HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

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9 Terrestrial and freshwater ecology

9.1 Introduction

9.1.1 This chapter describes the assessment of potential terrestrial and freshwater ecology effects resulting from the construction, operation and decommissioning of the Park and Ride Facility at Dalar Hir (hereafter referred to as 'Park and Ride').

9.1.2 Please refer to chapter B9 (terrestrial and freshwater ecology) (Application Reference Number: 6.2.9) for the technical basis for the assessment including a summary of legislation, policy and guidance; key points arising in consultation that have guided the terrestrial and freshwater ecology assessment; and assessment methodologies and criteria.

9.1.3 This chapter should be read in conjunction with the Dalar Hir baseline survey reports in:

- appendix F9-1 Extended Phase 1 Habitat Survey and HSI Survey (Application Reference Number: 6.6.17);
- appendix F9-2 Dalar Hir Buffer Extended Phase 1 Report (Application Reference Number: 6.6.18);
- appendix F9-3 Wylfa Dalar Hir bats and barn owl report (Application Reference Number: 6.6.19);
- appendix F9-4 Wylfa Dalar Hir badgers report (Application Reference Number: 6.6.20);
- appendix F9-5 Wylfa Dalar Hir water vole report (Application Reference Number: 6.6.21);
- appendix F9-6 Wylfa Dalar Hir great crested newt report (Application Reference Number: 6.6.22);
- appendix F9-7 Wylfa Dalar Hir reptiles report (Application Reference Number: 6.6.23);
- appendix F9-8 Wylfa Dalar Hir: Building 12 Bat Survey 2016 (Application Reference Number: 6.6.24); and
- appendix F9-10 - Dalar Hir freshwater ecology report (Application Reference Number: 6.6.26).

9.1.4 This chapter should also be read in conjunction with the Dalar Hir Protected and Legally Controlled Species Compliance Report (see appendix F9-9, Application Reference Number: 6.6.25) which discusses species protected and legally controlled by UK legislation including:

- fish;
- breeding birds;
- badgers (*Meles meles*);
- bats;

- otter (*Lutra lutra*);
- water vole (*Arvicola amphibius*);
- Invasive Non-Native Species (INNS) of plant; and
- the legal implications of the proposed development on these species.

9.1.5 Effects from proposed developments can arise from direct and indirect impacts upon habitats or species, and be of a temporary or permanent nature. As indirect effects can occur through changes in hydrology, pollution of air and water, and via noise, this chapter is supported by information from the relevant chapters of the Environmental Statement. Where necessary, cross-reference to information in other chapters is provided.

9.2 Study area

9.2.1 This section describes the study area relevant to the terrestrial and freshwater ecology assessment for the Park and Ride.

9.2.2 The area for the desk study was a 2km radius from the Park and Ride site for legally protected species and designated sites (statutory and non-statutory) of nature conservation importance. This search area was based on professional judgement and good practice guidelines (e.g. [RD1]) and was considered to be sufficient to account for the majority of ecological receptors that would be potentially vulnerable to effects arising from construction, operation and decommissioning activities within the Park and Ride site. This took into account the zones of influence relevant to other disciplines such as air quality (chapter F5, Application Reference Number: 6.6.5) and surface water and groundwater (chapter F8, Application Reference Number: 6.6.8).

9.2.3 Within the desk study area, the areas subject to specific surveys were defined by appropriate best practice guidelines and professional judgement based on the habitat preferences of the target species (see section 9.3 and baseline reports listed in 9.1.3). This area is referred to as the field survey area for terrestrial and freshwater ecology, and included all areas within the boundary of the Park and Ride site and a buffer zone extending approximately 500m. The 500m buffer was influenced by the results of the desk study, good practice guidelines (e.g. [RD1]), and professional judgement, and is considered to be an appropriate distance beyond which most development related impacts would not extend.

9.3 Baseline environment

9.3.1 This section provides a summary of the baseline conditions for terrestrial and freshwater ecology within the study area described in section 9.2. Receptors have been valued according to the methodology and criteria described in chapter B9 (Application Reference Number: 6.2.9).

Statutory and non-statutory designated sites

9.3.2 The proposed Park and Ride does not lie within or adjacent to any statutory or non-statutory designated sites. The following statutory sites were recorded

within the desk study area and are shown on figure F9-1 (Application Reference Number: 6.6.38).

- Llyn Dinam Special Area of Conservation (SAC): 36.69ha site, approximately 1.2km south-west of the Park and Ride site with Annex I habitats: 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition – type vegetation (see the Shadow Habitats Regulations Assessment Report) (Application Reference Number: 5.2).
- Llynnau y Fali – Valley Lakes Site of Special Scientific Interest (SSSI): 98ha site, approximately 1.2km south-west of the Park and Ride site. A mosaic of open water areas with associated mesotrophic marshland and damp grassland habitats supporting rare plant species such as marsh fern (*Thelypteris thelypteroides*) and cyperus sedge (*Carex pseudocyperus*).
- Llyn Traffwll SSSI: 44.8ha site, approximately 900m to the south of the Park and Ride site. It comprises a small shallow lake supporting aquatic flora and over-wintering wildfowl. It forms part of the Royal Society for the Protection of Birds (RSPB) Valley Wetlands Reserve.

9.3.3 The following non-statutory designated sites have been recorded within the study area.

- Cors Plas (E14) Isle of Anglesey County Council (IACC) Wildlife Site: 54.6ha site, approximately 1.2km south-east of the Park and Ride site. An extensive area of marshy grassland with several excavated pools and some willow scrub. The site is important mainly for its wildfowl and a large part of the site is managed by the RSPB and forms part of the Valley Wetlands Reserve.
- Rhostir a Phwll Caergeiliog (E13) IACC Wildlife Site: 4.5ha, approximately 1.4km west of the Park and Ride site. An area of wet heath and a basin mire which has grown over the site of a former pool. There is also some scrub bordering the mire on the eastern side, dominated by common gorse *Ulex europaeus* and hawthorn *Crataegus monogyna*.
- Gwely Cyrs Caergeiliog (E01) IACC Wildlife Site: 2.7ha site, approximately 1.9km west of the Park and Ride site. The site is a reedbed surrounded by a band of marshy grassland. The reedbed has great reedmace *Typha latifolia* and common reed *Phragmites australis* with soft rush *Juncus effusus* near its edge.
- Valley Wetlands RSPB Reserve: 35.88ha site, approximately 1km south of the Park and Ride site. A wetland habitat mosaic supporting wading and over-wintering bird species.

9.3.4 In accordance with the criteria presented in table B9-12, the SAC site is of high value as it is a designation important in an international context.

9.3.5 In accordance with the criteria presented in table B9-12, the SSSIs are of high value as they are statutory designated sites of national importance.

9.3.6 The IACC Wildlife Sites are considered to be of medium value, as they are a non-statutory designation, important in a county/regional context.

9.3.7 The Valley Wetlands RSPB Reserve supports bird species and habitat types of low value. Although some of the bird species recorded are listed on Schedule 1 of the Wildlife and Countryside Act 1981, the Local Biodiversity Action Plan [RD2] and/or are listed in accordance with the requirements of Section 7 of the Environment (Wales) Act 2016 as species of principal importance, they are not present in sufficient numbers to form a critical part of a wider population at this scale. The Valley Wetlands RSPB Reserve is therefore considered to be of low value.

Terrestrial and freshwater habitats and species

Habitats

9.3.8 The majority of terrestrial habitats recorded in the study area during a Phase 1 habitat survey in 2013 were improved grassland, semi-improved neutral grassland, semi-improved grassland and marshy grassland. Also present were the following habitats (appendix F9-1, Application Reference Number: 6.6.17; and F9-2, Application Reference Number: 6.6.18):

- hedgerows;
- young plantation woodland;
- broadleaved semi-natural woodland;
- scattered scrub;
- tall ruderal vegetation;
- bare ground; and
- buildings.

9.3.9 The grassland habitat types present are common and widespread, and were considered to be of negligible value. However, some small areas of habitats were present that are listed in accordance with the requirements of Section 7 of the Environment (Wales) Act 2016, for example field edges (this is represented by rank grassland within the study area), scrub and broadleaved woodland. These habitats were limited in extent and are considered to be of low value.

9.3.10 Taken together, it is considered that terrestrial habitats within the study area are of low value.

9.3.11 Due to the absence or limited extent of habitats necessary to support notable assemblages of fungi, lichens, bryophytes, higher plants, terrestrial invertebrates or overwintering birds, these groups are not considered further in this assessment. Similarly, due to the limited extent of suitable habitat that would be affected by the Park and Ride, notable mammals (with the exception of badger, bats and water vole) have been excluded from this assessment.

9.3.12 The physical habitat of the watercourses within the field survey area was characteristic of a semi-rural ditch system, where water features have been re-sectioned and realigned to serve as field and road drainage. The still-water waterbodies had different levels of physical habitat modification, with some

pond features recognised as part of the sustainable drainage network of ponds serving local infrastructure (see appendix F9-10, Application Reference Number: 6.6.26). Sample locations and nomenclature given to waterbody locations are provided in appendix F9-10 (Application Reference Number: 6.6.26).

9.3.13 Dissolved oxygen percent saturation varied across sample sites from 31.1% to 107% (super-saturated) and suspended solids ranged from <3mg/l to 733mg/l. Nutrient levels were generally low with the exception of reactive phosphorus with readings of between 0.167mg/l and 0.234mg/l. Metal concentrations were elevated at two sample locations. In summary, water quality across the site is typical of that found within a rural setting close to a main transport route.

9.3.14 Taken together the value of the freshwater habitats is considered to be low.

Species

Invasive non-native species of plant

9.3.15 Japanese knotweed (*Fallopia japonica*), montbretia (*Crocosmia x crocosmiiflora*) and Canadian pondweed (*Elodea canadensis*) have been recorded from within the boundary of the Park and Ride site (see appendices F9-1, Application Reference Number: 6.6.17; and F9-2, Application Reference Number: 6.6.18 of this Environmental Statement). This group does not form a receptor, and so is not assigned a value, but does have the potential to cause a significant environmental effect which would require appropriate mitigation.

Amphibians

9.3.16 Cofnod (the North Wales Environmental Information Service) returned four records of great crested newt (GCN) between 2007 and 2017 within 2km of the Park and Ride site.

9.3.17 No GCN have been recorded in any waterbodies within the boundary of the Park and Ride site. However, GCN were recorded in the attenuation pond complex located approximately 25m to the south of the Park and Ride site boundary between the A5 and A55 in Pond 13 and Pond 16b (see appendix F9-6, Application Reference Number: 6.6.22). The peak count of GCN from these ponds was two and one adults respectively.

9.3.18 Surveys of the complex of attenuation ponds have also been completed as part of monitoring of success of the mitigation by the North and Mid-Wales Trunk Road Agent. The data available from appendix F9-6 (Application Reference Number: 6.6.22) and monitoring surveys combined are provided in table F9-1.

Table F9-1 GCN survey data from monitoring of mitigation pond complex

Year	No. of surveys	Maximum count
2010	3	0
2011	3	0
2012	3	0
2013	3	0
2014	7	Pond 13 – 2 and Pond 16b – 1
2015	3	Pond 13 – 2
2016	3	Pond 13 – 2
2017	1	Pond 13 – 1

9.3.19 The terrestrial habitats within the boundary of the Park and Ride site are separated from the ponds supporting GCN by a road (the A5) and two mortared stone walls, although the Nant Dalar Hir links the two areas through a culvert. The physical barriers between the Park and Ride site and the small populations present in the two ponds, combined within the lack of evidence of GCN from ponds to the north of the A5, suggest that GCN are likely to be absent from terrestrial habitats within the boundary of the Park and Ride site. There is therefore no potential for the species to be affected.

9.3.20 Common toad (*Bufo bufo*) were recorded in one pond to the north of the Park and Ride site, and in two ponds in the same complex as those supporting GCN between the A5 and A55. Common toads were also recorded under refuges placed for the reptile surveys throughout the boundary of the Park and Ride site.

9.3.21 Common frog (*Rana temporaria*) and palmate newt (*Lissitriton helveticus*) were also recorded in ponds throughout the study area.

9.3.22 In summary, GCN is considered to be absent from habitats within the Park and Ride site. Common toad is listed in accordance with the requirements of Section 7 of the Environment (Wales) Act 2016, and would therefore be a low value receptor due to its conservation status. Common frog and palmate newt are assigned a negligible value as they are common, widespread and receive no legal protection.

Reptiles

9.3.23 Cofnod returned two records of reptiles between 2007 and 2017 within 2km of the Park and Ride site: adder (*Vipera berus*) and common lizard (*Zootoca vivipara*).

No reptiles were recorded during the surveys. The group is therefore considered to be absent from the Park and Ride site and they are not discussed further in this assessment (see appendix F9-7, Application Reference Number: 6.6.23).

Breeding birds

9.3.24 Cofnod returned numerous bird records between 2007 and 2017 within 2km of the Park and Ride site. The majority were recorded along the A55 and within the Valley Wetlands RSPB Reserve.

9.3.25 During the Extended Phase 1 habitat survey (see appendix F9-1, Application Reference Number: 6.6.17), the Park and Ride site was found to have habitats with the potential to support breeding birds. These included hedgerows, plantation woodland and a building (Building 12). Several notable species were also recorded incidentally e.g. dunnock (*Prunella modularis*) and kestrel (*Falco tinnunculus*). While no breeding bird surveys were completed, evidence of nesting by swallow (*Hirundo rustica*) and house sparrow (*Passer domesticus*) was recorded from Building 12 (see appendix F9-3, Application Reference Number: 6.6.19). No evidence of barn owl using the buildings within the study area was recorded during surveys, and so the species is not discussed further in this assessment (see appendix F9-3, Application Reference Number: 6.6.19).

9.3.26 The extent of the habitats likely to be used by breeding birds, including notable species, would limit the assemblage that the Park and Ride site could support. The value of the breeding bird population that could be affected by the development of the Park and Ride site is considered to be low.

Badgers

9.3.27 Cofnod returned no records of badgers between 2007 and 2017 within 2km of the Park and Ride site.

9.3.28 Evidence of badger was recorded within the boundary of the Park and Ride site, as shown in appendix F9-4 (Application Reference Number: 6.6.20). This evidence consisted of one active single-hole outlier sett. A further two possible single-hole outlier setts were also found, although their recent use was not confirmed. No evidence of foraging or latrines was recorded.

9.3.29 Badgers are rare on Anglesey and, combined with their legal protection status are an important receptor. However, usage of the study area by badgers appears to be occasional and so badgers are assigned a low value.

Bats

9.3.30 Cofnod returned nine records of bats between 2007 and 2017 within 2km of the Park and Ride site and included noctule bat (*Nyctalus noctula*), Natterer's bat (*Myotis nattereri*) and brown long-eared bat (*Plecotus auritus)*.

9.3.31 No bat roosts were recorded within the boundary of the Park and Ride site. However, Building 12 would be demolished and was found to have low potential to support roosting bats (see appendix F9-3, Application Reference Number: 6.6.19). The study area was considered to have habitats that bats are likely to use for commuting and foraging.

9.3.32 An inspection and dusk emergence survey of Building 12 was completed in 2016 (see appendix F9-8, Application Reference Number: 6.6.24). This survey did not record any evidence of bats. During the survey, there was one

pass by a noctule, indicating that bat usage of the area in general is likely to be low.

9.3.33 The bats that the study area supports are therefore assigned a low value.

Otter and water vole

9.3.34 Cofnod returned nine records of otter and four records of water vole between 2007 and 2017 within the study area.

9.3.35 No evidence of otter has been recorded within the boundary of the Park and Ride site (see appendix F9-1, Application Reference Number: 6.6.17; and appendix F9-5, Application Reference Number: 6.6.21). However, the habitats within the Nant Dalar Hir were considered to be suitable to support the species. Impacts on otter are therefore not assessed in this chapter, but they are included in the Dalar Hir Protected and Controlled Species Report (see appendix F9-9, Application Reference Number: 6.6.25) to address potential outcomes of the species moving into the Park and Ride site.

9.3.36 Evidence of water vole was recorded on the Nant Dalar Hir (Ditch 9) within the boundary of the Park and Ride site. Evidence of water vole was also recorded outside the boundary of the Park and Ride site on Ditch 11, Ditch 24, Pond 14, and Pond 16d within the wider study area. The locations of all waterbodies are shown in appendix F9-5 (Application Reference Number: 6.6.21).

9.3.37 The water vole population in the study area is likely to be small given the limited amount of suitable habitat. In the context of the wider area, the study area is therefore likely to form only a small part of the network of waterbodies supporting the species in Anglesey. Water vole are therefore considered to be of low value.

Diatoms

9.3.38 There is a large variability in diatom populations recorded across the study area, which would be expected given the range of habitat types assessed (see appendix F9-10, Application Reference Number: 6.6.26). No species of conservation interest were recorded and community structure was typical of lowland drainage channels set in a semi-rural landscape. The value of the diatom assemblage is therefore considered to be negligible.

Macrophytes

9.3.39 Cofnod returned numerous records of macrophytes between 2007 and 2017. These were generally associated with the A55 and Valley Wetlands RSPB Reserve.

9.3.40 The macrophyte communities at all sites surveyed were relatively poor in terms of diversity of scoring taxa and number of truly aquatic groups. However, two plants listed in accordance with the requirements of Section 7 of the Environment (Wales) Act 2016 were recorded: pillwort (*Pilularia globulifera*) and tubular water-dropwort (*Oenanthe fistulosa*), both of which were found in Pond 14a (see appendix F9-10, Application Reference Number: 6.6.26).

9.3.41 The presence of these species means that the value of the macrophytes is therefore considered to be low.

Macroinvertebrates

9.3.42 Four species of conservation importance were recorded during surveys of the study area (see appendix F9-10, Application Reference Number: 6.6.26). These were:

- a horse leech (*Haemopis sanguisuga*) in Ditch 24a and Ditch 29;
- a leech (*Erpobdella testacea*) in Ditch 9, Ditch 24a and Ditch 34;
- the moss bladder snail (*Aplexa hypnorum*) in Ditch 17; and
- the white-lipped ramshorn snail (*Anisus leucostoma*) in Ditch 17 and Ditch 33.

9.3.43 All four species have a conservation score of five from the river flow indexing framework using benthic macroinvertebrates [RD3] and are of Local conservation importance. The presence of these species has resulted in Moderate Community Conservation Index scores [RD4] across all sites. The remaining species are ubiquitous in the observed habitat types. This supports the habitat characterisation of the study area, which largely consists of field boundary ditch systems with limited numbers of plant species and flow types, and little substrate diversity.

9.3.44 Taken together the value of the macroinvertebrate communities in the waterbodies present in the study area is considered to be low.

Fish

9.3.45 Three species of fish were recorded in the study area (see appendix F9-10, Application Reference Number: 6.6.26) as listed below:

- European eel (*Anguilla anguilla*);
- nine-spined stickleback (*Pungitius pungitius*); and
- three-spined stickleback (*Gasterosteus aculeatus*).

9.3.46 The European eel, which receives protection via the Eels (England and Wales) Regulations 2009, is listed as critically endangered on the Red List [RD5], and is a species listed in accordance with the requirements of Section 7 of the Environment (Wales) Act 2016. Nine-spined stickleback and three-spined stickleback have been found in Ditch 9, Ditch 24a, Ditch 29, Ditch 33, Ditch 34 and Pond 16d during field surveys.

9.3.47 Fish are assigned a medium value. This is based on the presence of European eel as the species of the highest value, and qualified by the legal protection they are afforded.

Summary of receptors

9.3.48 In accordance with chapter B9 (Application Reference Number: 6.2.9), only those receptors considered to be of low, medium and high value and that have potential to be affected by the proposed development are taken forward to assessment. These are summarised in table F9-2.

Table F9-2 Value of receptors taken forward to assessment

Receptor	Value of receptor
Llyn Dinam SAC	High
Llynnan y Fali SSSI	High
Llyn Traffwll SSSI	High
Cors Plas IACC Wildlife Site	Medium
Rhostir a Phwll Caergeiliog IACC Wildlife Site	Medium
Gwely Cyrs Caergeiliog IACC Wildlife Site	Medium
Fish	Medium
Valley Wetlands RSPB Reserve	Low
Terrestrial habitats	Low
Freshwater habitats	Low
Macrophytes	Low
Macroinvertebrates	Low
Common toad	Low
Breeding birds	Low
Badger	Low
Bats	Low
Water vole	Low

Evolution of the baseline

9.3.49 The environmental baseline presented above is unlikely to change significantly as a result of external influences for the period covering construction, operation and decommissioning of the Park and Ride. Whilst it is acknowledged in chapter F8 (surface water and groundwater, Application Reference Number: 6.6.8) that over the medium to long term, climate change could potentially alter the hydrological regime of the watercourses in the study area, it is likely that effects would remain localised and of relatively low magnitude given the channel types. Therefore, the assessments in this chapter do not include the evolution of baseline conditions as a factor for consideration.

9.4 Design basis and activities

9.4.1 This section sets out the design basis for this assessment of effects. It sets out where any assumptions have been made to enable the assessment to be carried out at this stage in the evolution of the design. This section also identifies the embedded and good practice mitigation that would be adopted to reduce adverse effects as inherent design features or by implementation of standard industry good working practice.

9.4.2 As described in chapter F1 (proposed development) (Application Reference Number: 6.6.1), the application for development consent is based on a parameter approach. The assessment described within this chapter has taken into consideration the flexibility afforded by the parameters. A worst case scenario has therefore been assessed from a terrestrial and freshwater ecology perspective within the parameters described in chapter F1 (Application Reference Number: 6.6.1).

Construction

9.4.3 Construction would follow the approach described in chapter F1 (Application Reference Number: 6.6.1). Those activities which could affect ecological receptors include:

- site clearance (including demolition) and vegetation clearance;
- operation of construction vehicles and machinery;
- earthworks (outside environmental buffer zones) including topsoil stripping, excavation for sub-base to all roads, and excavation for foundations to the new building;
- creating pedestrian routes, landscaping, and installing signage and lighting;
- the construction of site drainage channels, outfalls, culverts and a storm water attenuation tank; and
- measures to protect the environment or to reinstate environmental features damaged during construction.

Basis of assessment and assumptions

9.4.4 Upon completion of the construction of the Power Station, the Park and Ride site would be returned to its pre-development state (i.e. agricultural land use).

9.4.5 It is assumed that the drainage system would not be removed as part of decommissioning and therefore this system would continue to provide mitigation against surface water flooding and pollution within the runoff.

Embedded mitigation

9.4.6 Mitigation embedded in the designs presented in chapter F1 (Application Reference Number: 6.6.1) includes the following measures relevant to ecological receptors that would be delivered through the Park and Ride sub-Code of Construction Practice (CoCP) (Application Reference Number: 8.10) and volume 3 of the Design and Access Statement (Associated Developments and Off-Site Power Station Facilities) (Application Reference Number: 8.2.3).

- To avoid disturbance to water vole, the crossing installed over the Nant Dalar Hir would consist of a clear span (single span) bridge rather than a culvert.
- To avoid loss of habitat of most value to breeding birds, bats and common toad, and to avoid disturbance to active badger setts, hedgerows, trees (including root protection zones) and walls would be reinstated and protected wherever practicable.

Good practice mitigation

9.4.7 Good practice during the construction phase includes the following measures which would be implemented via the overarching Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Park and Ride sub-CoCP (Application Reference Number: 8.10).

- With the exception of Ditch 7, all remaining ditches and streams within the boundary of the Park and Ride site will be retained and protected by a 15m machinery/plant exclusion zone surrounding watercourses to mitigate impacts on water quality. Where works within this zone are required, e.g. for drainage infrastructure installation, appropriate risk assessments and method statements will be prepared to limit impacts, prior to works commencing within this zone, which will be completed in the presence of an Environmental Clerk of Works (ECoW).
- A buffer zone of 30m would be in place around an existing badger sett in the north of the site. Within these buffer zones, use of heavy plant machinery would not take place. Where work cannot be avoided, hand tools only would be used in accordance with appropriate risk assessments and method statements, and in the presence of an ECoW.
- Works compounds, storage sites, access roads and construction work would be located/carried out at an agreed minimum distance from water features as advised by an ECoW.
- Horizon will manage emergency pollution control measures in keeping with Pollution Prevention Guidelines (PPGs) previously issued by the Environment Agency (until replaced by corresponding Guidance for Pollution Prevention (GPPs)), in particular PPG01, GPP05, PPG06 and GPP13 [RD6, RD7, RD8 and RD9] and ensuring the necessary consents for working in proximity to watercourses are obtained. This would include using measures such as management of runoff and use of spill kits.
- Implementing measures to control air quality changes such as dust suppression on haul roads and implementation of appropriate controls on emissions from construction plant.
- Where possible, habitat with the potential to support bird nests would be removed outside the breeding bird season (typically March to August inclusive). This would ensure that no birds are nesting on-site at the start of construction within or/near to the identified habitat. If it is not possible

to avoid the breeding bird season, then clearance works would be supervised by the implementation of the measures outlined below.

- An ECoW would complete a pre-construction survey prior to removing any habitat with the potential to support nesting birds, including ground nesting species. The pre-construction survey would identify the presence of any active nests, and in the event they are identified, establish appropriate methodologies to reduce any potential impacts on these nests during clearance works.
- The ECoW would supervise the clearance of habitats once it has been established that there are no nests present.
- Should active nests be found, either during the pre-construction survey or during supervision, then the ECoW would set up a work exclusion zone of an appropriate distance to prevent disturbance. The exclusion zone distance would be set based on the judgement of the ECoW and the species concerned, but would typically range between 5-10m.
- Work exclusion zones would be maintained until chicks have fledged or the nest has become inactive, as determined through monitoring visits by the ECoW.

- In order to manage the risk of introducing and/or spreading INNS, Horizon will prepare one (or more) Biosecurity Risk Assessment (s) and Method Statement (s) to cover all activities. Each Biosecurity Risk Assessment will consider in general:
  - measures that will be undertaken to control and eradicate INNS within the area of works; and
  - measures or actions that aim to prevent INNS being introduced to the site for the duration of the construction phase of the scheme.
- In the management of existing known presence of INNS, Biosecurity Risk Assessments and Method Statements will detail:
  - how areas with the presence of INNS will be demarcated;
  - how any contaminated materials will be appropriately managed throughout the works, including where appropriate eradication from the site;
  - appropriate disposal; and
  - how any transfer or spread will be prevented.
- In terms of prevention of new introduction to the site through terrestrial and marine pathways, Biosecurity Risk Assessments and Method Statements will detail:
  - Risk pathways and risk activities for the transfer and spread of non-native species;
  - risk assessment for the transfer and spread of individual non-native species of known concern;

  - methods to manage risk of transfer including any actions to be undertaken prior to reaching site; and,
  - contingency planning and corrective actions.

- Horizon will implement a monitoring programme for non-native species. This will include observational surveys on structures that may provide suitable substrate for non-native species. Surveys will record presence/abundance of non-native species with reporting in agreement with Natural Resources Wales (NRW). Monitoring survey requirements for specific sites are set out in the sub-CoCPs where relevant. Where new presence of INNS is discovered, Biosecurity Risk Assessments and Method Statements will be reviewed and amended where necessary. Wherever appropriate, workers will be given an activity specific tool-box talk from an ECoW. This will include photographs of any INNS species known to be present on a site.
- Badger would be protected from accidental entrapment during the construction phase. This would include covering excavations overnight where possible. Where this is not possible, trenches would have shallow sloped ends until they are filled in, or rough planks would be left to act as ramps to allow badger to climb out.
- A pre-demolition bat survey would be carried out for any building to be demolished. In accordance with best practice guidance [RD1] this would consist of a dusk emergence survey followed by a dawn re-entry survey, before demolition is due to take place. If no bats were recorded leaving or entering the building, then it would be demolished as soon as possible after the survey. If bats are recorded using the building, then demolition would be postponed until a European Protected Species (EPS) mitigation Licence has been obtained.
- Pre-construction surveys would be completed to determine the exact locations of any water vole burrows in areas of habitat likely to be affected during drainage infrastructure installation. This would inform micro-siting of works to avoid impacts to burrows and the animals themselves. This would be secured as a DCO requirement, Draft Development Consent Order (Application Reference Number: 3.1).
- During works to install drainage infrastructure where effects on burrows are likely (as informed by pre-construction surveys), vegetation clearance would take place ahead of works. This is an effective way of dissuading water vole from using an area, if used over a short period, and in small areas. This would be followed by supervision of all works to banks of watercourses by an ECoW. Any water voles found would be released into areas of retained habitat.

9.4.8 Those good practice mitigation measures relating to the avoidance of breaches of the legislation protecting species e.g. the timing of works, are also described in appendix F9-9 (Application Reference Number: 6.6.25).

Operation

9.4.9 Operation would follow the approach described in chapter F1 (Application Reference Number: 6.6.1).

Basis of assessment and assumptions

9.4.10 The basis for the assessment is that the most valuable habitats for ecological receptors are being retained, as a result of measures set out in paragraph 9.4.6 and 9.4.7, including the majority of those listed in accordance with Section 7 of the Environment (Wales) Act 2016. This minimises effects on all aquatic receptors, common toad, breeding birds, badger, bats and water vole. However, during operation, air quality changes, disturbance and hydrological changes were identified.

Embedded mitigation

9.4.11 Mitigation embedded in the project description in chapter F1 (Application Reference Number: 6.6.1) includes the following measures relevant to ecological receptors.

- Lighting during the operational stage would ensure that light-spill onto hedges and watercourses are avoided wherever practicable. This would reduce disturbance to fish, breeding birds and badger.
- The surface water drainage design would include measures to control the peak runoff rate from the site. Attenuation capacity provided would be sufficient to control flooding of the Park and Ride. This would prevent degradation of habitats suitable for fish, macrophytes, macroinvertebrates and water vole, and avoid degradation of Llyn Traffwll SSSI. This would be secured through volume 3 of the Design and Access Statement (Application Reference Number: 8.2.3).

Good practice mitigation

9.4.12 There are not considered to be any effects likely to be mitigated by good practice mitigation measures.

Decommissioning

9.4.13 Decommissioning would follow the approach described in chapter F1 (Application Reference Number: 6.6.1).

Basis of assessment and assumptions

9.4.14 The main assumption relating to ecological receptors is that the Park and Ride site would be returned to its current state (i.e. agricultural land use). A further assumption is that the effect pathways during decommissioning works i.e. construction type activities, would be similar in scale to those during construction.

Embedded mitigation

9.4.15 The embedded mitigation during decommissioning would be the same as for construction, with measures in place primarily to protect retained habitat features of value to ecological receptors.

9.4.16 The embedded mitigation measures would also involve reinstatement of habitats removed during construction to facilitate operation, as described in chapter F1 (Application Reference Number: 6.6.1). This would include grassland habitats, but most significantly would also include the reinstatement of hedges and walls in gaps created to allow access to the Park and Ride.

Good practice mitigation

The good practice mitigation measures would be the same as those proposed during the construction phase, with measures in place primarily to protect retained habitats features of value to ecological receptors, and minimise the significance of other effect pathways, for example changes in air quality or hydrological effects.

9.5 Assessment of effects

9.5.1 This section presents the findings of the assessment of potential impact pathways associated with the construction, operation and decommissioning of the Park and Ride. Table F9-3 provides a summary of the potential impact pathways.

Table F9-3 Summary of potential impact pathways for ecological receptors

Potential impact	Area in which the impact may influence ecological receptors	Receptors that could be affected
Changes in air quality during construction and decommissioning.	Release of fugitive dust could affect receptors within 50m of the Park and Ride site boundary, and within 50m of access roads which lie within 500m from the Park and Ride entrance. Emissions from plant and machinery (i.e. non-road mobile machinery) (as set out in chapter F5 (Application Reference Number: 6.6.5). Potential for habitat loss or degradation in areas affected.	Statutory and non-statutory designated sites for nature conservation. Terrestrial habitats.
Changes in air quality during operation.	Emissions may affect ecological receptors up to 200m from roads affected by increased traffic using the Park and Ride across the whole of Anglesey (see chapter C4 (air quality effects	Statutory and non-statutory designated sites for nature conservation.

Potential impact	Area in which the impact may influence ecological receptors	Receptors that could be affected
	of traffic, Application Reference Number: 6.3.4) of this Environmental Statement).	
Habitat loss during construction.	Habitat loss would be restricted to areas cleared to make way for the construction of the Park and Ride. There would be no additional habitat loss during operation of the Park and Ride.	Badger Bats Breeding birds Common toad Freshwater habitats Macroinvertebrates Macrophytes Terrestrial habitats Water vole
Habitat reinstatement during decommissioning.	During decommissioning habitat reinstatement would only occur within the boundary of the Park and Ride.	Badger Breeding birds Common toad Water vole
Disturbance via increases in noise and light pollution during construction, operation and decommissioning.	Disturbance via increases in lighting and noise during all stages could affect habitats within the Park and Ride, and its immediate boundary.	Badger Bats Breeding birds Fish Water vole
Hydrological changes during construction, operation and decommissioning.	Hydrological changes could affect areas crossed by infrastructure installed within the Park and Ride, and habitats downstream of the most northerly outfall.	Fish Freshwater habitats Macrophytes Macroinvertebrates Statutory and non-statutory designated sites for nature conservation. Water vole
Mortality and injury during construction and decommissioning	Mortality and injury if species are present when their habitats are affected during construction and decommissioning.	Badger Breeding birds Common toad Macroinvertebrates
Introduction and spread of INNS of plant during	INNS of plant could be spread within or be introduced to habitats within the Park and	Freshwater habitats

Potential impact	Area in which the impact may influence ecological receptors	Receptors that could be affected
construction and decommissioning.	Ride site. Habitats outside of the Park and Ride site could be affected should materials from within the Park and Ride site containing viable propagules of INNS of plant not be disposed of properly, or if propagules are accidentally transported by people or vehicles.	Statutory and non-statutory designated sites for nature conservation. Terrestrial habitats

Construction

Air quality changes

9.5.2 There were no statutory or non-statutory sites within the areas potentially affected by dust emissions. The embedded and good practice measures set out in chapter F5 (Application Reference Number: 6.6.5) would result in there being a negligible change in air quality as a result of dust during construction. A negligible effect on statutory designated sites and terrestrial habitat is therefore predicted.

9.5.3 Changes in air quality as a result of emissions from plant and machinery have the potential to affect statutory or non-statutory sites and terrestrial habitat via nitrogen and acid deposition or exceedance of critical levels of acid or oxides of nitrogen. As set out in chapter F5 (Application Reference Number: 6.6.5), the phased construction programme, and the relatively low number and size of plant and machinery required means the potential effect on local air quality would be negligible, and therefore a negligible effect on the ecology receptors is predicted.

Habitat loss

9.5.4 The Park and Ride would result in the loss of areas of improved and semi-improved grassland, ephemeral ditches 7 and 8, and the demolition of Building 12. The design has been developed to retain the most valuable terrestrial habitats: field edges, hedgerows and riparian habitat.

9.5.5 The limited loss of terrestrial and freshwater habitat in itself is considered to be a negligible magnitude of change and would therefore be of negligible significance.

9.5.6 The loss of terrestrial habitats could also affect the use of the site by foraging and commuting bats, badger, breeding birds, and common toad. Good practice and embedded mitigation includes the provision of buffer zones along existing hedgerows, field edges, ditches and the badger setts, and the planting of trees, shrubs and hedgerows. The parts of the site of most value to these species/groups would be largely retained, with areas of new planting proposed. This is considered to be a minor benefit and a small magnitude of

change. A minor positive effect on these species groups is predicted as a result.

9.5.7 The demolition of Building 12 could affect bats and breeding birds. The baseline survey data indicated that this building was not used by roosting bats but was used by swallow and house sparrow. The loss of this building is considered to be a small magnitude of change as there would be a loss of nest building habitat for swallow and house sparrow and, given the new buildings at the Park and Ride would provide similar nesting opportunities as those being lost for these species, a negligible effect is predicted.

9.5.8 The loss of freshwater habitats would occur in the Nant Dalar Hir where the clear span bridge and the drainage infrastructure are constructed. The loss would be localised with the majority of the watercourse protected by a buffer and construction activities controlled by good practice mitigation. From the perspective of compliance with the Water Framework Directive, this is assessed in a project-wide context within the Water Framework Directive Compliance Assessment (Application Reference Number: 8.26).

9.5.9 The loss of bank-side vegetation due to shading from the new bridge and provision of drainage outfalls is considered to be a small magnitude of change and of negligible significance as the ecological functionality of the watercourse would not be affected. This loss could also affect macro invertebrates and water vole. The good practice mitigation includes micro siting of the drainage infrastructure which would avoid the loss of any water vole burrows. This would be a small magnitude of change and is assessed as being of a negligible effect on the macroinvertebrate and water vole population.

Disturbance

9.5.10 Disturbance from noise and vibration could affect fish, breeding birds, badger and water vole. The changes in noise during construction have been assessed in chapter F6 (noise and vibration) (Application Reference Number: 6.6.6) and any changes in noise above 65dB LAeqT would be within and immediately adjacent to the Park and Ride site boundary. However, with embedded mitigation in the form of the buffer zones around ecological features, and good practice mitigation set out in chapter F6 (Application Reference Number: 6.6.6), the magnitude of change is predicted to be small; a measurable change could occur, but the effect would be negligible.

9.5.11 Good practice mitigation would reduce the risk of water vole being in burrows close to drainage infrastructure installation. This would protect water vole from mortality and injury but would also reduce potential disturbance effects on water vole to negligible levels.

9.5.12 Disturbance during the night to fish in watercourses, and commuting and foraging badger and bats is not predicted, as there is no night working planned. Furthermore, lighting would be minimised and directed away from watercourses, hedges and the boundary of the Park and Ride in general.

9.5.13 In summary, the magnitude of change due to disturbance affecting fish, breeding birds, badger and water vole would be small. The significance of this effect would be negligible.

Hydrological changes

9.5.14 Embedded mitigation would ensure that watercourses are protected in the first instance from runoff and accidental pollution through the provision of buffer zones. They are further protected by good practice mitigation in the form of adherence to PPGs where works to install structures such as headwalls are required (see chapter F8, Application Reference Number: 6.6.8). From the perspective of compliance with the Water Framework Directive, this is assessed in a project-wide context in the Water Framework Directive Compliance Assessment (Application Reference Number: 8.26).

9.5.15 A further embedded mitigation measure includes minimising the number and size of drainage infrastructure connections as much as practically possible, thereby further reducing the potential for deleterious effects. While some effects are inevitable in terms of alteration of small sections of riparian and instream habitats, these effects would be localised to the study area and would not be measurable 900m downstream at the Llyn Traffwll SSSI. These small magnitude effects would therefore only affect freshwater habitats in the study area which are of low value, and would represent an effect of negligible significance.

9.5.16 Surface water draining into the Nant Dalar Hir would be attenuated and would not have any deleterious effects on its water quality, and therefore would not affect the Llyn Traffwll SSSI.

9.5.17 In summary, the magnitude of change due to hydrological changes affecting Llyn Traffwll SSSI would be negligible. The magnitude of change due to hydrological changes affecting fish, macrophytes, macroinvertebrates and water vole would be small. The significance of this effect would be negligible and it would not be significant.

Mortality and injury

9.5.18 There is the potential for mortality and injury to affect breeding birds if their nests are present in areas affected by habitat removal. These effects would be avoided by the timing of works as good practice mitigation, and would be reduced to negligible levels.

9.5.19 The retention of the majority of hedges and watercourses as embedded mitigation makes it likely that the risk of mortality and injury to common toad and badger would be negligible. The provision of measures to protect badgers from being trapped in excavations, such as covering excavations or providing escape routes, would also reduce this risk to negligible levels.

9.5.20 Potential mortality and injury effects on water vole are possible during works to install drainage infrastructure, but would be reduced to negligible levels by good practice mitigation via pre-construction surveys, micro-siting of works, vegetation clearance and supervision of work by an ECoW.

9.5.21 Mortality and injury effects on macroinvertebrates are also possible during construction works to install drainage infrastructure. However, the small scale of these works would limit the significance of effects to negligible levels. It is also considered that recolonisation would occur naturally from upstream and downstream areas of unaffected habitat, contiguous with construction areas.

9.5.22 In summary, the magnitude of change due to mortality and injury affecting macroinvertebrates, common toad, breeding birds and badger would be negligible. The significance of this effect would be negligible.

Introduction or spread of invasive non-native species of plant

9.5.23 Adherence to the Biosecurity Risk Assessment and Method Statement would ensure that INNS are safely removed from the Park and Ride site, and that their introduction and spread is prevented. This would be of benefit to terrestrial habitats, but due to the small scale of the areas covered by INNS this would be a small magnitude of change and a positive effect of minor significance. The enhancement to terrestrial habitats due to the removal of INNS would therefore not be significant.

Operation

Air quality changes

9.5.24 The assessment of air quality as a result of vehicle emissions is addressed in chapter C4 (Application Reference Number: 6.3.4).

Disturbance

9.5.25 During operation of the Park and Ride, light and human activity does have the potential to affect fish, badger, bats and water vole. These effects would be mitigated by embedded mitigation in the form of buffer zones protecting the hedges and watercourses and by the lighting design avoiding light-spill towards features that could be used for foraging and commuting. These effects are therefore predicted to cause a negligible magnitude of change and would be of negligible significance.

Hydrological changes

9.5.26 The drainage strategy for the operation of the Park and Ride is such that there would be a negligible change in hydrology within the receiving watercourses (see chapter F8, Application Reference Number: 6.6.8), including the Nant Dalar Hir which is hydrologically connected to the Llyn Traffwll SSSI. It is therefore considered that there would be a negligible magnitude of change on the receiving watercourses and any effects on the SSSI, freshwater habitats, macrophytes, macroinvertebrates, fish and water vole are considered to be negligible. From the perspective of compliance with the Water Framework Directive, this is assessed in a project-wide context in the Water Framework Directive Compliance Assessment (Application Reference Number: 8.26).

Decommissioning

9.5.27 The pathways for effect during decommissioning would be similar to those experienced by ecological receptors during construction. The list of embedded and good practice mitigation measures and the predicted significance of effects are therefore not repeated here. None of the effects of decommissioning are predicted to be significant.

9.6 Additional mitigation

9.6.1 There are no minor, moderate or major adverse effects predicted during the construction, operation or decommissioning of the Park and Ride. There is therefore no additional mitigation proposed.

9.7 Residual effects

9.7.1 No adverse effects of minor significance or greater were identified for terrestrial and freshwater ecology.

9.7.2 The embedded and good practice mitigation for the Park and Ride is predicted to avoid and reduce potential effects on all receptors following construction, operation and decommissioning of the Park and Ride to the extent that no minor, moderate or major adverse effects on ecological receptors are likely. There would therefore be no significant effects on any ecological receptor.

9.8 References

Table F9-4 Schedule of references

ID	Reference
RD1	Collins, J. 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd Edition. London: Bat Conservation Trust.
RD2	Isle of Anglesey County Council. 2003. *Working for the wealth of wildlife: Anglesey's local biodiversity action plan (LBAP)* – B2 Habitat Action Plans (HAPs) and Species Action Plans (SAPs).
RD3	Extence, C., Balbi, D. and Chadd, R. 1999. *River flow indexing using British benthic macroinvertebrates: a framework for setting hydroecological objectives.* River Research and Applications. 15(6), pp. 545-574.
RD4	Chadd, R and Extence, C. 2004. *The conservation of freshwater macroinvertebrate populations: a community based classification scheme*. Aquatic Conservation: Marine and Freshwater Ecosystems. 14: 597 – 624.
RD5	International Union for Conservation of Nature. 2015. *The IUCN Red List of Threatened Species*. Version 2015.1. [Online]. [Accessed: June 2015]. Available from: http://www.iucnredlist.org
RD6	Environment Alliance. 2007. *Pollution Prevention Guidelines – Understanding Your Environmental Responsibilities – Good Environmental Practices: PPG1*. [Online]. [Accessed: February 2016]. Available from: http://webarchive.nationalarchives.gov.uk/20140328084622/http://cdn.environment-agency.gov.uk/lit_1404_8bdf51.pdf.
RD7	Northern Ireland Environment Agency, Scottish Environment Protection Agency and Natural Resources Wales. 2017. *Guidance for Pollution Prevention: Works and maintenance in or near water: GPP 5*. Cardiff. Natural Resources Wales.
RD8	Environment Alliance. 2007. *Pollution Prevention Guidelines – Working at construction and demolition sites: PPG6*. [Online]. [Accessed: May 2017]. Available from: http://webarchive.nationalarchives.gov.uk/20140328084622/http://cdn.environment-agency.gov.uk/pmho0412bwfe-e-e.pdf.
RD9	Northern Ireland Environment Agency, Scottish Environment Protection Agency and Natural Resources Wales. 2017. *GPP 13: Vehicle washing and cleaning.* Cardiff: Natural Resources Wales.

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