations of NO_X, nutrient nitrogen deposition and acid deposition would be less than 1% of the relevant air quality objective value and critical loads, and the impact to daily mean concentrations of NO_X would less than 10% of the Critical Level for that pollutant. At the other ecological sites considered, the impact would less than 100% of the air quality standards for all the pollutants and averaging periods considered. In line with EA guidance (Ref 14.19) impacts associated with construction phase road traffic emissions and emergency generator emissions on ecological receptors would therefore be insignificant (**not significant**) at all receptors considered.

10 Cumulative Effects

10.1 INTRODUCTION

10.1.1 This section of the assessment considers the cumulative effects of the various elements of the Proposed Development and the accumulated effects of the proposals with other developments proposed in the vicinity.

10.2 INTRA PROJECT CUMULATIVE EFFECTS

10.2.1 Intra-project effects are reported in Chapter 19, Intra-Project Effects (**Document 5.19**).

10.3 INTER PROJECT CUMULATIVE EFFECTS

10.3.1 Inter-project cumulative effects occur when two or more planned developments have an effect on the same receptor leading to an overall effect of greater significance. Note that these 'other developments' are developments that have not yet been constructed and are not operational; where developments are constructed and operational they are considered to form part of the existing baseline.

10.3.2 Chapter 20 Inter-Project Cumulative Effects (**Document 5.20**) presents a methodology for determining whether inter-project cumulative effects could occur as a result of these 'other developments' being built and/or operated at the same time as the Proposed Development. This methodology is based upon the Planning Inspectorate Advice Note 17, which deals with cumulative effects assessment. A long list of other developments needs to be developed and agreed initially. Once this is agreed, the methodology consists of four main stages as follows:

10.3.3 Stage 1: a long list of other developments is identified and outline information gathered. Consideration is given to whether the other development is within the zone of influence (ZOI) for each topic; if it is, then the assessment progresses to stage 2.

10.3.4 Stage 2: consideration is given to the potential temporal overlap i.e. whether the construction or operational effects of the other development could coincide with those of the Proposed Development. Consideration is also given to the scale and nature of the other development, the nature of the receiving environment and whether there are shared receptors, and whether

there is a 'pathway' for a cumulative effect to occur. At the end of stage 2 a shortlist of other developments is considered in stages 3 and 4.

- Stage 3: detailed information is gathered about each of the shortlisted other developments, typically in the form of ESs or Scoping Reports.
- Stage 4: cumulative effects are assessed and mitigation identified, and apportioned, where necessary. The securing mechanism for any necessary mitigation is identified.

10.3.5 The potential for cumulative effects to occur is considered for any effects that are minor, moderate or major. However, where the residual effects on a shared receptor are concluded to be negligible for either the Proposed Development or the other development, it is not considered possible for there to be a resulting inter-project cumulative effect. Where all effects related to a particular topic are negligible, for either the proposed Development or other development, the other development is screened out at stage 2.

10.3.6 It is important to note that a finding of 'not significant' for dust an PM_{10} means that the impact is considered to be of such a low level that it would have no potential to contribute to cumulative effects with other types of effect or other development; i.e. it is the equivalent of a 'negligible' effect.

10.3.7 Details about the 'other developments' on the long list considered at stage 1 are provided in Chapter 20 Inter-Project Cumulative Effects (**Document 5.20**) and its appendices.

Stage 1 and Stage 2

10.3.8 Table 14.81 provides a summary of stages 1 and 2 of the air quality inter-project cumulative effects assessment. Where the effects of other developments are either outside the ZOI or outside the temporal scope of the Proposed Development, they have not been included in this table.

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Table 14.81 Summarising Stage 1 and Stage 2 of the Inter-Project CEA					
Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
Wylfa Newydd Nuclear Power Station	Yes	Yes	Potential overlap between both the construction and operational phases.	Shared receptors: human health, ecological and construction dust receptors in Section A and road traffic emissions receptors on the approach to Section A via the A55 and A5025 (link 1, link 2 and link 21). The combined 2-way HGV construction flows associated with the Proposed Development and the Wylfa Newydd Power Station on the A55 and A5025 exceed the criteria to signify that air quality impacts should be quantified at sensitive locations adjacent to this road link. The implementation of dust control measures that are committed to in the Construction Environmental Management Plan (CEMP) (**Document 7.4**) for the Proposed Development should control impacts to the extent that effects are **negligible**. Such measures are standard practice on all well managed construction sites and are likely to be equally enforced on the other development construction site. Therefore significant cumulative effects are considered unlikely and dust receptors are not considered further in this assessment.	Yes – road traffic emissions only
Wylfa Nuclear Power Station Decommissioning	Yes	Yes	Overlap between all phases of the Wylfa Nuclear Power Station Decommissioning and the construction and operation of the Proposed Development.	Shared receptors: road traffic emissions receptors (both human health and ecological) on the approach to Section A via the A55 and A5025 (link 1, link 2 and link 21). The traffic associated with the 'other development' is included within the baseline and future baseline therefore the Proposed Development's assessment is inherently cumulative including this other development.	No
Penrhos Leisure Village	No	No			
Anglesey Eco Park	No	No			
Parc Cybi	No	No			
Rhyd-y-Groes Re-power	No	No			
Holyhead Waterfront Redevelopment	No	No			
Glyn Rhonwy Pumped Storage	Yes	Yes	Construction is expected to last four years with the	Shared receptors: road traffic emissions receptors on the approach to Section E via the A487 (link 18).	Yes – vehicle emissions

Table 14.81 Summarising Stage 1 and Stage 2 of the Inter-Project CEA					
Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
			development operational by 2019. However as construction does not appear to have started yet, it is assumed that there could be an overlap between construction and operational phases.	The combined 2-way HGV construction flows associated with the Proposed Development and the Glyn Rhonwy Pumped Storage on the A487 exceed the criteria to signify that air quality impacts should be quantified at sensitive locations adjacent to this road link.	
Underground Grid Connection between Glyn Rhonwy Pumped Storage Development and Pentir Substation	Yes	Yes	The connection is expected to take less than a year however as the start date is not currently known, it is assumed there could be overlap in the construction and operational phases.	Shared receptors: road traffic emissions receptors on the approach to Section E via the A487 (link 18), and dust sensitive receptors located within 350 m of both the Proposed Development and the 'other development' construction site boundary, and/or within 50 m of a road used by construction traffic that is within 500 m of the Order Limits and construction site access/egress point. Limited vehicle movements associated with the 'other development'. The effects of the Proposed Development on receptors near to link 18 are **negligible** and therefore significant cumulative effects are unlikely to occur. The implementation of dust control measures that are committed to in the CEMP (**Document 7.4**) for the Proposed Development should control impacts to the extent that effects are **negligible**. Such measures are standard practice on all well managed construction sites and are likely to be equally enforced on the other development construction site. Therefore significant cumulative effects are unlikely to occur.	No
West Anglesey Demonstration Project	No	No			
Holyhead Deep	No	No			
A487 Caernarfon to Bontnewydd Bypass	Yes	Yes	Overlap between construction phases in 2020 to 2021 and the operational phases.	Shared receptors: road traffic emissions receptors on the approach to Section F via the A487 (link 18). **Negligible** impacts predicted at receptors located adjacent to link 18 and connected links from the Proposed Development, therefore significant cumulative effects are unlikely.	No

Table 14.81 Summarising Stage 1 and Stage 2 of the Inter-Project CEA					
Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
Menai Science Park	Yes	Yes	The first phase of the development would be completed prior to the construction phase of the Proposed Development however the remainder of the development would take approximately 10 years to complete (more detailed timescale currently unknown) therefore is likely to overlap with both the construction and operation phases of the proposed development.	Shared receptors: road traffic emissions receptors on the approach to Section E, via the A55 (link 21), A5 (link 13) and the A5152 (link 12). The operational traffic associated with the 'other development' is included within the future baseline therefore the Proposed Developments assessment is inherently cumulative including this other development.	No
Third Menai Crossing	Yes	Yes	Potential for the construction phases to overlap (construction timescale currently unknown anticipated to be 2020/2021 to 2022/2023). The operations phases would also overlap.	Potential shared receptors: road traffic emissions receptors human health and ecology) on the approach to and through Section F via the A55 (link 21), and dust sensitive receptors located within 350 m of both the Proposed Development Order Limits and the other development construction site boundary, and/or within 50 m of a road used by construction traffic that is within 500 m of an Order Limits and construction site access/egress point. **Negligible** impacts are predicted from road traffic emissions as a result of the Proposed Development at receptors locations adjacent to the A55, so significant cumulative effects are considered unlikely. The implementation of dust control measures that are committed to in the CEMP (**Document 7.4**) for the Proposed Development should control impacts to the extent that effects are **negligibl**e. Such measures are standard practice on all well managed construction sites and are likely to be equally enforced on the other development construction site. Therefore significant cumulative effects are considered unlikely.	No

Table 14.81 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
A55 - Junction 15 & Junction 16 Improvement	Yes	Yes	Potential for the construction phases to overlap (timescales currently unknown but expected to be between autumn 2020 to autumn 2022). The operational phases would also overlap.	Shared receptors: none.	No
A55 Abergwyngregyn to Tai'r Meibion Improvement	Yes	Yes	Potential for the construction phases to overlap (timescales currently unknown but expected to be between autumn 2020 to autumn 2022). The operational phases would also overlap.	Shared receptors: none.	No
Nant y Garth Landfill Site	Yes	Yes	Overlap of operation of landfill (time-limited to the end of July 2021) and construction of the Proposed Development.	Potential shared receptors: dust sensitive receptors located within 350 m of both the Proposed Development and the 'other development' site boundary, and/or within 50 m of a road used by construction traffic that is within 500 m of the Order Limits and site boundary access/egress point. The implementation of dust control measures that are committed to in the CEMP (**Document 7.4**) for the Proposed Development should control impacts to the extent that effects are **negligible.** Dust control measures are also standard practice on all well managed waste sites and are likely to be equally enforced on the 'other development' site. Therefore significant cumulative effects are considered unlikely. Nant y Garth Landfill Site proposals comprise minor amendments to restoration conditions. The operational traffic of the site is included within the baseline and future baseline therefore the Proposed Developments assessment is inherently cumulative including this other development.	No
Caernarfon Brickworks Quarry	No	No			

Table 14.81 Summarising Stage 1 and Stage 2 of the Inter-Project CEA					
Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
Amlwch Liquid Natural Gas (LNG)	No	No			
Green Wire	Yes	Yes	Timescales currently unknown. If connection in place as per the agreement (completed by end of 2020) there would be an overlap with the OHL and tunnel construction however not with works at Pentir. Likely to be an overlap in operation phases.	Shared receptor: construction dust sensitive receptors within 350 m of both the Proposed Development and the Green wire construction site boundary. Air quality sensitive receptors located adjacent to the B4547 and A4244. As **negligible** effects from the Proposed Development have been predicted at potential shared receptors. Potential significant cumulative effects are considered unlikely and are not considered further in this assessment.	No
Llanbadrig Solar Farm	Yes	Yes	It is likely that this development would be constructed before the construction phase of the Proposed Development. There would be an overlap with the operational phases.	Shared receptor: road traffic emissions receptors (human health and ecology) on the approach to and through Section A via the A5025 (link 1). Llanbadrig Solar Farm would be complete prior to the construction of the Proposed Development. The operational traffic is therefore included within the future baseline therefore the Proposed Developments assessment is inherently cumulative including this 'other development'.	No
Codling Wind Park	No	No			
Grŵp Llandrillo Menai Llangefni Campus	Yes	Yes	Although some elements would be completed prior to the construction phase of the Proposed Development there is the potential for overlap between the full build out of the site	Shared receptor: road traffic emissions receptors (human health and ecology) on the approach to and through Section D via the B5420 (link 6) and A5114 (link 8) and the Llangefni Link Road (link 8.2). The Proposed development is predicted to have a **negligible** effect on air quality sensitive receptors near to these links. Therefore, significant cumulative effects are considered unlikely.	No

Table 14.81 Summarising Stage 1 and Stage 2 of the Inter-Project CEA

Development Name	Stage 1		Stage 2		
	Within ZOI?	Progress to Stage 2?	Overlap in Temporal Scope?	Is the Scale and Nature of Development likely to have a Significant Cumulative Effect? Relevant Shared Receptors and/or Pathways?	Progress to Stage 3/4?
			(timescale currently unknown) and the construction of the Proposed Development. There is also overlap between the operational phases of the developments.		
Dinorwig Cables	Yes	Yes	Potential overlap between construction phases (cable installation is programmed for between 2019 and 2025) along with overlap in the operational phases.	Potential shared receptor: road traffic emissions receptors (human health) on the approach to and through Section F via the A4244 (link 20). Construction could overlap with construction of the Proposed Development with the potential for increased traffic on link 20. Potential effects are unlikely to exceed **negligible** due to likely low number of vehicle movements associated with Dinorwig Cables therefore significant cumulative effects on shared receptors are considered unlikely.	No
Holyhead Port Expansion	Yes	Yes	Planning consent is not currently in place. Therefore timescales are unknown. Potential overlap between construction phases. Overlap between the operational phases.	Shared receptors: air quality sensitive receptors located adjacent to the A55 (link 21). Proposed Development effects at sensitive locations adjacent to the A55 are **negligible**. Therefore, significant cumulative effects are considered unlikely.	No

Stage 3 and Stage 4

10.3.9 At the end of Stage 2 the original long list of other developments was reduced to a short list of other development where there would be potential for a significant cumulative effect to occur. The short list of other developments is as follows:

- Wylfa Newydd Nuclear Power Station; and
- Glyn Rhonwy Pumped Storage.

10.3.10 Stage 3 requires the gathering of detailed information; however, a substantial amount of information about the other developments had already been gathered to support stages 1 and 2.

10.3.11 The results of the Stage 4 assessment of cumulative effects and mitigation are presented in Table 14.82 below.

10.3.12 Professional judgement has been applied in determining whether the combination of effects from two developments could result in a cumulative effects, and whether the cumulative effects would be of greater significance than the effects considered separately.

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Table 14.82 Air Quality CEA

Development Name	Effects on shared receptors from the Proposed Development	Effects on shared receptors from the 'other development'	Assessment of Cumulative effect with Proposed Development	Proposed Mitigation applicable to the Proposed Development including any apportionment	Residual Cumulative Effect
Wylfa Newydd Power Station	<u>Human health, dust and ecological receptors</u> - **Negligible (not significant)** effects predicted at shared receptors located adjacent to link 1, link 2 and link 21.	The air quality effect is not quantified in isolation.	The Proposed Development contributes 1%, 1% and <1% of the LGV cumulative AADT flow on Link 1, Link 2 and Link 21 respectively, and 9%, 8% and 7% of the HGV cumulative AADT flow respectively. However, the Wylfa Newydd development contributes 37%, 23% and 5% of the LGV cumulative AADT flow on Link 1, Link 2 and Link 21 respectively, and 53%, 51% and 9% of the HGV cumulative AADT flow respectively. Consideration of cumulative effects, assuming other development traffic flows are in both the future baseline and construction phase scenario, results in **Negligible** and insignificant effects predicted at shared human health and ecological receptors located adjacent to Link 1, Link 2 and Link 21 (and other A55 links considered). Consideration of cumulative effects, assuming other development traffic flows are just in the construction phase scenario only, results in a **minor** adverse effect at human health sensitive receptors located adjacent to Link 1 (Section A), and a **negligible** effect at human health sensitive receptors located adjacent to Link 21 (and other A55 links), which are not considered to be significant. At ecological receptors, assuming the impacts of the other development traffic flows are in both the future baseline and construction phase scenario, impacts can be screened as insignificant (i.e. the effect is not significant). Assuming the other development traffic flows are just in the construction phase scenario only, impacts cannot be screened as insignificant for annual mean nutrient nitrogen deposition at Beddmanarch-Cymyran SSSI, adjacent to Link 1 (Section A) and Coedydd Afon Menai SSSI, adjacent to Link 21 (Section F), where deposition rates already exceed the lower Critical Load in the future baseline. Total deposition rates with the cumulative impact at Beddmanarch-Cymyran SSSI remain below the upper Critical Load value for this habitat. Impacts cannot be screened as insignificant for annual mean concentrations of NOX at Cors Ddyga SSSI (Section D) or Coedydd Afon Menai SSSI (Section F). However, at these locations, total NOX concentrations, with the cumulative impact, remain below the air quality objective value.	No additional mitigation proposed.	**Negligible** to **Minor** adverse. **Not significant**.

Table 14.82 Air Quality CEA

Development Name	Effects on shared receptors from the Proposed Development	Effects on shared receptors from the 'other development'	Assessment of Cumulative effect with Proposed Development	Proposed Mitigation applicable to the Proposed Development including any apportionment	Residual Cumulative Effect
			The contribution of the Proposed Development to the cumulative effects reported is temporary and would last for the duration of the Proposed Development construction phase only.		
Glyn Rhonwy Pumped Storage	<u>Human health receptors</u> **Negligible** effects predicted at shared receptors located adjacent to Link 18.	The air quality effect of the other development is not quantified in isolation.	The Proposed Development contributes 1% of the LGV cumulative AADT on Link 18, and 7% of the HGV cumulative AADT. However, the other development contributes 4% of the LGV cumulative AADT on Link 18, and 12% of the HGV cumulative AADT. Consideration of cumulative effects, assuming other development traffic flows are in both the future baseline and construction phase scenario, results in **negligible** effects predicted at shared receptors located adjacent to Link 18. Consideration of cumulative effects, assuming other development traffic flows are in both the construction phase scenario only also results in **negligible** effects at the human health sensitive receptors located adjacent to Link 18. The contribution of the Proposed Development to the cumulative effects reported is temporary and would last for the duration of the Proposed Development construction phase only.	No additional mitigation proposed.	**Negligible** **Not significant**.

Conclusion

10.3.13 Taking into consideration the cumulative emissions of 'other developments' would increase the impact reported at the human health sensitive receptors considered. However, even with the increase in impacts, the cumulative effect of the Proposed Development and 'other developments' remains not significant for all air quality sensitive locations considered.

10.3.14 Cumulative effects could also occur at the ecological receptors located near to the A55 (Cors Ddyga SSSI and Coedydd Afon Menai SSSI) and the A5025 (Beddmanarch-Cymyran SSSI), when comparing the cumulative operational scenario to the future baseline scenario (with no cumulative flows). The impact on annual mean nutrient nitrogen deposition rates at these locations exceeds 1% of the relevant Critical Loads for the habitats, and cannot be screened as insignificant. When comparing the cumulative operational scenario against the cumulative future baseline scenario (i.e. cumulative flows are present in both scenarios), impacts are such that they can be screened as insignificant for all three habitats. Total deposition rates at Beddmanarch-Cymyran SSSI remain below the upper Critical Load value for this habitat. Impacts cannot be screened as insignificant for annual mean concentrations of NO_X at Cors Ddyga SSSI (Section D) or Coedydd Afon Menai SSSI (Section F), both of which are near to the A55. However, at these locations, total NO_X concentrations remain below the air quality objective value.

10.3.15 It should be noted that the contribution of the Proposed Development to the cumulative effects reported is temporary and would last for the duration of the Proposed Development construction phase only.

Construction Dust Emissions

10.3.16 Due to the rural nature of the Proposed Development construction works, there is limited potential for inter-project cumulative effects to occur. In the limited locations where there is such potential, i.e. where the same receptors are located within 350 m of both Proposed Development construction works and other construction worksites, the implementation of standard practice dust control measures on each site would reduce emissions to the extent that a significant effect is unlikely to occur. It is also considered that a finding of 'not significant' for dust an PM_{10} means that the impact would be of such a low level that it would have no potential to contribute to cumulative effects with other types of effect or other development

Construction Phase Road Traffic and Emergency Generator Emissions

10.3.17 The other developments on the long list outlined in Chapter 20 Inter-Project Cumulative Effects ES **(Document 5.20)** have been reviewed for their relationship with the construction programme for the Proposed Development. The majority of other developments:

- Are of a scale unlikely to significantly increase traffic flow on the local highway network; or
- Have a programme of works that is unlikely to overlap with the peak construction period for the Proposed Development; or

10.3.18 However, there is the potential for inter-project cumulative effects to occur as a result of emissions from construction phase vehicle movements associated with the Proposed Development, coupled with similar emissions from some other developments. Cumulative impacts are most likely where the other developments share construction traffic routes with the Proposed Development.

10.3.19 The assessment of cumulative road traffic emissions impacts is required at locations where there is the potential for a significant effect to occur. The potential for a significant effect to occur has been determined by applying the screening criteria described in relevant guidance (Ref 14.15) to projected changes in cumulative traffic flow on the local road network.

10.3.20 The traffic data used to inform the cumulative air quality assessment are summarised in Appendix 14.3 (**Document 5.14.2.3**). Table 14.83 shows the cumulative increase in average daily vehicle movements over the course of the peak year of the construction period on the road links affected by both the Proposed Development and cumulative development traffic flows, and also highlights which road links subsequently have an exceedance of the criteria set by EPUK and IAQM (Ref 14.15). The location of the road Links is shown on Figure 14.1. It shows the guidance criteria are exceeded on the A55 on Anglesey (Link refs: AQ1, AQ2, AQ3, AQ4, AQ5 and 21) and in Gwynedd (Link ref: 21, AQ6, AQ7 and AQ8). The criteria are also exceeded on roads between the A55 and Langefni (Link Ref: 8), the A5025 north of Valley (Link ref: 1), and the B5109, east of Llangefni (Link ref: 6). Elsewhere, cumulative vehicle flows remain below the guidance criteria, which suggest that any air quality effects at locations adjacent to them are unlikely to be significant.

Table 14.83: Screening of Cumulative construction traffic routes

Link Ref	Traffic Route/Link	Cumulative Flow Only		Cumulative Flow + NWC Flow		EPUK and IAQM Guidance Criteria Exceeded (Yes / No)
		LGV[1]	HGV[2]	LGV[1]	HGV[2]	
1	A5025 between A5 at Valley Crossroads and Wylfa.	**1734**	**243**	**1782**	**282**	Yes
4	B5111 between Llanerchymedd access B8	5	4	26	53	No
5	B5110 between B5111 and access C8	3	1	14	32	No
6	B5420 / B5109 / Ffordd Cae Sel between LLR and B5111	80	2	102	18	Yes
8	A5114 between A55 J6 Llangefni Link Road.	160	3	204	**106**	Yes
18	A487 between B4547 and A55 J9.	**847**	**174**	**960**	**276**	Yes
AQ1	A55 west of J6	**1675**	**189**	**1814**	**348**	No
AQ2	A55 between J6 and J7	**1675**	**189**	**1814**	**348**	Yes
AQ3	A55 between J7 and J7a	**1675**	**189**	**1814**	**348**	Yes
AQ4	A55 between J7a and J8	**1675**	**189**	**1814**	**348**	Yes
AQ5	A55 between J8 and J8a	**1675**	**189**	**1814**	**348**	Yes
21	A55 Britannia Bridge between J8a and A55 J9	**1675**	**189**	**1814**	**348**	Yes
AQ6	A55 between J9 and J10	**1675**	**189**	**1814**	**348**	Yes
AQ7	A55 between J10 and J11	**1675**	**189**	**1814**	**348**	Yes
AQ8	A55 East of J11	**1675**	**189**	**1814**	**348**	Yes
Link 26	B5112 between A55 J5 and B5111	53	2	89	2	No

[1] LGV (Light Goods Vehicles) have been used in this assessment to represents Light Duty Vehicles (LDV) and represent vehicles that weigh less than 3.5 tonnes.

[2] HGV (Heavy Goods Vehicles) have been used in this assessment to represents Heavy Duty Vehicles (HDV) and represent vehicles that weigh 3.5 tonnes or more.

10.3.21 The cumulative impacts of road traffic emissions and the combined impact of cumulative road traffic and emergency generator emissions, on human and ecological receptors, as appropriate, are reported for each section of the Proposed Development.

10.3.22 For the cumulative assessment, the values reported assume the worst case Proposed Development impact in relation to the tunnel scenarios considered.

Section A Wylfa to Rhosgoch

10.3.23 Cumulative traffic flows on the A5025 through and north of Valley have the potential to significantly affect local air quality at sensitive locations near to this route.

10.3.24 Modelled predictions of cumulative concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.84, for the human receptors considered in this assessment in Section A. The impact and effects are summarised in Tables 14.85.

10.3.25 The tables show that predicted cumulative pollutant concentrations and the number of exceedances reported are well below the national air quality objective values. Receptors experiencing the highest increases in Section A would experience a low impact magnitude when compared to the cumulative baseline (future baseline plus cumulative flows) and a medium impact magnitude when compared to the Proposed Development baseline concentrations (future baseline flows only). Such impacts at locations where total concentrations are so low are considered negligible and minor adverse respectively, and are not significant.

Table 14.84 Predicted Cumulative Pollutant Statistics at Human Receptors – Section A Wylfa to Rhosgoch

Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Baseline				
RT2/12431	26.2	10.8	7.6	<1
RT2/12443	9.8	9.6	6.3	<1
RT2/12821	7.1	9.6	6.5	<1
Future Baseline (+ Cumulative Contribution)				

Table 14.84 Predicted Cumulative Pollutant Statistics at Human Receptors – Section A Wylfa to Rhosgoch				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
RT2/12431	27.7	10.8	7.6	<1
RT2/12443	12.1	9.6	6.3	<1
RT2/12821	9.6	9.6	6.5	<1
Future Operational (+ Cumulative Contribution)				
RT2/12431	28.6	10.8	7.6	<1
RT2/12443	12.5	9.6	6.3	<1
RT2/12821	10.0	9.6	6.5	<1
Air Quality Objective Value	**40**	**40**	**25**	<1

Table 14.85 Predicted Change in Pollutant Statistics at Human Receptors – Section A Wylfa to Rhosgoch				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Operational (+ Cumulative Contribution) - Future Baseline				
RT2/12431	+2.3 (M)	+0.3 (VL)	+0.2 (VL)	<1
RT2/12443	+2.7 (M)	+0.5 (VL)	+0.3 (VL)	<1
RT2/12821	+2.9 (L)	+0.6 (L)	+0.3 (VL)	<1
Future Operational (+ Cumulative Contribution) - Future Baseline (+ Cumulative Contribution				
RT2/12431	+0.8 (L)	+0.1 (I)	+0.1 (I)	<1
RT2/12443	+0.4 (VL)	+0.1 (I)	+<0.1 (I)	<1
RT2/12821	+0.4 (VL)	+0.1 (I)	+0.1 (I)	<1

Table 14.85 Predicted Change in Pollutant Statistics at Human Receptors – Section A Wylfa to Rhosgoch				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Change in concentration descriptor: (I) = Imperceptible, (VL) = Very Low, (L) = Low, (M) = Medium, (La) = Large				

10.3.26 Modelled predictions of cumulative concentrations of annual and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition rates are provided in Table 14.86, for the ecological receptors considered in Section A. The impact of cumulative emissions as a percentage of the air quality objective value, critical level and critical loads are provided in Table 14.87.

10.3.27 Table 14.86 shows that just nutrient nitrogen deposition exceeds its relevant lower Critical Load in the Proposed Development baseline (future baseline flows only), cumulative baseline (future baseline flows plus cumulative flows) and cumulative operational (future baseline flows plus Proposed Development flows plus cumulative flows). This is mainly due to a high background nutrient nitrogen deposition rate, which is common across much of the UK. All other pollutants remain below the relevant air quality objective, Critical Level and Critical Loads.

10.3.28 The cumulative impact against the Proposed Development baseline (future baseline flows only) as shown in Table 14.87 suggested that there would be an increase of 1% or more of the relevant annual mean air quality objective and Critical Loads for annual mean concentrations of NO_X and nutrient nitrogen deposition rates, at locations of the SSSI closest to the A5025. For annual mean NO_X, these impacts occur where total concentrations are well below the air quality objective. Therefore, in line with EA guidance (Ref 14.19), these impacts are considered insignificant (**not significant**). For nutrient nitrogen deposition, the largest impacts occur at the locations closest to the A55, where total deposition rates are greater than the lower Critical Load (but less than the upper Critical Load). 40 m further back from the A5025, the impact on nutrient nitrogen deposition rates falls to below 1%. The cumulative impact against the Proposed Development baseline (future baseline flows only) demonstrates that there would be an increase of less than 10% of the relevant Critical Load for daily mean NO_X, which, in line with EA guidance (Ref 14.19) is considered insignificant (**not significant**).

10.3.29 The cumulative impact against the cumulative baseline (future baseline flows plus cumulative flows) is less than 1% of the relevant annual mean air quality objective and Critical Loads, and less than 10% of the daily mean NO_X Critical Level, for all locations of the SSSI considered, which, in line with EA guidance (Ref 14.19) is considered insignificant (**not significant**).

Table 14.86 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section A Wylfa to Rhosgoch									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
Future Baseline									
AQ/A/E01	Beddmanarch-Cymyran SSSI	66	8.5	12.7	0.8	14.42	1.16	1.03	0.13
		70	8.3	12.4	0.8	14.39	1.16	1.03	0.13
		80	8.0	12.1	0.8	14.34	1.16	1.03	0.13
		90	7.9	11.8	0.8	14.32	1.15	1.02	0.13
		100	7.7	11.6	0.8	14.29	1.15	1.02	0.13
		110	7.6	11.4	0.8	14.28	1.15	1.02	0.13
Future Baseline (+ Cumulative Contribution)									
AQ/A/E01	Beddmanarch-Cymyran SSSI	66	8.6	13.0	0.8	14.44	1.16	1.03	0.13
		70	8.4	12.6	0.8	14.41	1.16	1.03	0.13
		80	8.2	12.3	0.8	14.37	1.16	1.03	0.13
		90	8.0	12.0	0.8	14.34	1.16	1.03	0.13

Table 14.86 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section A Wylfa to Rhosgoch									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		100	7.8	11.7	0.8	14.31	1.15	1.02	0.13
		110	7.7	11.5	0.8	14.29	1.15	1.02	0.13
Future Operational (+ Cumulative Contribution)									
AQ/A/E01	Beddmanarch-Cymyran SSSI	66	8.6	13.0	0.8	14.44	1.16	1.03	0.13
		70	8.4	12.6	0.8	14.41	1.16	1.03	0.13
		80	8.2	12.3	0.8	14.37	1.16	1.03	0.13
		90	8.0	12.0	0.8	14.34	1.16	1.03	0.13
		100	7.8	11.7	0.8	14.31	1.15	1.02	0.13
		110	7.7	11.5	0.8	14.29	1.15	1.02	0.13
Air Quality Objective, Critical Level, Critical Load									
Beddmanarch-Cymyran SSSI			**30**	**75**	**10**	**10–20**	**2.796–3.406**	**1.469–1.777**	**1.327–1.629**

Table 14.87 Predicted Change in Pollutant Statistics at Ecological Receptors, Relative to Future Baseline – Section A Wylfa to Rhosgoch

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
Future Operational (+ Cumulative Contribution) - Future Baseline									
AQ/A/E01	Beddmanarch-Cymyran SSSI	66	3.6%	2.2%	0.1%	1.6%	0.8%	0.8%	0.1%
		70	3.2%	1.9%	0.1%	1.6%	0.8%	0.8%	0.1%
		80	2.9%	1.7%	0.1%	1.4%	0.7%	0.7%	0.1%
		90	2.5%	1.5%	0.1%	1.3%	0.6%	0.6%	0.1%
		100	2.3%	1.4%	0.1%	1.2%	0.6%	0.6%	0.1%
		110	2.1%	1.2%	0.1%	1.0%	0.5%	0.5%	0.1%
Future Operational (+ Cumulative Contribution) - Future Baseline (+ Cumulative Contribution)									
AQ/A/E01	Beddmanarch-Cymyran SSSI	66	0.6%	0.3%	0.1%	0.2%	0.2%	0.1%	0.1%
		70	0.5%	0.3%	0.1%	0.1%	0.1%	0.1%	0.1%
		80	0.4%	0.3%	0.1%	0.1%	0.3%	0.1%	0.1%

Table 14.87 Predicted Change in Pollutant Statistics at Ecological Receptors, Relative to Future Baseline – Section A Wylfa to Rhosgoch

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		90	0.4%	0.2%	0.1%	0.1%	0.2%	0.1%	0.1%
		100	0.4%	0.2%	0.1%	0.1%	0.2%	0.1%	0.1%
		110	0.3%	0.2%	0.1%	0.1%	0.2%	0.1%	0.1%
Air Quality Objective, Critical Level, Critical Load									
Beddmanarch-Cymyran SSSI			**30**	**75**	**10**	**10–20**	**2.796–3.406**	**1.469–1.777**	**1.327–1.629**

Section B Rhosgoch to Llandyfrydog

10.3.30 Cumulative traffic flows in Section B would not exceed the criteria defined in current guidance (Ref 14.15) to indicate that a significant effect could occur ((see Table 14.83).

Section C Llandyfrydog to B5110 North of Talwrn

10.3.31 Cumulative traffic flows in Section C would not exceed the criteria defined in current guidance (Ref 14.15) to indicate that a significant effect could occur ((see Table 14.83).

Section D B5110 North of Talwrn to the Ceint

10.3.32 Cumulative traffic flows on the A55, east of junction 6, and the B5420, east of Llangefni, have the potential to significantly affect local air quality at sensitive locations near to this route.

10.3.33 Modelled predictions of cumulative concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.88, for the human receptors considered in this assessment in Section D. The impact and effects are summarised in Tables 14.89.

10.3.34 The tables show that predicted cumulative pollutant concentrations and the number of exceedances reported are well below the national air quality objective values. The worst impacted receptors in Section D would experience a very low impact magnitude when compared to the cumulative baseline (future baseline plus cumulative flows) and Proposed Development baseline concentrations (future baseline flows only). Such impacts at locations, where total concentrations are so low are considered negligible and **not significant**, in line with EPUK and IQM guidance (Ref 14.15).

Table 14.88 Predicted Cumulative Pollutant Statistics at Human Receptors – Section D B5110 North of Talwrn to the Ceint

Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Baseline				
R4/01250	10.9	10.9	7.0	<1
RT4/13208	9.9	9.5	6.0	<1

Table 14.88 Predicted Cumulative Pollutant Statistics at Human Receptors – Section D B5110 North of Talwrn to the Ceint				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Baseline (+ Cumulative Contribution)				
R4/01250	10.9	10.9	7.0	<1
RT4/13208	10.2	9.6	6.0	<1
Future Operational (+ Cumulative Contribution)				
R4/01250	11.2	11.0	7.0	<1
RT4/13208	10.3	9.6	6.0	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

Table 14.89 Predicted Cumulative Pollutant Statistics at Human Receptors – Section D B5110 North of Talwrn to the Ceint				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Operational (+ Cumulative Contribution) - Future Baseline				
R4/01250	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
RT4/13208	+0.4 (VL)	<0.1 (I)	<0.1 (I)	<1
Future Operational (+ Cumulative Contribution) - Future Baseline (+ Cumulative Contribution)				
R4/01250	+0.3 (VL)	<0.1 (I)	<0.1 (I)	<1
RT4/13208	+0.1 (I)	<0.1 (I)	<0.1 (I)	<1
Change in concentration descriptor: (I) = Imperceptible, (VL) = Very Low, (L) = Low, (M) = Medium, (La) = Large				

10.3.35 Modelled predictions of cumulative concentrations of annual and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition rates are provided in Table 14.90, for the ecological receptors considered in Section D. The impact of cumulative emissions as a percentage of the air quality objective value, Critical Level and Critical Loads are provided in Table 14.91.

10.3.36 Table 14.90 shows that just nutrient nitrogen deposition exceeds its relevant lower Critical Load in Proposed Development baseline (future baseline flows only), cumulative baseline (future baseline flows plus cumulative flows) and cumulative operational (future baseline flows plus Proposed Development flows plus cumulative flows). This is mainly due to a high background nutrient nitrogen deposition rate, which is common across much of the UK. All other pollutants remain below the relevant air quality objective, Critical Level and Critical Loads.

10.3.37 The cumulative impact against the Proposed Development baseline (future baseline flows only), as shown in Table 14.91, demonstrates that there would be an increase of 1% or more of the relevant annual mean air quality objective and for annual mean NO_X concentrations at locations on the SSSI closest to the A5 and A55. At these locations, the total concentration, including the contribution of the Proposed Development, remains below the national air quality objective value for that pollutant. The annual mean impacts of the other pollutants considered are less than 1% of the Critical Loads. Daily mean impacts on concentrations of NO_X are less than 10% of the Critical Level. Such impacts are considered insignificant (**not significant**) by relevant EA guidance (Ref 14.19).

10.3.38 The cumulative impact against the cumulative baseline (future baseline flows plus cumulative flows) is less than 1% of the relevant air quality objective, Critical Level and Critical Loads for all locations of the SSSI considered.

Table 14.90 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section D B5110 North of Talwrn to the Ceint									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
Future Baseline (+ Cumulative Contribution)									
AQ/D/E01	Cors Ddyga SSSI	0	26.4	39.6	1.3	16.35	1.34	1.18	0.16
		5	22.2	33.3	1.3	16.03	1.32	1.16	0.16
		10	20.0	30.0	1.3	15.87	1.31	1.15	0.16
		15	18.6	27.9	1.3	15.76	1.30	1.14	0.16
		20	17.6	26.4	1.3	15.68	1.30	1.14	0.16
		25	16.8	25.2	1.3	15.62	1.29	1.13	0.16
		30	16.2	24.3	1.3	15.57	1.29	1.13	0.16
		35	15.6	23.4	1.3	15.52	1.28	1.12	0.16
		40	15.2	22.7	1.3	15.49	1.28	1.12	0.16
		45	14.8	22.2	1.3	15.46	1.28	1.12	0.16
		50	14.4	21.6	1.3	15.43	1.28	1.12	0.16

Table 14.90 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section D B5110 North of Talwrn to the Ceint									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		100	12.3	18.5	1.3	15.27	1.27	1.11	0.16
		150	11.4	17.1	1.3	15.19	1.26	1.10	0.16
		200	10.9	16.3	1.3	15.15	1.26	1.10	0.16
Future Operational (+ Cumulative Contribution)									
AQ/D/E01	Cors Ddyga SSSI	0	26.5	39.7	1.3	16.36	1.34	1.18	0.16
		5	22.3	33.4	1.3	16.04	1.32	1.16	0.16
		10	20.1	30.2	1.3	15.87	1.31	1.15	0.16
		15	18.7	28.0	1.3	15.77	1.30	1.14	0.16
		20	17.7	26.5	1.3	15.69	1.30	1.14	0.16
		25	16.9	25.3	1.3	15.63	1.29	1.13	0.16
		30	16.2	24.4	1.3	15.58	1.29	1.13	0.16
		35	15.7	23.5	1.3	15.53	1.29	1.13	0.16

Table 14.90 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section D B5110 North of Talwrn to the Ceint									
Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		40	15.2	22.8	1.3	15.49	1.28	1.12	0.16
		45	14.8	22.2	1.3	15.46	1.28	1.12	0.16
		50	14.5	21.7	1.3	15.44	1.28	1.12	0.16
		100	12.4	18.6	1.3	15.27	1.27	1.11	0.16
		150	11.4	17.1	1.3	15.19	1.26	1.10	0.16
		200	10.9	16.3	1.3	15.15	1.26	1.10	0.16
Air Quality Objective, Critical Level, Critical Load									
Cors Ddyga SSSI			**30**	**75**	**10**	**10–15**	**1.920–8.773**	**1.130–4.273**	**0.790–4.500**

Table 14.91 Predicted Change in Cumulative Pollutant Statistics at Ecological Receptors – Section D B5110 North of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
Future Operational (+ Cumulative Contribution) - Future Baseline									
AQ/D/E01	Cors Ddyga SSSI	0	2.6%	1.6%	0.1%	0.6%	0.2%	0.4%v	0.1%
		5	2.4%	1.4%	0.1%	0.5%	0.2%	0.3%	0.1%
		10	2.1%	1.3%	0.1%	0.5%	0.2%	0.3%	0.1%
		15	2.0%	1.2%	0.1%	0.5%	0.2%	0.3%	0.1%
		20	1.8%	1.1%	0.0%	0.5%	0.2%	0.3%	0.0%
		25	1.7%	1.0%	0.1%	0.4%	0.1%	0.3%	0.1%
		30	1.6%	1.0%	0.1%	0.4%	0.1%	0.2%	0.1%
		35	1.5%	0.9%	0.1%	0.3%	0.1%	0.2%	0.1%
		40	1.4%	0.8%	0.1%	0.3%	0.1%	0.2%	0.1%

Table 14.91 Predicted Change in Cumulative Pollutant Statistics at Ecological Receptors – Section D B5110 North of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		45	1.3%	0.8%	0.1%	0.3%	0.1%	0.2%	0.1%
		50	1.3%	0.8%	0.1%	0.3%	0.1%	0.2%	0.1%
		100	0.8%	0.5%	0.1%	0.2%	0.1%	0.2%	0.1%
		150	0.6%	0.4%	0.1%	0.1%	0.1%	0.1%	0.1%
		200	0.5%	0.3%	0.1%	0.1%	0.1%	0.1%	0.1%
Future Operational (+ Cumulative Contribution) - Future Baseline (+ Cumulative Contribution)									
AQ/D/E01	Cors Ddyga SSSI	0	0.4%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
		5	0.3%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
		10	0.3%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
		15	0.3%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
		20	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%

Table 14.91 Predicted Change in Cumulative Pollutant Statistics at Ecological Receptors – Section D B5110 North of Talwrn to the Ceint

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		25	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
		30	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
		35	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
		40	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
		45	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
		50	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
		100	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
		150	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
		200	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Air Quality Objective, Critical Level, Critical Load									
Cors Ddyga SSSI			**30**	**75**	**10**	**10–15**	**1.920–8.773**	**1.130–4.273**	**0.790–4.500**

Section E Ceint to the Afon Braint

10.3.39 Cumulative traffic flows on the A55, east of junction 7 have the potential to significantly affect local air quality at sensitive locations near to this route.

10.3.40 Modelled predictions of cumulative concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.92, for the human receptors considered in this assessment in Section E. The impact and effects are summarised in Table 14.93.

10.3.41 The tables show that predicted pollutant concentrations and the number of exceedances reported are well below the national air quality objective values during the Proposed Development construction phase, for all tunnel options and scenarios considered. The greatest impacts reported are very low, representing a negligible effect, in line with EPUK and IAQM guidance (Ref 14.15), which is considered to be **not significant**.

Table 14.92 Predicted Cumulative Pollutant Statistics at Human Receptors – Section E Ceint to the Afon Braint

Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Baseline (+ Cumulative Contribution)				
R5/00071	11.2	9.9	6.4	<1
R5/02601	11.6	10.3	6.6	<1
R5/02726	9.0	10.0	6.6	<1
Future Operational (+ Cumulative Contribution)				
R5/00071	11.3	9.9	6.4	<1
R5/02601	11.7	10.3	6.6	<1
R5/02726	9.1	10.0	6.6	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

Table 14.93 Predicted Change in Cumulative Pollutant Statistics at Human Receptors – Section E Ceint to the Afon Braint				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Operational (+ Cumulative Contribution) - Future Baseline				
R5/00071	+0.6 (L)	+0.1 (I)	+0.1 (I)	<+1
R5/02601	+0.5 (VL)	+0.1 (I)	+0.1 (I)	<+1
R5/02726	+0.4 (VL)	+0.1 (I)	<+0.1 (I)	<+1
Future Operational (+ Cumulative Contribution) - Future Baseline (+ Cumulative Contribution)				
R5/00071	+0.1 (I)	<+0.1 (I)	<+0.1 (I)	<+1
R5/02601	+0.1 (I)	<+0.1 (I)	<+0.1 (I)	<+1
R5/02726	+0.1 (I)	<+0.1 (I)	<+0.1 (I)	<+1
Change in concentration descriptor: (I) = Imperceptible, (VL) = Very Low, (L) = Low, (M) = Medium, (La) = Large				

Section F Afon Braint to Pentir – IACC Section

10.3.42 Cumulative traffic flows on the A55, east of junction 7a, have the potential to significantly affect local air quality at sensitive locations In Section F (IACC section).

10.3.43 Modelled predictions of cumulative concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective value are provided in Table 14.94, for the human receptors considered in this assessment in Section F (IACC section). The impact and effects are summarised in Table 14.95.

10.3.44 The tables show that predicted cumulative pollutant concentrations and the number of exceedances reported are well below the national air quality objective values. Impacts reported range from very low to low. Such impact at locations where total concentrations as low as reported represent a negligible effect, in line with EPUK and IAQM guidance (Ref 14.15), which is considered to be **not significant**.

Table 14.94 Predicted Cumulative Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir – IACC Section				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Baseline (+ Cumulative Contribution)				
R5/02917	9.4	9.9	6.4	<1
R5/03134	7.9	10.6	7.2	<1
R5/03353	13.7	10.5	6.8	<1
R5/03460	14.4	12.0	8.0	<1
R5/03755	6.3	9.2	6.0	<1
R5/05343	11.3	10.7	7.1	<1
R5/05644	12.0	10.2	6.6	<1
R5/05837	12.1	10.2	6.6	<1
R5/06661	11.3	10.8	7.1	<1
R5/06714	15.6	11.2	7.4	<1
R5/06835	17.0	11.4	7.5	<1
R5/06863	12.8	10.8	7.1	<1
R5/06907	14.9	10.4	6.8	<1
Future Operational (+ Cumulative Contribution)				
R5/02917	9.7	9.7	9.7	<1
R5/03134	9.0	9.0	9.0	<1
R5/03353	14.7	14.7	14.7	<1
R5/03460	15.0	15.0	15.0	<1
R5/03755	7.0	7.0	7.0	<1
R5/05343	11.5	11.5	11.5	<1
R5/05644	12.2	12.2	12.2	<1
R5/05837	12.3	12.3	12.3	<1
R5/06661	11.5	11.5	11.5	<1
R5/06714	15.8	15.8	15.8	<1

Table 14.94 Predicted Cumulative Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir – IACC Section				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/06835	17.2	17.2	17.2	<1
R5/06863	13.0	13.0	13.0	<1
R5/06907	15.1	15.1	15.1	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

Table 14.95 Predicted Cumulative Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir – IACC Section				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Operational (+ Cumulative Contribution) - Future Baseline				
R5/02917	+0.6 (L)	<+0.1 (I)	<+0.1 (I)	<+1
R5/03134	+1.2 (L)	<+0.1 (I)	<+0.1 (I)	<+1
R5/03353	+1.0 (L)	+0.1 (VL)	+0.1 (VL)	<+1
R5/03460	+0.8 (L)	+0.1 (VL)	<+0.1 (I)	<+1
R5/03755	+0.7 (L)	<+0.1 (I)	<+0.1 (I)	<+1
R5/05343	+0.6 (L)	+0.1 (VL)	<+0.1 (I)	<+1
R5/05644	+0.7 (L)	+0.1 (VL)	+0.1 (VL)	<+1
R5/05837	+0.7 (L)	+0.1 (VL)	+0.1 (VL)	<+1
R5/06661	+0.3 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/06714	+0.5 (VL)	+0.1 (VL)	<+0.1 (I)	<+1
R5/06835	+0.6 (L)	+0.1 (VL)	<+0.1 (I)	<+1
R5/06863	+0.5 (VL)	<+0.1 (I)	<+0.1 (I)	<+1

Table 14.95 Predicted Cumulative Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir – IACC Section				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
R5/06907	+0.6 (L)	+0.1 (VL)	<+0.1 (I)	<+1
Future Operational (+ Cumulative Contribution) - Future Baseline (+ Cumulative Contribution				
R5/02917	+0.4 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/03134	+1.1 (L)	<+0.1 (I)	<+0.1 (I)	<+1
R5/03353	+1.0 (L)	<+0.1 (I)	<+0.1 (I)	<+1
R5/03460	+0.7 (L)	<+0.1 (I)	<+0.1 (I)	<+1
R5/03755	+0.7 (L)	<+0.1 (I)	<+0.1 (I)	<+1
R5/05343	+0.3 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/05644	+0.3 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/05837	+0.3 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/06661	+0.2 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/06714	+0.2 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/06835	+0.3 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/06863	+0.2 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/06907	+0.3 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
Change in concentration descriptor: (I) = Imperceptible, (VL) = Very Low, (L) = Low, (M) = Medium, (La) = Large				

Section F Afon Braint to Pentir – Gwynedd Council Section

10.3.45 Cumulative traffic flows on the A55, east of junction 8a have the potential to significantly affect local air quality at sensitive locations In Section F (Gwynedd Council section).

10.3.46 Modelled predictions of cumulative concentrations of annual mean NO_2, PM_{10} and $PM_{2.5}$ and the number of exceedances of the daily PM_{10} air quality objective are provided in Table 14.96, for the human receptors considered in this assessment in Section F (Gwynedd Council section). The impact and effects are summarised in Table 14.97.

10.3.47 The tables show that predicted cumulative pollutant concentrations and the number of exceedances reported are well below the national air quality objective values. Impacts reported range from very low to low when cumulative operational concentrations are compared to Proposed Development baseline concentrations (future baseline flows only). Reported impacts are very low when cumulative operational concentrations are compared to cumulative baseline concentrations (future baseline flows plus cumulative flows). Such impacts at locations with total concentrations as low as reported represent a negligible effect, in line with EPUK and IAQM guidance (Ref 14.15), which is considered to be **not significant**.

Table 14.96 Predicted Cumulative Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Operational (+ Cumulative Contribution)				
R5/07180	11.7	9.9	6.5	<1
R5/07195	15.8	11.1	7.5	<1
R5/07470	16.7	10.4	6.8	<1
R5/07783	15.6	10.6	7.0	<1
R5/11751	15.2	11.1	7.3	<1
R5/AQ01	15.1	11.3	7.7	<1
Future Operational (+ Cumulative Contribution)				
R5/07180	11.9	10.0	6.5	<1
R5/07195	16.0	11.1	7.5	<1
R5/07470	17.0	10.4	6.8	<1
R5/07783	15.8	10.6	7.0	<1
R5/11751	15.3	11.1	7.3	<1
R5/AQ01	15.2	11.4	7.7	<1
Air Quality Objective Value	**40**	**40**	**25**	**35**

Table 14.97 Predicted Change in Cumulative Pollutant Statistics at Human Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section				
Receptor ID	Annual Mean Concentration (µg/m^3)			No. of Days PM_{10} Exceeds 50 µg/m^3 (days)
	NO_2	PM_{10}	$PM_{2.5}$	
Future Operational (+ Cumulative Contribution) - Future Baseline				
R5/07180	+0.4 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/07195	+0.6 (L)	<+0.1 (I)	<+0.1 (I)	<+1
R5/07470	+0.6 (L)	<+0.1 (I)	<+0.1 (I)	<+1
R5/07783	+0.7 (L)	+0.1 (I)	<+0.1 (I)	<+1
R5/11751	+0.6 (L)	+0.1 (I)	<+0.1 (I)	<+1
R5/AQ01	+0.5 (VL)	+0.1 (I)	<+0.1 (I)	<+1
Future Operational (+ Cumulative Contribution) - Future Baseline (+ Cumulative Contribution				
R5/07180	+0.1 (I)	<+0.1 (I)	<+0.1 (I)	<+1
R5/07195	+0.2 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/07470	+0.3 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/07783	+0.3 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/11751	+0.1 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
R5/AQ01	+0.1 (VL)	<+0.1 (I)	<+0.1 (I)	<+1
Change in concentration descriptor: (I) = Imperceptible, (VL) = Very Low, (L) = Low, (M) = Medium, (La) = Large				

10.3.48 Modelled predictions of cumulative concentrations of annual and daily mean NO_X, annual mean SO_2, nitrogen deposition and acid deposition rates are provided in Table 14.98, for the ecological receptors considered in Section F (Gwynedd Council Section). The impact of cumulative emissions as a percentage of the air quality objective value, critical level and critical loads are provided in Table 14.99.

10.3.49 Table 14.98 shows that just nutrient nitrogen deposition, total acid and acid as nitrogen deposition exceed the relevant Critical Loads in Proposed Development baseline (future baseline flows only), cumulative baseline (future baseline flows plus cumulative flows) and cumulative operational (future baseline flows plus Proposed Development flows plus cumulative

flows). This is mainly due to a high background nutrient nitrogen deposition rate, which is common across much of the UK. All other pollutants remain below the relevant air quality objective, Critical Level and Critical Loads.

10.3.50 The cumulative impact against the Proposed Development baseline (future baseline flows only), demonstrates that there would be an increase of 1% or more of the annual mean air quality objective for NO_X and Critical Load for nutrient nitrogen deposition, at locations on the Coedydd Afon Menai SSSI (northeast of A55). There would also be an increase of 1% or more of the relevant long-term annual mean air quality objective for NO_X on the Coedydd Afon Menai SSSI (southwest of A55). The impacts on annual mean NO_X occur at some locations where total pollutant concentrations are greater than 70% the air quality objective, with the contribution of the Proposed Development. The cumulative impacts on nutrient nitrogen deposition occur at locations where total deposition rates are already above the upper Critical Load value for this habitat. Other annual mean pollutants considered are less than 1% of the Critical Loads, and the cumulative impact of the daily mean concentrations of NO_X is less than 10% of the Critical Level for that pollutant. In line with EA guidance (Ref 14.19), impacts on annual mean and daily mean NO_X, and acid deposition are considered insignificant (**not significant**).

10.3.51 The cumulative impact against the cumulative baseline (future baseline flows plus cumulative flows) is 1% or less of the relevant air quality objective for annual mean NO_X, and less than 1% of the Critical Level and Critical Loads for the other pollutants at all locations of the SSSI considered.

Table 14.98 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
Future Baseline (+ Cumulative Contribution)									
AQ/F(G)/E 01	Coedydd Afon Menai SSSI (northeast of A55)	0	20.1	30.2	1.0	35.75	2.75	2.55	0.20
		5	21.2	31.8	1.0	35.92	2.77	2.57	0.20
		10	22.2	33.3	1.0	36.07	2.78	2.58	0.20
		15	23.0	34.5	1.0	36.19	2.79	2.59	0.20
		20	23.4	35.0	1.0	36.25	2.79	2.59	0.20
		25	23.4	35.1	1.0	36.25	2.79	2.59	0.20
		30	23.3	34.9	1.0	36.24	2.79	2.59	0.20
		35	22.9	34.4	1.0	36.18	2.78	2.58	0.20
		40	22.6	33.9	1.0	36.13	2.78	2.58	0.20
		45	22.2	33.2	1.0	36.07	2.78	2.58	0.20

Table 14.98 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		50	21.7	32.6	1.0	35.99	2.77	2.57	0.20
		100	18.3	27.5	1.0	35.47	2.73	2.53	0.20
		150	16.5	24.8	1.0	35.18	2.71	2.51	0.20
		200	15.4	23.2	1.0	35.01	2.70	2.50	0.20
AQ/F(G)/E 02	Coedydd Afon Menai SSSI (Southwest of A55)	0	17.3	26.0	1.0	35.31	2.72	2.52	0.20
		5	17.1	25.7	1.0	35.28	2.72	2.52	0.20
		10	16.9	25.4	1.0	35.25	2.72	2.52	0.20
		15	16.7	25.1	1.0	35.22	2.72	2.52	0.20
		20	16.6	24.9	1.0	35.20	2.71	2.51	0.20
		25	16.4	24.6	1.0	35.17	2.71	2.51	0.20
		30	16.3	24.4	1.0	35.15	2.71	2.51	0.20

Table 14.98 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		35	16.1	24.2	1.0	35.12	2.71	2.51	0.20
		40	16.0	24.0	1.0	35.11	2.71	2.51	0.20
		45	15.8	23.8	1.0	35.07	2.71	2.51	0.20
		50	15.7	23.6	1.0	35.06	2.70	2.50	0.20
		100	14.9	22.3	1.0	34.93	2.70	2.50	0.20
		150	14.2	21.3	1.0	34.82	2.69	2.49	0.20
		200	13.7	20.6	1.0	34.74	2.68	2.48	0.20
Future Operational (+ Cumulative Contribution)									
AQ/F(G)/E 01	Coedydd Afon Menai SSSI (northeast of A55)	0	20.4	30.6	1.0	35.80	2.76	2.56	0.2
		5	21.5	32.2	1.0	35.97	2.77	2.57	0.2
		10	22.5	33.7	1.0	36.12	2.78	2.58	0.2

Table 14.98 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		15	23.3	35.0	1.0	36.24	2.79	2.59	0.2
		20	23.7	35.5	1.0	36.30	2.79	2.59	0.2
		25	23.7	35.6	1.0	36.30	2.79	2.59	0.2
		30	23.6	35.3	1.0	36.29	2.79	2.59	0.2
		35	23.2	34.8	1.0	36.23	2.79	2.59	0.2
		40	22.9	34.3	1.0	36.18	2.78	2.58	0.2
		45	22.5	33.7	1.0	36.12	2.78	2.58	0.2
		50	22.0	33.0	1.0	36.04	2.77	2.57	0.2
		100	18.6	27.8	1.0	35.52	2.74	2.54	0.2
		150	16.7	25.1	1.0	35.22	2.72	2.52	0.2
		200	15.6	23.4	1.0	35.05	2.70	2.50	0.2

Table 14.98 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
AQ/F(G)/E 02	Coedydd Afon Menai SSSI (Southwest of A55)	0	17.5	26.3	1.0	35.34	2.72	2.52	0.2
		5	17.3	26.0	1.0	35.32	2.72	2.52	0.2
		10	17.1	25.7	1.0	35.28	2.72	2.52	0.2
		15	16.9	25.4	1.0	35.25	2.72	2.52	0.2
		20	16.8	25.1	1.0	35.24	2.72	2.52	0.2
		25	16.6	24.9	1.0	35.20	2.71	2.51	0.2
		30	16.4	24.7	1.0	35.17	2.71	2.51	0.2
		35	16.3	24.4	1.0	35.16	2.71	2.51	0.2
		40	16.2	24.3	1.0	35.14	2.71	2.51	0.2
		45	16.0	24.0	1.0	35.11	2.71	2.51	0.2
		50	15.9	23.8	1.0	35.09	2.71	2.51	0.2

Table 14.98 Predicted Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		100	15.0	22.5	1.0	34.95	2.70	2.50	0.2
		150	14.3	21.5	1.0	34.84	2.69	2.49	0.2
		200	13.9	20.8	1.0	34.78	2.68	2.48	0.2
Air Quality Objective, Critical Level, Critical Load									
Coedydd Afon Menai SSSI			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**

Table 14.99 Predicted Change in Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
Future Operational (+ Cumulative Contribution) - Future Baseline									
AQ/F(G)/E 01	Coedydd Afon Menai SSSI (northeast of A55)	0	2.3%	1.4%	0.1%	1.1%	0.3%	0.6%	0.1%
		5	2.5%	1.5%	0.1%	1.3%	0.4%	0.7%	0.1%
		10	2.7%	1.6%	0.1%	1.3%	0.3%	0.7%	0.1%
		15	2.9%	1.8%	0.1%	1.4%	0.4%	0.7%	0.1%
		20	2.9%	1.8%	0.1%	1.4%	0.4%	0.8%	0.1%
		25	3.0%	1.8%	0.1%	1.4%	0.4%	0.8%	0.1%
		30	3.0%	1.8%	0.1%	1.4%	0.4%	0.7%	0.1%
		35	2.8%	1.7%	0.1%	1.3%	0.3%	0.7%	0.1%
		40	2.8%	1.7%	0.1%	1.4%	0.4%	0.7v	0.1%
		45	2.7%	1.6%	0.1%	1.4%	0.4%	0.8%	0.1%

Table 14.99 Predicted Change in Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		50	2.7%	1.6	0.1%	1.3%	0.3%	0.7%	0.1%
		100	1.9%	1.1	0.1%	1.0%	0.3%	0.5%	0.1%
		150	1.5%	0.9	0.1%	0.7%	0.2%	0.4%	0.1%
		200	1.2%	0.7	0.1%	0.7%	0.2%	0.4%	0.1%
AQ/F(G)/E 02	Coedydd Afon Menai SSSI (Southwest of A55)	0	1.6%	1.0	0.1%	0.8%	0.2%	0.4%	0.1%
		5	1.6%	1.0	0.1%	0.8%	0.2%	0.4%	0.1%
		10	1.5%	0.9	0.1%	0.7%	0.2%	0.4%	0.1%
		15	1.5%	0.9	0.1%	0.7v	0.2%	0.4%	0.1%
		20	1.4%	0.8	0.1%	0.8%	0.2%	0.4%	0.1%
		25	1.5%	0.9	0.1%	0.7%	0.2%	0.3%	0.1%
		30	1.4%	0.8	0.1%	0.7%	0.2%	0.3%	0.1%

Table 14.99 Predicted Change in Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		35	1.3%	0.8%	0.1%	0.7%	0.2%	0.3%	0.1%
		40	1.4%	0.8%	0.1%	0.7%	0.2%	0.4%	0.1%
		45	1.3%	0.8%	0.1%	0.7%	0.2%	0.4%	0.1%
		50	1.2%	0.7%	0.1%	0.7%	0.2%	0.3%	0.1%
		100	1.1%	0.7%	0.1%	0.5%	0.1%	0.3%	0.1%
		150	0.9%	0.5%	0.1%	0.3%	0.1%	0.2%	0.1%
		200	0.8%	0.5%	0.1%	0.5%	0.1%	0.3%	0.1%
Future Operational (+ Cumulative Contribution) - Future Baseline (+ Cumulative Contribution)									
AQ/F(G)/E01	Coedydd Afon Menai SSSI (northeast of A55)	0	0.8%	0.5%	0.1%	0.5%	0.1%	0.3%	0.1%
		5	0.9%	0.5%	0.1%	0.5%	0.1%	0.3%	0.1%
		10	0.9%	0.5%	0.1%	0.5%	0.1%	0.3%	0.1%

Table 14.99 Predicted Change in Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		15	1.0%	0.6%	0.1%	0.5%	0.1%	0.3%	0.1%
		20	1.0%	0.6%	0.1%	0.5%	0.1%	0.3%	0.1%
		25	1.0%	0.6%	0.1%	0.5%	0.1%	0.3%	0.1%
		30	1.0%	0.6%	0.1%	0.5%	0.1%	0.3%	0.1%
		35	0.9%	0.5%	0.1%	0.5%	0.1%	0.3%	0.1%
		40	1.0%	0.6%	0.1%	0.5%	0.1%	0.3%	0.1%
		45	1.0%	0.6%	0.1%	0.5%	0.1%	0.3%	0.1%
		50	0.9%	0.5%	0.1%	0.5%	0.1%	0.3%	0.1%
		100	0.7%	0.4%	0.1%	0.5%	0.1%	0.3%	0.1%
		150	0.6%	0.4%	0.1%	0.4%	0.1%	0.2%	0.1%
		200	0.5%	0.3%	0.1%	0.4%	0.1%	0.2%	0.1%

Table 14.99 Predicted Change in Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
AQ/F(G)/E 02	Coedydd Afon Menai SSSI (Southwest of A55)	0	0.6%	0.4%	0.1%	0.3%	0.1%	0.2%	0.1%
		5	0.6%	0.4%	0.1%	0.4%	0.1%	0.2%	0.1%
		10	0.6%	0.4%	0.1%	0.4%	0.1%	0.2%	0.1%
		15	0.6%	0.4%	0.1%	0.4%	0.1%	0.2%	0.1%
		20	0.6%	0.4%	0.1%	0.3%	0.1%	0.2%	0.1%
		25	0.6%	0.4%	0.1%	0.3%	0.1%	0.2%	0.1%
		30	0.5%	0.3%	0.1%	0.2%	0.1%	0.1%	0.1%
		35	0.5%	0.3%	0.1%	0.3%	0.1%	0.2%	0.1%
		40	0.6%	0.4%	0.1%	0.4%	0.1%	0.2%	0.1%
		45	0.6%	0.4%	0.1%	0.4%	0.1%	0.2%	0.1%
		50	0.5%	0.3%	0.1%	0.3%	0.1%	0.2%	0.1%

Table 14.99 Predicted Change in Cumulative Pollutant Statistics at Ecological Receptors – Section F Afon Braint to Pentir – Gwynedd Council Section

Receptor ID	Ecological Receptor	Distance from main Road Source (m)	Concentration (µg/m^3)			Deposition Rate			
			Annual Mean NO_X	Daily Mean NO_X	Annual Mean SO_2	Annual Mean Nutrient Nitrogen (kg/ha/yr)	Annual Mean Acid (keq/ha/yr)	Annual Mean Acid (as Nitrogen) (keq/ha/yr)	Annual Mean Acid (as Sulphur) (keq/ha/yr)
		100	0.5%	0.3%	0.1%	0.2%	0.1%	0.1%	0.1%
		150	0.5%	0.3%	0.1%	0.2%	0.1%	0.1%	0.1%
		200	0.4%	0.3%	0.1%	0.3%	0.1%	0.2%	0.1%
Air Quality Objective, Critical Level, Critical Load									
Coedydd Afon Menai SSSI			**30**	**75**	**10**	**10 – 20**	**2.588–5.331**	**1.365–2.844**	**1.223–2.487**

11 Summary

11.1.1 This Chapter describes the potential impact of the Proposed Development on local air quality.

11.1.2 A review of baseline conditions has identified that existing air quality within the study area is generally of a good standard. No AQMAs have been declared and no air quality objectives are known to be exceeded where there is human health sensitive exposure. A baseline survey undertaken within the study area confirmed this, with elevated annual mean NO_2 concentrations only measured at locations immediately adjacent to sections of the A55 and A5025, where there is no relevant exposure to annual mean NO_2, and limited exposure to hourly mean NO_2. However, the baseline assessment has identified that there are already exceedances of the air quality objective value for annual mean NO_X concentrations and deposition rates for nutrient nitrogen and acid as nitrogen at some sensitive ecological sites within the study area.

11.1.3 A qualitative assessment of construction dust and particulate matter (PM_{10}) emissions has been undertaken in line with current IAQM guidance. The assessment has informed the level of mitigation required to control emissions to the extent that a significant effect would not occur. The measures required for the works are standard practice on most well managed construction sites across the UK. The dust mitigation measures are set out within the CEMP (**Document 7.4**) for the Proposed Development. No additional measures, beyond those described in this chapter and the CEMP (**Document 7.4**), are required for the Proposed Development.

11.1.4 A quantitative assessment of road traffic and emergency generator emissions impacts has also been undertaken. The assessment has identified that there are no exceedances of the national air quality objective values at any human sensitive receptors within the study area (nor any exceedance of the WHO guideline values for PM_{10} and $PM_{2.5}$). Impacts due to the Proposed Development would not cause any effect considered to be significant at these locations, in accordance with the method endorsed by the EPUK and IAQM.

11.1.5 The quantitative assessment did identify that there would be impacts at ecological sites considered within the study area that are located adjacent to the construction traffic routes. Parts of these sensitive ecological sites already experience an exceedance of the relevant air quality objective and/or

critical loads, due to high background concentrations. However, in line with appropriate guidance, these impacts are screened as insignificant and are considered **not significant**.

11.1.6 A cumulative assessment has been undertaken, to quantify the cumulative impact of Other Development traffic flows, as well as Proposed Development traffic flows, and the resultant effect at sensitive receptors located near to the construction traffic routes. The assessment of cumulative effects has considered a scenario where the cumulative traffic flows occur in both future baseline and Proposed Development construction phase scenarios, and another scenario where the cumulative traffic flow only occurs within the Proposed Development construction phase scenario. In the former cumulative scenario, impacts range from imperceptible to low at human health sensitive receptors located near to the construction traffic routes, which equates to a negligible effect, and impacts are screened as insignificant at the ecological receptors, the effects of which are considered to be **not significant**. In the latter cumulative scenario, impacts range from imperceptible to medium at human health sensitive receptors located near to the construction traffic routes, which equates to a minor adverse effect, which is considered to be **not significant**. At the ecological receptors considered, some impacts cannot be screened as insignificant, including nutrient nitrogen deposition at Cors Ddyga and Coedydd Afon Menai SSSIs. At these locations, the lower Critical Load value is already exceeded in the baseline. The contribution associated with the Proposed Development would be temporary and will would for the duration of the Proposed Development construction works only.

11.1.7 Overall, the impact and associated effect of the Proposed Development on local air quality is considered to be **not significant**. Impacts are predominantly due to construction activity, which would be temporary in nature, lasting only for the duration of the works. Upon completion of the construction phase, air quality would return to future baseline conditions. Decommissioning would have less of an effect than construction but the same approach to mitigation would apply. As such, the Proposed Development would not contravene any local or national air quality related policies.

Table 14.100 Potential Air Quality Effects of the Proposed Development

Resource/ Receptor	Value	Potential effects and sensitivity	Mitigation	Residual Magnitude	Significance
Human Health Sensitive Receptors	High	Increase in exposure to pollutant concentrations due to emissions from construction traffic end emergency generator emissions at High sensitive receptors, such as residential dwellings.	Measures AE21	Very Low to Medium	**Not Significant** Medium magnitude impact predicted to occur at limited locations where total pollutant concentrations (including the impact of the Proposed Development) are so low that there is no risk of the air quality objective values being exceeded.
	High	Increase in exposure to short term concentrations of PM10 from construction activity. In line with the IAQM guidance applied to the assessment, the sensitivity of Sections range from Low to High, depending on the number of receptors located close to the Order Limits in each Section.	Measures AE11, AE12, AE13, AE14 and AE15	Negligible to Low	**Not Significant**

Table 14.100 Potential Air Quality Effects of the Proposed Development					
Resource/ Receptor	Value	Potential effects and sensitivity	Mitigation	Residual Magnitude	Significance
Ecologically Sensitive Receptors		Increase in exposure to pollutant concentrations and deposition rates due to emissions from construction traffic end emergency generator emissions at High sensitive internationally designated sites.	Measures AE21	Screened as Insignificant	**Not Significant**
Dust sensitive receptors	High	Increase in dust concentrations at High amenity and ecologically sensitive locations, including residential properties and internationally designated conservation sites.	Measures AE11, AE12, AE13, AE14 and AE15	Negligible to Low	**Not Significant**

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