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Llywodraeth Cymru
Welsh Government

**THE LONDON TO FISHGUARD TRUNK ROAD (A40) (LLANDDEWI
VELFREY TO PENBLEWIN IMPROVEMENT AND DE-TRUNKING) ORDER
201-**

**THE LONDON TO FISHGUARD TRUNK ROAD (A40) (LLANDDEWI
VELFREY TO PENBLEWIN IMPROVEMENT) (SIDE ROADS) ORDER 201-**

**THE WELSH MINISTERS (THE LONDON TO FISHGUARD TRUNK ROAD
(A40) (LLANDDEWI VELFREY TO PENBLEWIN IMPROVEMENT))
COMPULSORY PURCHASE ORDER 201-**

PROOF OF EVIDENCE

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WELSH GOVERNMENT, ECOLOGY AND NATURE CONSERVATION

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1. Author

- 1.1 I am Peter John Wells and I am a Senior Ecologist at Ove Arup & Partners Ltd (hereafter referred to as “Arup”). I hold a BSc (Hons) degree in Biology from the University of Wales, Aberystwyth and a MSc degree in Environmental Science from the University of Aberdeen. I am a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and am a Chartered Environmentalist.
- 1.2 I have been working as an ecologist since 2000 in both public and private sector organisations. Prior to joining Arup in 2007, I held positions with Atkins and the Countryside Council for Wales (now Natural Resources Wales).
- 1.3 I have led the ecological surveys and input to the environmental Statements for a wide range of development types including five highways schemes for Welsh Government and the Roads Service in Northern Ireland. During my time with Arup I led the coordination of surveys on the M4 Corridor around Newport project on two occasions (2007/8 and 2014) providing baseline information for the production of the Environmental Statement (ES) for that scheme.
- 1.4 I am the main point of contact and lead for ecological input to projects within Arup’s Cardiff Office and provide specialist advice on bats and Habitats Regulations Assessments to colleagues across the UK.
- 1.5 I am the lead ecologist on the A40 Llanddewi Velfrey to Penblewin Scheme (hereafter referred to as “the Scheme”) and the author of the Chapter 8 of the ES (Ecology and Nature Conservation) (Doc. 3.08.01) and author of the Statement to Inform an Appropriate Assessment (SIAA) (Doc. 4.06.12).
- 1.6 The evidence provided in this Proof of Evidence has been prepared in accordance with CIEEM’s Code of Professional Conduct. The opinions expressed are given in a fair and impartial manner and are my true and professional opinions.

2. Scope and Purpose of this Proof of evidence

2.1 Andrew Sumner has provided his evidence in relation to wider environmental topics (WG 1.4.2). My Proof of Evidence addresses the ecology and nature conservation considerations of the Scheme.

2.2 My Proof of Evidence is presented in the following structure:

1. Author
2. Scope and Purpose of this Proof of evidence
3. Legislation, Policy and Guidance
4. Methodology and Consultation
5. Ecological Baseline
6. Effects of the Construction of the Published Scheme on Ecological Receptors
7. Effects of the Operation of the Published Scheme on Ecological Receptors
8. Effects of the Published Scheme on European Designated Sites
9. Mitigation and Compensation Design in the Published Scheme
10. Monitoring Proposals of the Published Scheme
11. Residual Effects of the Published Scheme
12. Consultees' Responses and Objections to the Scheme
13. Changes to the Mitigation Proposals
14. Residual Effects of the Revised Scheme
15. Conclusions
16. Appendices (Separate Volume)

3. Legislation, Policy and Guidance

3.1 Relevant legislation, policies and guidance to ecology and nature conservation are set out in Section 8.2 of Chapter 8 of the ES (3.01.01). Pieces of legislation relevant to the Scheme and its effects on ecological receptors include:

- a) The Conservation of Habitats and Species Regulations 2017 (as amended¹) (Doc. 4.06.10);
- b) The Ramsar Convention (Doc. 4.06.04);
- c) The Eels (England and Wales) Regulations 2009 (Doc. 4.06.05);
- d) The Wildlife and Countryside Act 1981 (as amended) (Doc. 4.01.20);
- e) The National Parks and Access to the Countryside Act 1949 (as amended) (Doc. 4.06.06);
- f) The Protection of Badgers Act 1992 (Doc. 4.06.07);
- g) The Hedgerow Regulations 1997 (Doc. 4.06.08);
- h) The Environmental (Wales) Act 2016 (Doc. 4.01.05);
- i) The Well-being of Future Generations (Wales) Act 2015 (Doc. 4.01.10); and
- j) The Wild Mammals (Protection) Act 1996 (Doc. 4.06.09).

3.2 Planning policy has been addressed in the evidence of John Davies (WG 1.7.2). Policies relevant to the Scheme and its effects on ecological receptors include:

- a) The Wales Transport Strategy 2008 (Doc. 4.01.29);
- b) The Pembrokeshire County Council Local Development Plan (Doc. 4.01.58);
- c) Planning Policy Wales Edition 10 (Doc. 4.01.30);
- d) United Kingdom Biodiversity Action Plan and the UK Post 2010 Biodiversity Framework (Doc. 4.06.27);

¹ Amended with effect from Exit Day by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (S.I.2019 No. 579) (Doc. 4.6.40.).

- e) Trunk Road Estate Biodiversity Action Plan 2004 – 2014 (TREBAP) (Doc. 4.01.26);
- f) Green Corridors on the Welsh Government Trunk Roads and Motorways (Doc. 4.01.25);
- g) Wales Action Plan for Pollinators (2013) (Doc. 4.06.36); and
- h) The Pembrokeshire Local Biodiversity Action Plan (Doc. 4.06.30).

3.3 Guidance relevant to the Scheme and its effects on ecological receptors which has been used in the assessment of the impacts of the published Scheme includes:

- a) HD 44/09 Assessment of Implications (of Highways and/or Roads Projects) on European Sites (Including Appropriate Assessment) (Doc 4.01.61);
- b) HA 59/92 Mitigating Against Effects on Badgers (Doc 4.01.61);
- c) HA 80/99 Nature Conservation Advice in Relation to Bats (Doc 4.01.61);
- d) HA 81/99 Nature Conservation Advice in Relation to Otters (Doc 4.01.61);
- e) HA 97/01 Nature Conservation Advice in Relation to Dormice (Doc 4.01.61);
- f) HA 98/01 Nature Conservation Advice in Relation to Amphibians (Doc 4.01.61);
- g) HA 116/05 Nature Conservation Advice in Relation to Reptiles and Roads (Doc 4.01.61); and
- h) The Bat Conservation Trust Good Practice Survey Guidelines (Collins, 2016)²).

² Collins, J. (Ed.). (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.). London: Bat Conservation Trust.

4. Methodology and Consultation

Survey Methodology

- 4.1 The methodology used for the ecological surveys undertaken during 2016 and 2017 are set out in Chapter 8 of the ES and summarised below.
- 4.2 A desk study was undertaken during 2016 to establish the location of designated sites and identify records of protected species. A Phase 1 Habitat Survey was undertaken within a study area extending 250m either side of the alignment of the preferred route. National Vegetation Classification surveys were undertaken on four areas, two woodlands and two grasslands, identified during the Phase 1 Survey.
- 4.3 Protected species surveys undertaken during 2016 included the following species and species groups:
- a) Amphibians
 - b) Bats, include surveys of buildings and trees for roosts and activity surveys;
 - c) Dormice (*Muscardinus avellanarius*)
 - d) Otter (*Lutra lutra*);
 - e) Water vole (*Arvicola amphibious*);
 - f) Badger (*Meles meles*);
 - g) Breeding Birds;
 - h) Barn owl (*Tyto alba*); and
 - i) Reptiles;
- 4.4 Further survey work undertaken in 2017 focused on bats, great crested newts (*Triturus cristatus*) and badgers. These including repeating great crested newt presence/absence surveys, repeating emergence and re-entry surveys to determine the presence of bat roosts, targeted passive bat monitoring along the proposed alignment of the Scheme, and walkover surveys to confirm the location of badger setts within the

immediate vicinity of the Scheme. The methodology used for the surveys is set out in Chapter 8 of the ES.

- 4.5 All of the surveys were undertaken in accordance with published guidance as set out in Section 8.4 of Chapter 8 of the ES (Doc. 3.08.01).

Assessment Methodology

- 4.6 The potential effects of the Scheme have been assessed within the ES following the guidance published by the Chartered Institute of Ecology and Environmental Management for Ecological Impact Assessment (CIEEM) (Doc. 4.06.21). The CIEEM methodology was used as it represented the best practice guidelines at the time of assessment. In assessing the potential impacts of the Scheme regard was also given to the assessment methodology which was contained within Volume 11, Section 3, Part 4 of the Design Manual for Roads and Bridges (DMRB) (Doc. 4.01.61) at the time of the assessment with which there are broad similarities in terms of the evaluation of receptors and determining the magnitude of effects.

Consultation

- 4.7 Consultation with Environmental Stakeholders was undertaken prior to publication of the Draft Orders through the Environmental Liaison Group Meetings listed in the Evidence of Andrew Sumner (WG 1.4.2).

In addition, two meetings were held with the Protected Species Team of Natural Resources Wales (NRW) prior to the publication of the Draft Orders, on the 5 July 2017 and 22 November 2018. The minutes produced following the meetings are provided in Appendix A of this Proof of Evidence. A summary of the comments raised by NRW in the meeting on 5 July 2017 is provided in Table 8.4 in Chapter 8 of the ES (Doc. 3.08.01).

5. Ecological Baseline

- 5.1 There are five Special Areas of Conservation (SAC) within 10km of the Scheme and a further two SACs designated for bats within 30km of the Scheme. There is one Special Protection Area (SPA) within 10km of the Scheme. Details of these designated sites are set out in the Statement to Inform an Appropriate Assessment (Doc. 4.06.12).
- 5.2 There are three Special Areas of Conservation (SAC) within Pembrokeshire which have been designated for bat species along with other features. These are the Pembrokeshire Bat Sites and Bosherton Lakes SAC designated for greater horseshoe bat (*Rhinolophus ferrumequinum*) and lesser horseshoe bat (*Rhinolophus hipposideros*), the Limestone Coast of South West Wales SAC designated for greater horseshoe bat, and the North Pembrokeshire Woodlands SAC designated for barbastelle bat (*Barbastella barbastellus*).

Habitat Survey Results

- 5.3 The area of the Scheme is dominated by areas of improved grassland used for cattle grazing. The fields are separated by large hedgerows with tress, with occasional stream corridors with larger areas of broad leaved woodland. The existing A40 corridor is lined with mature hedgerows and areas of mixed plantation woodland, most notably where it passes through Ffynnon Wood. The composition of species within the habitats present are described in further detail in Section 8.5 of Chapter 8 of the ES (Doc. 3.08.01) and Appendices 8.2 and 8.3 of the ES (Doc. 3.08.03). The habitats present are considered to be of either local value or of value only within the context of the study area used for the surveys.

Species Survey Results

- 5.4 Although there was a positive eDNA survey result for great crested newt and probably great crested newt eggs found during the 2016 surveys, no evidence of great crested newts was recorded during the surveys in 2017. It is therefore considered that this species is likely to be absent

from the area of Scheme. Common amphibian species which were recorded during the surveys include smooth newt (*Lissotriton vulgaris*), palmate newt (*Lissotriton helveticus*), common frog (*Rana temporaria*) and common toad (*Bufo bufo*), which are all considered to be of local value.

- 5.5 Bat roosts were identified in 14 buildings during the surveys undertaken during 2016 and 2017, with a further building likely to contain a roost. Species found roosting within the vicinity of the Scheme include common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auritus*) and a *Myotis* species. Brown long-eared bat were also recorded using roosts in three trees within the study area during 2016.
- 5.6 Activity surveys including both walked transect and static monitoring recorded a range of species across the study area, including on linear features that will be intersected by the Scheme. Common and soprano pipistrelle bats were the most frequently recorded species followed by *Myotis* species and noctule (*Nyctalus noctula*). Other species including long-eared species, Leisler's bat (*Nyctalus leisleri*), serotine (*Eptesicus serotinus*), Nathusius' pipistrelle (*Pipistrellus nathusii*), barbastelle (*Barbastella barbastellus*), lesser horseshoe bat and greater horseshoe bat were also recorded in low numbers.
- 5.7 The activity survey information was used to identify 12 key flight routes which are intersected by the Scheme. These are linear features, such as hedgerows and stream corridors, where significant amounts of bat activity and/or rarer species were recorded. The locations of these flight routes are shown on Figure 8.78 in Volume 2 of the ES (Doc. 3.08.02).
- 5.8 The populations of barbastelle bat, lesser horseshoe bat and greater horseshoe bat are considered to be of international value due to their inclusion as features of SACs within 30km of the Scheme. The other bat species populations identified in the study area are considered to be of local value.

- 5.9 Dormouse nests were recorded in nest tubes at either end of the Scheme during surveys in 2016 as shown on Figure 8.80 in Volume 2 of the ES (Doc. 3.08.02). In light of comments received from NRW the assessment within the ES was undertaken on the assumption that dormice are present in all areas of suitable habitat within the study area. The hedgerows and woodland within the study area are considered to provide high quality habitat for dormice. The dormouse population within the study area is considered to be of local value.
- 5.10 Low levels of otter activity were recorded along water courses within the study area during the surveys undertaken in 2016. The Scheme and study area are located on a ridge line forming the watershed between two catchments, and the water courses are therefore relatively small and do not provide significant foraging areas for otters. Two potential otter holts were identified within the study area.
- 5.11 The otter population using the watercourses within the study area is considered to be part of or to contribute to the populations designated as features of the Carmarthen Bays and Estuaries SAC and the Cleddau Rivers SAC. These are therefore considered to be of international importance.
- 5.12 No signs of water vole were recorded during the surveys and it is therefore considered that this species is likely to be absent from the study area.
- 5.13 A total of 49 badger setts were identified during 2016 with a further six setts identified in 2017. Six main setts were identified, and the potential arrangement of family groups was inferred using the proximity of setts and other badger fields signs such as latrines. The habitats present within the study area provide optimum habitat for badgers. The badger population within the study area is considered to be of local value.

- 5.14 58 species of birds were recorded during breeding bird surveys, of which 48 are considered to have bred within the study area. None of the species are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) (Doc.4.01.20).
- 5.15 Barn owl surveys did not record any active nesting or roosting sites within the study area. A former nest site was found to no longer be used by barn owls, however it has been assumed that the species is present within the wider landscape. The majority of habitats within the study area are of sub-optimal quality for barn owl foraging with only small areas of optimal habitat present.
- 5.16 The breeding bird assemblage within the study area is considered to be of local value, as is the population of barn owls.
- 5.17 Common lizard (*Zootica vivipara*) were recorded within the western areas of the study area. The study area is also considered to provide suitable habitat for other reptile species including slow worm (*Anguis fragilis*) and grass snake (*Natrix natrix*), and the assessment has therefore been undertaken on the assumption that these species are also present. The reptile populations are considered to be of local value.
- 5.18 Based on the habitats present within the study area it was assumed that the study area supports a range of species included on the list of species of principal importance for the conservation of biodiversity published in response to Section 7 of the Environment (Wales) Act 2016 (Doc. 4.01.05). The populations of such species are considered to be of local importance.

6. Effects of the Construction of the Published Scheme on Ecological Receptors

6.1 The potential effects of the Scheme have been assessed in the ES and SIAA in the absence of mitigation measures, with residual effects also identified following the inclusion of mitigation and compensatory measures.

Habitats

6.2 The construction of the Scheme will result in the loss of grassland, woodland and hedgerow habitats beneath the footprint of the Scheme. The areas of habitats that would be removed by the Scheme are shown in Table 8.14 of the ES (Doc. 3.08.01) and replicated in Table 1 below.

Table 1 Areas and lengths of habitats to be removed during construction taken from Table 8.14 of Chapter 8 of the ES (Doc. 3.08.01)

Existing Features / Habitat Types	Quantity removed
Broad-leaved woodland	1.49ha
Broad-leaved plantation	0.23ha
Mixed plantation	1.66ha
Coniferous plantation	0.11ha
Scrub	0.67ha
Improved and poor semi-improved grassland	21.71ha
Semi improved neutral grassland	1.28ha
Marshy grassland	2.24ha
Bracken	0.37ha
Standing water	0.01ha
Hedgerows	5,594 linear m
Watercourses	792 linear m

6.3 The loss of the habitats from the construction of the Scheme is not considered to be significant due to the low value of the habitats.

- 6.4 There is the potential for indirect effects on water courses through the release of sediment laden run-off or pollution from construction activities in to watercourses being crossed by the Scheme. The effects of such events on watercourses as ecological habitats is considered to be of low magnitude but potentially significant in the absence of mitigation.

Amphibians

- 6.5 Amphibian populations are likely to use areas within the footprint of the Scheme as terrestrial habitat and therefore would be at risk from vegetation clearance and soil moving activities, along with the loss and fragmentation of habitats. This is considered to be a low magnitude impact that would not be significant.

Bats

- 6.6 One soprano pipistrelle roost, located in Trefangor Cottage which is to be demolished, would be directly affected by the construction of the Scheme and a further 14 roosts within buildings adjacent to the Scheme are likely to experience disturbance from the noise and vibration caused during the construction period.
- 6.7 The clearance of vegetation along the route of the proposed Scheme has the potential to lead to fragmentation of habitats for bat species and may prevent certain species, such as the horseshoe bat species, from crossing the Scheme to access foraging areas.
- 6.8 Construction activities undertaken at night requiring lighting also have the potential to discourage bats from flying in the vicinity of the construction corridor and may further fragment habitats.
- 6.9 The potential effect of the construction of the Scheme on bat populations is considered to be an impact of large magnitude which is considered to be significant.

Dormice

6.10 The construction of the Scheme would result in the loss of 4.16ha of dormouse habitat comprising woodland and scrub, and 5,958m of hedgerows. There is also the risk of injuring or killing dormice during the clearance of vegetation. Once cleared the construction corridor is likely to act as a barrier to dormouse dispersal leading to fragmentation of dormouse habitats and populations.

6.11 The construction of the Scheme is therefore considered to be a significant effect due to the large magnitude of the effect on the local populations.

Otter

6.12 The two potential holts identified during the surveys are located a sufficient distance from the Scheme such that it is considered unlikely that they will be affected by disturbance. However, otter are likely to move through the area of the Scheme between river catchments and are therefore vulnerable to being hit by construction vehicles, becoming trapped in excavations or prevented from crossing the Scheme by disturbance from the light and noise of construction activities.

6.13 The effects of the construction of the Scheme is therefore considered to be a moderate magnitude impact that would be significant.

Badger

6.14 Nine badger setts are located under the footprint of the Scheme and would therefore be lost during construction of the Scheme. A further 13 setts, including one main sett, are located within 30m of the Scheme and are therefore likely to be subject to significant disturbance during construction, and may be abandoned or collapse resulting in the killing or injury to badgers.

6.15 The construction of the Scheme also has the potential to fragment badger habitat and badgers will be vulnerable to being hit by construction vehicles, becoming trapped in excavations or prevented from crossing the Scheme by disturbance from the light and noise of construction activities.

6.16 These impacts are considered to be a moderate impact that would be significant.

Breeding birds

6.17 The construction of the Scheme will lead to a loss of habitats used by birds for nesting and foraging within the footprint of the Scheme and the potential displacement of birds from habitats within the vicinity of the Scheme.

6.18 The loss of habitat is considered to be a low magnitude impact which would not be significant.

Reptiles

6.19 The proposed construction work has the potential for killing and injuring of reptiles along with the loss of breeding and terrestrial habitat through vegetation clearance and soil excavations.

6.20 This would be considered to be a low magnitude impact and would not be significant.

Section 7 Species

6.21 The proposed construction work has the potential for killing and injuring of Section 7 mammals along with the loss of habitat through vegetation clearance and soil excavations. There is also the potential loss of habitats that support Section 7 invertebrates.

6.22 It is considered that the construction phase of the Scheme is unlikely to have significant impacts on the local populations of these species.

7. Effects of the Operation of the Published Scheme on Ecological Receptors

- 7.1 Once operational the effects of the Scheme would be limited to the effects of air quality changes, water quality changes from road drainage, fragmentation of habitats where animals are deterred from crossing the Scheme, the effects of collisions between animals and vehicles and the effects of lighting on species within adjacent habitats.
- 7.2 Changes in emissions to air from the operation of the Scheme are set out in Chapter 13 of the ES and have been covered in the evidence of Andrew Sumner (WG 1.4.2).
- 7.3 The modelling of emissions from the operational Scheme showed a very small change in the amount of emissions although the location of emissions will be further to the north around Llanddewi Velfrey once the village is bypassed.
- 7.4 The effects of the very small-scale changes in emissions will be imperceptible in terms of the habitats and species within the study area.
- 7.5 During the operation of the Scheme, there is the potential for surface water run-off that would be contaminated with pollutants and particles from the road surface to enter watercourses. Furthermore, in the event of a traffic accident, spilled fuel or other pollutants could enter watercourses via the drainage network. This is considered to be a significant impact.
- 7.6 There is the potential for bats flying along the key flight routes identified by surveys to come into close proximity with road vehicles. Horseshoe bats (both species but especially lesser horseshoe) are particularly vulnerable to collision with vehicles as they will reduce their height to fly at ground level across open areas (Schofield, 1996)³. Given the high

³ Schofield, H. (1996). The ecology and conservation biology of *Rhinolophus hipposideros*, the lesser horseshoe bat.

level of bat activity and importance of the horseshoe bat populations, the potential magnitude of this impact is considered to be moderate in the absence of mitigation. This is considered to be a significant impact.

- 7.7 There is the potential for dormice, badgers, otters and Section 7 mammals species to come in to contact with vehicles while crossing the Scheme, once it is operational. In the absence of mitigation, this is considered to be a low impact that would be not significant given the relatively low traffic volumes at night.

8. Effects of the Published Scheme on European Designated Sites

- 8.1 The effects of the Scheme on European Sites are set out in the SIAA (Doc. 4.06.12) and Chapter 8 of the ES (Doc. 3.08.01). The majority of the features of the sites identified can be scoped out of the assessment as there are no pathways to link the impacts of the Scheme to the features of the sites, however the Cleddau Rivers SAC and Carmarthen Bays and Estuaries SAC were considered in terms of the hydrological pathways and otter populations. The three SACs with bat species listed as features were also included within the assessment. These are the Pembrokeshire Bat Sites and Bosherton Lakes SAC, the Limestone Coast of South West Wales SAC and the North Pembrokeshire Woodlands SAC.

8.2 As set out in the SIAA (Doc. 4.06.12) the consideration of effects on European sites identified the potential for the following significant effects in the absence of any mitigation measures other than plainly established and uncontroversial measures that are standard construction industry practice:

- a) Effects on the otter feature of the Cleddau Rivers SAC and the Carmarthen Bays and Estuaries SAC through collision with vehicles and habitat fragmentation;
- b) Effects on the greater horseshoe bat feature of the Pembrokeshire Bat Sites and Bosherton Lakes SAC and the Limestone Coast of South West Wales SAC through collision with vehicles and habitat fragmentation;
- c) Effects on the lesser horseshoe bat feature of the Pembrokeshire Bat Sites and Bosherton Lakes SAC through collision with vehicles and habitat fragmentation; and
- d) Effects on the barbastelle bat feature of the North Pembrokeshire Woodlands SAC through collision with vehicles and habitat fragmentation.

9. Mitigation and Compensation Design in the Published Scheme

Design mitigation

9.1 A number of culverts were included within the Scheme design to provide safe crossings for mobile animal species. This includes the oversizing of all stream culverts to 1.8m diameter to allow them to be used by bat species. The details of culverts and underpasses is shown in Table 8.16 of Chapter 8 of the ES and replicated in Table 2 below. The locations of these features are shown on the Environmental Master Plans in Appendix 2.5 of Chapter 2 of the ES (Doc. 3.02.02).

Table 2 Culvert and underpasses included within the Scheme design with an ecological mitigation function taken from Table 8.16 of Chapter 8 of the ES.

Chainage	Description	Provision
0+290	Mainline Cross Drainage Culvert	1.8m diameter pipe culvert approximately 31m in length with associated dry mammal underpass
1+680	NMU Underpass	Shared use bridleway underpass (unlit and suitable to be used bats and other mammals)
2+630	Pen-troydin-fach and Pen-troydin-fawr Farm Underpass	Shared Public Footway and Farm Underpass (Pen-troydin-fach and Pen-troydin-fawr) (unlit and suitable to be used bats and other mammals). This includes a watercourse. 3.2m wide with height of 2.7m above footway level. Approximately 55m in length.
3+000	Ecological Crossing point	1.8m diameter pipe for the crossing of Bats and badgers. 0.4m diameter pipe for the crossing of dormice. Approximately 48m in length
3+100	Watercourse crossing Culvert	1.8m diameter pipe culvert approximately 109m in length
3+115	Ecological Crossing Point	0.9m diameter mammal crossing approximately 85m in length
3+270	Watercourse crossing.	1.8m diameter pipe culvert approximately 108m in length with associated dry mammal underpass.
3+290	Pedestrian Underpass	3.3m wide, minimum 2.6m high public footpath underpass approximately 40m in length (unlit and suitable to be used bats and other mammals).
3+760	Mammal Underpass	0.6m diameter mammal underpass

9.2 Mammal fencing has also been designed in accordance with DMRB to prevent mammals from accessing the carriageway and guide them to the underpasses and culverts. The arrangements of fencing and other associated planting are shown on the Environmental Management Plans in Appendix 2.5 of Chapter 2 of the ES (Doc. 3.02.02). Planting will be used to guide bats and other mammal species to safe crossing points.

9.3 The drainage design, as discussed in the evidence of Tom Edwards (Doc. WG1.3.2, includes filter drains, catch-pits and attenuation basins. The assessments undertaken in Chapter 7 of the ES (Doc. 3.07.01) did not identify the need for any additional measures to control potential pollution events.

- 9.4 The proposed dormouse crossings are comprised of a 400mm diameter pipe buried within the embankment, through which branches and hemp ropes would be placed to provide a natural substrate to allow dormice to safely pass from one side to the other. Whilst it is not envisaged that these structures will be used on a regular basis, they are designed to provide a safe crossing for juvenile dormice dispersing from their parental territories.
- 9.5 The landscape planting design for the Scheme, as described in the evidence of Andrew Sumner (WG 1.4.2), has aimed to provide replacement habitat for dormice within the Scheme footprint and maintain connectivity. A total of 12.56ha of dormouse habitat will be created through the landscape planting within the highway boundary and in severed field parcels which provides compensation for habitats lost at a ratio of 2.15:1.
- 9.6 Lighting proposals were restricted to the two roundabout junctions at Penblewin and Bethel Chapel, in order to avoid effects on ecological receptors such as bats, dormice, badgers and otter. The lighting proposed at the two junctions will include appropriate design features to limit the light spill from luminaires to avoid the lighting of vegetation within proximity to Scheme. The area of lighting at the Penblewin Junction will be reduced from its current extent on the existing A40 corridor.
- 9.7 Existing trees will be retained where possible and larger specimens included to provide height to the vegetation on either side of the road and provide safe crossings for bats at each of the identified key crossing points. These safe crossing points are either underpasses or vegetation provisions located on either side of the Scheme to provide similar crossing points to those being used by bats on the existing A40. Specific details of the provisions are presented in Table 8.18 of the ES and replicated in Table 3 below.

Table 3 Key bat flight routes and mitigation provisions taken from Table 8.18 of Chapter 8 of the ES

Bat flight route	Chainage	Mitigation provision
A	0+500	Retained mature trees between existing A40 and Scheme. Inclusion of mature planting to north of the Scheme
B	1+020	Retain mature trees on south side of existing A40. Inclusion of mature planting to north of the Scheme
C	1+220	Retain mature trees on south side of existing A40. Inclusion of mature planting to north of the Scheme
D	1+510 – 1+820	Shared use bridleway underpass (unlit and suitable to be used bats and other mammals) at 1+680. Inclusion of planting to guide bats towards the underpass on both sides.
E	2+210	Inclusion of planting on either side of the Scheme
F	2+320	Inclusion of planting on either side of the Scheme
G	2+620	Shared Public Footway and Farm Underpass (Pen-troydin-fach and Pen-troydin-fawr) (unlit and suitable to be used bats and other mammals). This includes a watercourse. Approximately 70m in length.
H	2+850	Llanfallteg Road Overbridge
I	3+000	1.8m diameter pipe for the crossing of Bats and Dormouse. Approximately 48m in length
J	3+100	1.8m diameter pipe culvert approximately 109m in length
K	3+270	1.8m diameter pipe culvert. Approximately 108m in length.
L	3+460	Inclusion of planting on either side of the Scheme

Construction Mitigation

9.8 The following mitigation principles and measures were proposed to be included within the Scheme during the Construction Phase through detailed design and the adherence to a Construction Environmental Management Plan (CEMP):

- a) Pre-construction surveys for legally protected species including bats, otter, badger and barn owl;
- b) Protected Species Licences for bats, dormice and badgers, along with any other species identified through the pre-construction surveys;

- c) The badger setts within 30m of the construction activities will be excluded under licence, although where possible the exclusion will only be temporary;
- d) Provision of one artificial badger setts as a replacement for the main sett which will require exclusion;
- e) Phased vegetation clearance to allow for the presence of amphibians, reptiles and dormice;
- f) Where possible, vegetation clearance will take place outside of the bird breeding season and will be undertaken under the supervision of an ecologist;
- g) The exclusion of bats from Trefangor Cottage at an appropriate time of year, under an appropriate licence;
- h) Provision of a mix of bat box types on retained trees within the vicinity of Trefangor Cottage and along the length of the Scheme to compensate for the loss of the roost in Trefangor Cottage and disturbance to other roosts;
- i) Pollution control measures in accordance with industry standards and the Pollution Prevention Guidelines;
- j) Measures to control and contain sediment and material arising from excavations in proximity to water courses, will be included within the working method statements that will be developed as part of the agreed CEMP;
- k) Implementation of an Invasive Species Management Plan, to be agreed with relevant statutory environmental bodies prior to construction, to ensure that legally controlled plant species are not spread outside of the working areas;
- l) Restrictions on working hours to avoid night working and task lighting, such that no night working is undertaken in the vicinity of watercourses and key bat flight lines, and any task lighting elsewhere is restricted to ensure no light spill into adjacent habitats;
- m) Excavations to be covered or a means of escape provided for animals;

- n) Where possible, hedgerows affected by the construction works will be translocated to suitable receptor sites; and
- o) Supervision by an Ecological Clerk of Works of vegetation clearance and the installation of any ecological mitigation incorporated within the Scheme design.

Enhancement opportunities

- 9.9 Chapter 8 of the ES also identifies areas where enhancement works could be undertaken to contribute to biodiversity and various action plans and policies.
- 9.10 The downsizing of the existing A40 corridor between the parking area and Henllan Lodge has the potential to provide an area for the creation of wildflower grassland and other habitat types included within Welsh Government's Trunk Roads Estate Biodiversity Action Plan (TREBAP) (Doc. 4.01.26) that will provide further habitat enhancement over and above the areas of grassland that will be lost to the Scheme during construction. Enhancement could also contribute to the objectives of the Welsh Government's Green Corridors Initiative (Doc. 4.01.25).
- 9.11 This grassland creation works will benefit pollinator populations in the area and thus contribute to the Action Plan for Pollinators (Doc. 4.06.36) published by Welsh Government. The native woodland, scrub and hedgerow planting will also contribute to the aims of this Action Plan by mitigating for the loss of and providing additional woodland habitats.

10. Monitoring Proposals of the Published Scheme

10.1 Section 8.8 of Chapter 8 of the ES (Doc. 3.08.01) sets out the monitoring proposals for the ecological receptors, which are also set out below.

10.2 Monitoring will be undertaken during the construction and aftercare periods with any requirement beyond this, subject to agreement with the relevant statutory environmental bodies. The monitoring will include:

- a) Monthly monitoring the effective use of underpasses by;
- b) Quarterly monitoring the effective use of underpasses by badgers and otters;
- c) Monitoring the use of replacement badger setts with motion activated cameras;
- d) Quarterly monitoring of bat boxes; and
- e) Monitoring the use of dormouse crossings using motion activated cameras and hair tubes.

10.3 The results of the monitoring will be reported to NRW and other relevant statutory environmental bodies (including the local records centre) on an annual basis. In addition, the scope of the monitoring, methods and results will be discussed through further engagement with the Environmental Liaison Group during and post construction.

11. Residual Effects of the Published Scheme

11.1 The Appropriate Assessment documented in Section 7 of the SIAA (Doc. 4.06.12) concluded that with the mitigation measures identified and described in the SIAA and Chapter 8 of the ES, there would be no adverse effects on the integrity of the European sites being considered.

11.2 Section 8.9 of Chapter 8 of the ES concluded that with the various mitigation and compensatory measures that were proposed the potential effects of the Scheme would be reduced to levels that would not be significant.

12. Consultees' Responses and Objections to the Scheme

Natural Resources Wales (R0046)

12.1 NRW have raised a number of significant concerns with regards to the Scheme as set out in their letter dated 20 September 2019. These are summarised in the following paragraphs.

12.2 The proposals for bat crossing points do not reflect the 'Best Practice Principles for Bat Mitigation along linear transport infrastructure' as set out in Bethinussen and Altringham 2015 (Doc. 4.06.17), in particular in relation to the size of the proposed culverts;

12.3 A number of the culverts do not sit on a flight line, which is likely to impair their ability to function effectively;

12.4 'Hop over' crossing points would not be sufficient to mitigate the impacts of the Scheme on horseshoe bat species;

12.5 Further information requested in the form of a revised bat mitigation strategy including:

- a) Design and placement of mitigation structures taking in to account the requirements of each species for which it is intended;

- b) Underpass structures of sufficient size and sited along currently used flight lines;
- c) Drawings of the structure of all ecological crossing points, including how they site within the landscape, and how planting/fencing will enhance the chance of species finding them, encourage their use and discourage unsafe crossing.

12.6 NRW welcome the proposal to compensate dormouse habitat at a ratio of 2.15:1. It is unclear if the compensatory habitat is meaningfully located, such as that located between the proposed Scheme and the existing A40;

12.7 The proximity of dormouse compensatory planting in proximity to parts of the Scheme which are proposed to be lit;

12.8 Severing of hedgerows on the northern side of the Scheme by both the road and a private means of access to surrounding properties;

12.9 The crossing structures proposed for dormice are considered to be too long and narrow to be used successfully by dormouse and may not be able to be effectively maintained;

12.10 Requested further information in the form of a revised dormouse mitigation strategy including:

- a) Drawings showing the detailed locations of habitat creation for dormice including showing habitat lost, retained, and created;
- b) Proposals to offset the likely impacts of the road on dormouse populations, such as management to improve retained habitats;
- c) Revised proposals to minimise fragmentation caused by the Scheme, including crossing points for dormice based on a design that has supporting evidence of use by dormice, situated in key locations along the Scheme;
- d) Proposals and commitment to the long term management of such habitats;

- 12.11 There is insufficient information within the submitted Scheme to assess whether structures for the safe passage of otters have been located appropriately to ensure that otters will use the underpasses proposed rather than crossing the Scheme;
- 12.12 Some otter passes have been provided in locations of existing culverts, however not all, and the layout of the mammal fencing shown on the Environmental masterplans is unlikely to encourage otter discovery and use of the safe crossing points;
- 12.13 Requested further information in the form of a revised otter mitigation strategy including:
- a) Additional information/justification for the proposed location of the otter crossing points;
 - b) Additional information on the structure, location, fencing and planting around crossing point structures for otters;
- 12.14 The concerns raised in terms of horseshoe bats, barbastelle bat and otter need to be addressed in order to satisfy concerns with respect to the conclusions of the Statement to Inform an Appropriate Assessment.

Ms Amoores, Cyncoed, Llanddewi Velfrey (R0069)

- 12.15 The Letter of Objection made several points, but I will address one of those points which relates to Ecology and Nature Conservation. The point raised is that the Scheme “will be at the cost of wildlife, biodiversity and hundreds of acres of prime farmland”. The effects of the Scheme on farmland has been addressed by Andrew Sumner in his evidence (WG 1.4.2). The effects on the cost to wildlife and biodiversity are addressed in this evidence.

13. Changes to the Mitigation Proposals

- 13.1 With regard to the concerns raised by NRW a number of changes have been made to the Scheme design following publication of the draft Orders. The changes were discussed with NRW’s Protected Species

Team and the Officer responsible for the designated sites at a meeting on 21 November 2019. The minutes of the meeting are included in Appendix A of my evidence.

13.2 During the meeting two additional flight lines intersected by the Scheme were requested to be included within the consideration of bat mitigation. These are shown as flight lines A1 and C1 in Figure 1 in Appendix B of my evidence.

13.3 A protected species conservation strategy document has been prepared following the meeting with NRW on 21 November 2019. This document, included in Appendix C of my evidence, sets out the changes to the Scheme design and provides a number of drawings to provide further information as requested by NRW.

13.4 The following changes have been made to the mitigation measures for bats within the design of the Scheme following publication of the draft Orders:

- a) All of the culverts included in the Scheme to provide safe crossings for bats have been increased in size to a minimum of 3m wide by 3m high;
- b) A drainage culvert at Ch0+290 has been increased in size to 2m high by 3m wide;
- c) A bat crossing culvert and a separate pedestrian underpass have been combined and realigned to the existing field boundary at crossing point K;
- d) Landscape planting proposals have been revised in light of the changes to the culvert.

13.5 Dormouse crossing structures will be incorporated within the enlarged underpasses at five locations, three between the Llanfallteg Road Overbridge and Bethel Chapel, one between Ffynnon Wood and the Llanfallteg Road Overbridge, and one between Penblewin Roundabout and Ffynnon Wood.

13.6 In addition to the above changes, clarification has been provided in terms of the use of the existing A40 corridor following detrunking; the habitat creation, mammal fencing and lighting proposals.

13.7 No changes are proposed to the locations where bat crossing points cannot be mitigated with underpasses beneath the road.

14. Residual Effects of the Revised Scheme

14.1 With regards to the points raised in the two objections described in Section 11 above, the residual effects of the Revised Scheme have been reassessed in terms of the effects on:

- a) Bat species, with particular regards to SAC feature species;
- b) Dormice;
- c) Otters; and
- d) Wildlife and biodiversity.

Bat species – Size and Alignment of Culverts

14.2 The Scheme design has not been revised to include culverts of suitable size for woodland species in line with the recommendations of Berthinussen and Altringham (2015) (Doc. 4.06.17) as referenced in in the concerns of NRW (paragraph 11.1, bullet i. of this proof of evidence). The culverts have a cross-sectional area in excess of 5.35m², a size which was found to greatly increase the uptake of culverts by bats on the nearby A40 Robeston Wathen Improvements Scheme (Davies, 2019) (Doc. 4.06.23).

14.3 Berthinussen and Altringham (2015) (Doc. 4.06.17) recommends culverts of approximately 6m in height be used for woodland edge flying species, however it should also be noted that bats crossing a road over 5m above the road surface would be deemed to have crossed safely (Berthinussen and Altringham, 2012) (Doc. 4.6.16).

14.4 Research has also found the majority of bat species will use structures with much smaller dimensions as reporting in Limpens, Twisk, &

Veenbaas (2005) (Doc. 4.06.28), including species such as barbastelle bat, whiskered bat (*Myotis mystacinus*) and Brandt's bat (*Myotis brandtii*) which are woodland edge species.

14.5 Table 5 of Limpens, Twisk, & Veenbaas (2005) (Doc. 4.06.28) reports all of the species recorded on the Scheme with the exception of noctule and serotine, have been found to use tunnels 4m wide by 4m high and bridges over water with a minimum height of 2m. Whilst larger culverts up to 6m height may increase the certainty of being used by bats, the practicality and cost of including such large structures within a Scheme is limited and potentially unnecessary if smaller structures have been found to be effective elsewhere within the United Kingdom and Europe.

14.6 Therefore, although the revised mitigation design does not include culverts of 6m in height as recommended by the Best Practice Guidelines for transport infrastructure (Berthinussen and Altringham, 2015) (Doc. 4.06.17), there is evidence that the culverts proposed within the revised mitigation design will be of sufficient size to be effective in providing safe crossing points for all bat species.

14.7 With regard to the locations of the culverts relative to flight lines, the pedestrian underpass at CH3+280 has been combined with a bat underpass and the location moved directly on flight line K identified within the Environmental Statement. The majority of other mitigation measures are already located on the alignment of flight lines, including the two additional flight lines identified in consultations with NRW.

14.8 The NMU underpass at CH1+690 within Ffynnon Wood was located based a number of factors including the presence of bats flying over the existing A40 from roosts within buildings on the western side of Ffynnon Wood and the linkages to local public rights of way.

14.9 It is therefore my opinion that the culverts included within the Scheme as part of the bat mitigation strategy are suitably located to maximise the

potential for them to be used by bats to provide safe crossing points, in particular for horseshoe bat species forming part of the SAC populations.

Bat species – Effectiveness of “Hop over” Crossing Points

- 14.10 The use of ‘hop over’ planting to provide crossing points for bats has been proposed for two reasons. Firstly, the vertical alignment of the Scheme prevents the use of underpasses at some of the identified bat flight lines and cannot be altered due to constraints on the alignment. The alignment and engineering design have been addressed in the evidence of Tom Edwards (WG 1.3.2).
- 14.11 Secondly, there are a number of locations on the existing A40 where bats appear to have habituated over time to using mature trees with canopies overhanging the road to cross the carriageway. The mitigation strategy, contained in Appendix B of my evidence, has sought to replicate these situations as far as possible especially where the Scheme is in close proximity to the crossing points on the existing corridor such as at flight lines A, B, C and C1 on Figure 1 in Appendix B of my evidence.
- 14.12 Further analysis of the passive bat survey data from 2017 has been undertaken to assess the potential risk to bats, in particular SAC feature species. The analysis has comprised two parts, firstly to determine the proportion of surveyed nights when the SAC species were recorded, and secondly to determine the average time when the SAC species were recorded at each location.
- 14.13 Table 4 below shows the proportion of nights when SAC species were recorded at the key flight lines identified within the ES and SIAA (shown on Figure 1 in Appendix B).

Table 4 Frequency of SAC feature bat species recorded during surveys in 2017 at key flight routes.

Flight line	Type of mitigation	Number nights when bats recorded	Number of nights greater horseshoe bat recorded	Number of greater horseshoe bat passes	Number of nights lesser horseshoe bat recorded	Number of nights greater horseshoe bat recorded	Number of lesser horseshoe bat passes	Number of nights barbastelle recorded	Number of barbastelle bat passes
A1	Culvert	17	1	1					
A	Hop-over	22							
B	Hop-over	22							
C	Hop-over	not monitored in 2017							
C1	Hop-over	17	3	3				1	1
D	Culvert	15	1	1		1	1		
E	Hop-over	not monitored in 2017							
F	Hop-over	24	1	1					
G	Culvert	19	2	2					
H	Overbridge	24	1	1					
I	Culvert	23	2	2					
J	Culvert	15						1	1
K	Culvert	17		1					
L	Hop-over	24							

14.14 The number of nights when SAC bat species were recorded was low, the highest being three out the 17 nights when greater horseshoe bats were recorded at flight line C1. It is therefore my Opinion that SAC bat species are only infrequently crossing the existing the A40 or the alignment of the Scheme.

14.15 Furthermore, when comparing the average time when SAC bat species were recorded, shown in Table 5 below, with the Traffic data presented in Figure 1 of the evidence of Philip Thiele (WG 1.2.2), it can be seen that horseshoe bats are likely to be crossing the Scheme when the hourly two-way traffic flows are below 100 vehicles (approximately 1 vehicle every 36 seconds).

Table 5 Average time when SAC bat species were recorded

Flight line	Type of mitigation	Greater Horseshoe bat	Lesser Horseshoe bat	Barbastelle bat
A1	Culvert	00:45		
A	Hop-over			
B	Hop-over			
C	Hop-over			
C1	Hop-over	01:07		23:41
D	Culvert	02:28	04:13	
E	Hop-over			
F	Hop-over	00:16		
G	Culvert	00:36		
H	Overbridge	01:55		
I	Culvert	01:31		
J	Culvert			00:23
K	Culvert	01:16		
L	Hop-over			

14.16 Taking the slowest flight speed for greater horseshoe bat studied by Aldridge (1986) (Doc. 4.06.14) of 2.7m/s, it is estimated that at the widest crossing point (Flight line A, as shown in Appendix B of the Protected Species Conservation Strategy included in Appendix C of this proof of evidence) a greater horseshoe bat would take approximately 5

seconds to cross the carriageway and 7 seconds to cross the gap between the proposed mature planting.

14.17 Whilst it is acknowledged that “hop over” crossings are less effective for horseshoe bat species, it is my opinion that potential for horseshoe bat species to be hit by vehicles is very low given their infrequent presence on the alignment of the Scheme and the low traffic levels at the times when those species are likely to be crossing the Scheme. It is therefore my opinion that the impacts of killing or injury of bats through collision with vehicles on the Scheme would not be discernible from natural mortality rates.

14.18 Barbastelle bat, along with the majority of other bat species, have been found to use hop over style crossings as recorded in Limpens et al. (2005) (Doc. 4.06.28), and it is my opinion that the proposed mitigation in the form of hop overs are sufficient for the species which have been recorded in greatest numbers during the surveys, along with barbastelle bat.

14.19 An alternative would be to use an engineered crossing structure (bat gantry), however the use of such structures by bats has been limited to date, with some research showing that structures of this nature are not effective (Berthinussen and Altringham 2015) (Doc. 4.06.17).

14.20 Given the low frequency of horseshoe bats recorded on the alignment of the Scheme and the frequency of vehicles at the times when horseshoe bats have been recorded, it is my opinion that the inclusion of such structures within the mitigation design would not reduce the potential risk to these species given the uncertainty of their effectiveness. Such structures have therefore not been proposed to avoid the cost of mitigation measures that are unlikely to be effective.

Dormice – Effectiveness of Habitat Compensation

- 14.21 Dormouse habitat is proposed to be created as part of the Scheme would be located along the length of the Scheme. This would include the areas of severed field plots and the areas of land between the Scheme and the existing A40 to the west of Ffynnon Wood. The provision of replacement habitat has therefore been designed to both replace the habitats to be lost, but also to maintain habitat connectivity along the length of the Scheme.
- 14.22 On the northern side of the Scheme between Penblewin junction and Henllan Lodge a hedgerow is proposed between the main line of the Scheme and the Private Means of Access (PMA) to the north. No hedgerows have been proposed along the north edge of the PMA, however these may be introduced as part of accommodation works with Landowners during the construction of the Scheme if the orders are made.
- 14.23 During the meeting with NRW on 21 November 2019 clarification was provided by the project team on the intended use of the existing A40 corridor from the Rest Area eastwards to Henllan Lodge. This section of the existing corridor will be retained as a side road to provide access to local farms.
- 14.24 Only two areas of the proposed Scheme will be lit, being the junctions at either end of the Scheme. The lighting proposals are discussed in Tom Edwards' Proof of Evidence (WG 1.3.2).
- 14.25 It is therefore my opinion that the proposed habitat planting within the Scheme will provide suitable habitat for use by dormice and provide effective connectivity of habitats along the length of the Scheme.

Dormice – Effectiveness of Crossing Structures

14.26 Where larger culverts are now being proposed under the Scheme it is proposed to utilise an area within the culvert for dormouse connectivity. It is proposed to use approximately 0.5x0.5m within the upper corner of the culverts to install either branches within a boxed-off section or an Animex wildlife bridge within the culvert to link habitats on either side of the Scheme and allow the dispersal of dormice across the Scheme. It is anticipated that the use of part of the large box culverts for this purpose, which have been shortened in length where possible, will allow the dormouse connectivity structures to be maintained.

14.27 The locations of the proposed dormouse connectivity structures are shown on in Appendix A of the Protected Species Conservation Strategy included in Appendix of this proof of evidence.

14.28 It is my opinion that the revised mitigation proposals will be effective to maintain the connectivity of dormouse populations either side of the Scheme.

Otter – Effectiveness of Crossing Structures

14.29 The proposed changes to the culverts outlined in Section 12 above will result in some of the culverts being shorter in length. The proposals for protected species fencing have been reviewed to take into account of the changes to the culverts.

14.30 Protected species fencing is proposed along the Scheme on both the north and south sides due to the presence of otters and badgers. Where culverts are present within the Scheme design the protected species fencing will pass over or link in to the headwalls of the culverts and act to guide animals in to the culverts.

14.31 It is my opinion that the proposed mitigation measures will be effective to prevent otter and other terrestrial mammal species from accessing the

carriageway and provide safe crossing points which would be effective in maintaining connectivity for these species either side of the Scheme.

Assessment of Adverse Effects on the Integrity of European Sites

14.32 Taking in to account my opinions with respect to the residual effects of the revised Scheme on SAC bat species and otters described above. It is my opinion that the revised Scheme would not give rise to adverse effects on the integrity of European Sites within the terms of the requirements of an Appropriate Assessment under the Conservation of Habitats and Species Regulations 2017 (Doc. 04.06.10).

Effects on Wildlife and Biodiversity

14.33 As documented in the Environmental Statement, mitigation measures have been proposed to ensure compliance with all relevant legislation pertaining to the protection of species and commitments towards the maintaining of biodiversity, such as the duties of Welsh Government under Section 6 of the Environment (Wales) Act 2016 (Doc. 4.01.05).

14.34 Whilst it is acknowledged that there will be effects on plants and animals from the construction and operation of the Scheme, the project team has sought through the development of the Scheme design to avoid impacts where possible, and where this has not been possible to include measures to reduce the scale of any effects.

14.35 In addition, Chapter 8 of the ES (Doc.4.03.08) has identified opportunities for measures to enhance biodiversity, such as the inclusion of species rich grasslands, through the implementation of the Scheme.

14.36 It is therefore my opinion that the residual effects of the Scheme on wildlife and biodiversity will not be significant within the terms of the Environmental Impact Assessment process.

15. Conclusions

- 15.1 The design of the Scheme has followed relevant guidance and the project team has sought to follow the hierarchy of avoiding impacts where possible, mitigating and compensating impacts which cannot be avoided.
- 15.2 Surveys to establish the Ecological baseline have been undertaken following current best practice guidelines for the species concerned. The assessment of effects has also been undertaken following current best practice guidelines at the time of the Assessment.
- 15.3 Although the residual effects of the published Scheme were not considered significant within the ES, changes have been made to the design of mitigation measures to address the concerns of NRW and provide greater confidence in the effectiveness of mitigation measures.
- 15.4 It is my opinion that the Scheme, taking in to account the revised mitigation proposals, will not give rise to significant effects on ecological receptors and will therefore no give rise to adverse effects on the integrity of European Sites.

16. Appendices (Separate Volume)

Appendix A – Drawing - Bat Flight Routes

Drawing - A40LVP-ARP-VES-SWI-DR-LE-0210.pdf P01 – Figure 1 – Bat Flight Routes

Appendix B – Protected Species Mitigation Plan

Report – A40LVP-GEN-LSI-SWI-CO-ZL-0009 - Protected Species Mitigation Plan.

Appendix C – NRW meeting minutes

Report – A40LVP-ARP-GEN-SWI-MI-LE-0001 - NRW meeting minutes.