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Selection of critical levels and loads for air quality assessment and noise thresholds.

Mor Hafren Bio Power, Cardiff.

Technical Note

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BACKGROUND

1.1.1 Section 7.1 of the scoping direction for the Mor Hafren ERF directs the applicant to utilise screening distances of 10km for Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites (European sites) and 2km for Sites of Special Scientific Interest (SSSI). The scoping direction is based on the published Defra/Environment Agency's guidance: 'Air emissions risk assessment for your environmental permit'. The recent issued guidance published by the Institute of Air Quality Management (June 2019) also draws on the Environment Agency's guidance and also includes ancient woodland sites within 2km of the site for consideration.

1.1.2 An assessment of all European sites and SSSI's falling within these buffering zones around the application has been undertaken to provide information on the most appropriate critical levels/loads to be used when undertaking the air quality modelling. This high-level evaluation identifies those receptors most sensitive to a range of pollutants which will require assessment and also identifies some receptors than can potentially be screened out at an early stage.

1.1.3 This is not a Habitat Regulations Assessment Screening. The purpose of this note is to identify relevant ecological receptors that will require assessment during the air quality modelling. Table 1 below identifies relevant European sites and SSSI's within the 10km and 2km zones.

Declaration of compliance with professional code of ethics or conduct
The information which we have prepared and provided is true and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bonafide opinions.

Every reasonable attempt has been made to comply with the relevant best practice guidelines and BS42020:2013 (Biodiversity: Code of practice for planning and development).

UK leaving the EU
Until the UK has formally completed the transition phase of leaving the EU and until the Environment Bill 2020 comes into force it is assumed that all legislation pertaining to wildlife will remain as it was prior to the transition.

Table 1. Sites assessed to determine need for air quality assessment

Site name and designation	Distance from Site	AQ assessment needed	Justification
Severn Estuary SPA	1.2km to the south	Yes	Impacts on habitats within SAC should be sufficient to identify potential impacts on species where potential impacts identified. Some species can be screened out of assessment.
Severn Estuary SAC	1.2km to the south	Yes	Some habitats within SAC sensitive to changes in air quality. Impacts on fish species can probably be screened out.
Severn Estuary Ramsar	1.2km to the south	Yes	Overlap between features of interest within SAC and SPA.
River Usk/Afon Wysg SAC	9km to the east	Yes	Likely to be able to screen out likely significant effects after initial deposition modelling given distance from site.
Cardiff Beech Woods SAC	9.8km to the north-west	Yes	Likely to be able to screen out likely significant effects after initial deposition modelling given distance from site.
Gwent Levels – Rumney and Peterstone SSSI	Within and adjacent to Site	Yes	Botanical assemblages in ditches/reens unlikely to be impacted by nitrogen deposition. Impacts on grassland communities will need modelling (overlap with SINCs)

1.1.4 As a precaution SSSI's within 5km of the site have also been considered. This assessment has identified four SSSI's in the 2-5km zone. Three of these have been screened out as they are geological sites and will not be impacted by changes in air quality. These sites are:

- Rumney Quarry SSSI
- Penylan Quarry SSSI
- Rhymney River Section SSSI

1.1.5 Gwent Levels – St Brides SSSI is a biological site that lies approximately 3.7km to the east of the Site. Should the initial air quality modelling identify impacts on the Gwent Levels – Rumney and Peterstone SSSI at 2km, further assessment of the potential impacts on this site may be required.

RELEVANT CRITICAL LEVELS/LOADS FOR EUROPEAN SITES

1.1.6 The Severn Estuary SAC contains a number of Annex 1 habitats: Estuaries, subtidal sandbanks, intertidal mudflats and sandflats, Atlantic salt meadow and reefs. Subtidal sandbanks and reefs not sensitive to nitrogen deposition and modelling for these habitats is not required.

1.1.7 The lower end of the critical load range for nitrogen deposition on Estuaries and Atlantic salt meadows is 20kg/N/ha/yr. This figure should be used in the initial air quality modelling exercise as these are the habitats within the SAC most sensitive to nitrogen deposition.

1.1.8 No nitrogen critical load is given for intertidal mudflats and sandflats, given the location of the habitats in relation to the site it is unlikely there would be significant levels of deposition. It would probably be reasonable to assume that the effects of the tidal range on these habitats will prevent a significant build-up of nitrogen in any one location due to dynamic processes. The estuary critical load of 20kg/N/ha/yr. can be used to assess impacts on this habitat as the estuary habitat type is over-arching, encompassing intertidal habitats.

1.1.9 Three Annex II fish species occur within the SAC: sea lamprey, river lamprey and twaite shad. Both species of lamprey spawn and spend the juvenile phase of their lifecycle in rivers. The adult part of their life is spent in the sea or estuaries. Twaite shad spawn in the River Severn (also Usk and Wye) with the spawning population passing through the estuary to reach the spawning ground and a nursery area for juvenile shad.

1.1.10 APIS does not give a nitrogen critical load for the three fish species within the SAC and it is unlikely that deposition of nitrogen from air will impact significantly on the marine habitats. APIS does highlight a sensitivity of these species to acid deposition but this is in freshwater systems rather than estuaries, this is the same for ammonia. There could be a potential impact if there are significant increases in ammonia or acid deposition on freshwater SACs linked to the Severn estuary that play a role in supporting these species during the freshwater phase of their lifecycle. This will need to be reviewed after the initial modelling.

1.1.11 The Severn Estuary SPA is classified for supporting internationally important over-wintering populations of Bewick's swan, European white-fronted geese, dunlin, redshank, shelduck and gadwall as well as an internationally important assemblage of waterfowl (wildfowl and waders) – over 20,000 wintering birds.

1.1.12 It should be possible to screen out impacts on European white-fronted geese, Bewick's swan and gadwall due to the locations used by the main wintering populations within the SPA without undertaking any air quality assessment. The assemblage of pochard and tufted duck that occurs at the mouth of the Rhymney would be screened out as they would be using the area at high tide and are unlikely to be impacts by changes in air quality.

1.1.13 Aggregations of shelduck, dunlin, pintail and redshank all occur at the mouth of the Rhymney and would need consideration. The air quality modelling undertaken for the estuary habitat for the SAC should be sufficient to allow an assessment of the potential impacts on these species to be undertaken.

1.1.14 The qualifying interest features of the Severn Estuary Ramsar include a number of additional fish species not included in the SAC: Atlantic salmon, common eel, Allis shad, sea trout. The modelling for these species would be the same as those for fish species within the SAC.

1.1.15 Table 2 below summaries the critical loads/levels to be used for the initial air quality modelling on the Severn Estuary SAC/SPA/Ramsar.

Table 2. Pollutant and relevant critical levels/loads for assessing Severn Estuary SAC/SPA/Ramsar

Pollutant	Critical Level/Load
Nitrogen	20kg/N/ha/yr.
Ammonia	3 µg NH3/m3 Annual Mean
NOx	30 µg NOx/m3 Annual Mean
NOx	75 µg NOx/m3 24-hr mean
SO2	10-20 µg SO2/m3 Annual Mean

RELEVANT CRITICAL LEVELS/LOADS FOR SSSI'S

1.1.16 Air quality modelling for the Gwent Levels – Rumney and Peterstone SSSI should use the lower end of the critical load for nitrogen deposition given for coastal floodplain and grazing marsh for initial assessment (20kg/N/ha/yr.). This will address the potential for nitrogen deposition to impact on this area which may act as supporting habitat for SPA birds.

1.1.17 The particular interest feature of the SSSI is the vegetation within the reens (ditches) and the aquatic invertebrate flora is important for snails and dragonflies and terrestrial invertebrates. Most of the aquatic communities within the ditches would be those such as A21 *Ranunculus baudotii* community or possibly swamp communities S4 *Phragmites australis* swamp and reedbeds, S5 *Glyceria maxima* swamp, S6 *Carex riparia* swamp or S26 *Phragmites australis – Urtica diocia* tall herb fen. All these communities tend to be found in mesotrophic to eutrophic conditions.

1.1.18 S26 *Phragmites australis – Urtica diocia* tall herb fen are known to tolerant of eutrophic conditions. Rodwell (1995) notes that S26 tall herb fen is often the only fen vegetation found in much-improved agricultural landscapes. Common reed typically occurs in relatively fertile conditions (scored 6 on the Ellenberg scale for nitrogen) indicating it is unlikely to be susceptible to increased levels of nitrogen deposition.

1.1.19 Deposition of ammonia, nitrate and other forms of nitrogen from the atmosphere is unlikely to be the largest source of this nutrient to eutrophic standing waters (Gibson et al. 1992, Gibson et al. 1995, Jordan 1997) and, therefore, in general, nitrogen deposition is unlikely to be very harmful to eutrophic standing waters, even when close to sources.

1.1.20 The interest features of the Severn Estuary SSSI will mainly be covered by the screening for the Severn Estuary SAC with the exception of rocky platforms but these are probably not present within 2km of the Site.

1.1.21 The same critical levels/loads set out in Table 2 should be used for the assessment of air quality impacts on SSSI's.

SINCS

1.1.22 Four SINCs are present within 1km of the Site, these are set out in Table 3.

Table 3. SINCS within 1km of the Site

Site Name	Location	Interest Feature
Hendre Road	Immediately north of Site	Neutral grassland, marshy grassland and vascular plants. Site is within the Gwent Levels: Rumney and Peterstone SSSI but the grassland habitats are distinct from the ditches/reen features of the SSSI
Wentloog Industrial Park	300m to the west of the Site	Marshy grassland. Site is within the Gwent Levels: Rumney and Peterstone SSSI but the grassland habitats are distinct from the ditches/reen features of the SSSI.
Rumney Great Wharf	500m to the south of the Site	An area of saltmarsh and grassland on particular importance to wintering birds. Site appears to partially overlap with SPA.
Hendre Lake West	885m to the east of the Site	Neutral grassland and marshy grassland. Site is within the Gwent Levels: Rumney and Peterstone SSSI but the grassland habitats are distinct from the ditches/reen features of the SSSI.

1.1.23 The critical levels/loads used for the SSSI will be sufficient to allow impacts on these sites to be assessed.

NOISE THRESHOLDS

1.1.24 A review of noise thresholds produced by Cutts *et al* for a selection of waders and ducks would indicate that noise levels below 55dB within the European site would be sufficient to screen out likely significant effects. Noise from activities above 70dB within the European site are likely to need some more detailed assessment. Given the distance between the application site and the European site it is unlikely that construction activities would affect species using the mudflats and saltmarshes of the European site. If background ambient levels of noise at the estuary are above 60dB then the threshold for potential disturbance could be increased.

1.1.25 The SSSI grassland habitat around the Site may provide supporting habitat for some SPA species so it may be necessary to consider potential disturbance to birds using non-SPA habitats for feeding or roosting. Rumney Great Wharf SINC has been identified as being of importance for wintering birds and the noise assessment should cover this site.