

**PROOF OF EVIDENCE OF ANDY COATES**

**TERRESTRIAL ECOLOGY**



**THE CHILTERN RAILWAYS (BICESTER TO OXFORD IMPROVEMENTS)  
ORDER**

**TRANSPORT AND WORKS ACT 1992**

**TRANSPORT AND WORKS (APPLICATIONS AND OBJECTIONS  
PROCEDURE) (ENGLAND AND WALES) RULES 2006**



## **CONTENTS**

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
	<b>SCOPE OF MY EVIDENCE</b>	<b>1</b>
<b>2</b>	<b>SUMMARY OF THE ECOLOGICAL ASSESSMENT FINDINGS</b>	<b>3</b>
	<b>INTRODUCTION</b>	<b>3</b>
	<b>ECOLOGY SURVEYS</b>	<b>3</b>
	<b>HABITATS REGULATIONS ASSESSMENT</b>	<b>4</b>
	<b>SUMMARY OF RESIDUAL IMPACTS OF THE ORDER SCHEME</b>	<b>20</b>
<b>3</b>	<b>OBJECTIONS RAISED IN RELATION TO ECOLOGY</b>	<b>22</b>
<b>4</b>	<b>CONCLUSIONS</b>	<b>26</b>

# 1 INTRODUCTION

- 1.1 My name is Andy Coates. I hold a BSc (Hons) in Zoology from the University of Aberdeen and an MSc in Environmental Technology from Imperial College, London. I am a Member of the Institute of Ecology and Environmental Management (MIEEM).
- 1.2 I am a Technical Director with ERM. In that capacity I am responsible for directing the ecological work undertaken by ERM and ensuring that it is fit for purpose.
- 1.3 My role on the Chiltern Railways (Bicester to Oxford Improvements) Order project has been to oversee the assessment of the likely impacts to ecology from the construction and operation of the Order Scheme, and to advise Chiltern Railways on appropriate mitigation measures. I have also overseen the work undertaken to inform the consideration of the project against the requirements of the Habitats Regulations.
- 1.4 I have assessed the ecological impacts arising from proposed development for over 20 years including a range of rail projects for example Edinburgh Tram Line One, the Waverley Scottish Borders railway scheme, Edinburgh Airport Rail Link (EARL), South Hampshire Rapid Transit (SHRT) and Metro North in Dublin. I have given evidence at the Parliamentary / Public Inquiries, or Oral Hearings for each of these proposals.
- 1.5 I also have considerable experience in assessing ecological impacts from development in a range of other sectors including power stations, renewable energy schemes, business parks, housing schemes, waste developments, water and waste water treatment plants, oil, gas and water pipelines, mineral developments, other transport schemes, ports and other coastal developments, and ornithological assessments associated with offshore development schemes.

## SCOPE OF MY EVIDENCE

- 1.6 The Secretary of State for Transport [‘the Secretary of State’] issued a Statement of Matters (X/4) for the TWA Inquiry on 25 August 2010. In this Proof of Evidence, I address, in particular, the following matters from that Statement of Matters relating to the impacts of the Order Scheme on flora and fauna, in whole or in part:

### Matter 7

- whether implementation of the scheme is likely to damage or destroy a breeding site or resting place of any species protected under the Conservation of Habitats and Species Regulations 2010 (“the 2010 Regulations”); and, if so, whether appropriate mitigation measures have been designed and licences applied for by Chiltern Railways under the 2010 Regulations;

### Matter 8 (a) – (d)

- ‘in relation to the Oxford Meadows Special Area of Conservation (a “European site” under the 2010 Regulations):
  - whether the scheme (either alone or in combination with other plans or projects) is likely to have an adverse effect on the integrity of the site, having regard to the conservation objectives of the site and to the manner in which the scheme is proposed to be carried out by Chiltern Railways, including any proposed conditions or restrictions to which the draft TWA Order and deemed planning permission would be subject,
  - whether there are any alternatives to Chiltern Railways’ proposals which are capable of achieving the objectives of the scheme, which are feasible and which would have less adverse impact on the integrity of the site or no such impact,
  - whether the scheme is necessary for imperative reasons of overriding public interest, and
  - whether compensatory measures can be secured which would ensure the overall coherence of the Natura 2000 Network’.

Matter 10(e)

- the extent to which any adverse ecological impacts remain after mitigation.

1.7 In addition to the Statement of Matters, I also address any additional issues raised by Natural England (NE), who are OBJ 246 and the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT) who are OBJ 211 and those of other objectors who raised objections or made representations in relation to ecology.

1.8 The remainder of my evidence comprises a summary of the key ecological assessment findings from the Environmental Statement (ES) updated to reflect the findings of any subsequent surveys and associated assessments (Chapter 2), matters raised by NE and BBOWT (Chapter 3), and a short conclusion (Chapter 4). Additional ecology reports are attached in appendices to my evidence, and I explain the relevance of these later in my evidence.

<i>Appendix ASC1</i>	Environment Agency Stage 1 and 2 Assessment of new PIR permissions under the Habitats Regulations
<i>Appendix ASC2</i>	Oxford Meadows SAC location plan and SAC/SSSI citations
<i>Appendix ASC3</i>	Additional NO <sub>x</sub> concentrations at Oxford Meadows
<i>Appendix ASC4</i>	Accommodation works at Holts Farm Bridge and Potential Impacts on Wendlebury Meads SSSI
<i>Appendix ASC5</i>	Summer Bat Survey Report for Wolvercot Tunnel
<i>Appendix ASC6</i>	Great Crested Newt Survey Report and Mitigation Plan

## 2 SUMMARY OF THE ECOLOGICAL ASSESSMENT FINDINGS

### INTRODUCTION

- 2.1 The ES (CD/1.13-1.18) contained an ecological assessment of the Order Scheme proposals. Details about the existing ecological conditions used in this assessment were embraced not merely through a desk study and consultations with Stakeholders, but also through an Extended Phase 1 Habitat Survey which informed a range of detailed flora and fauna surveys. This assessment was in my opinion robust and sufficient for the purposes of the EIA Regulations taking account of the mitigation which will be implemented where any significant adverse effects were identified.
- 2.2 My evidence also refers to ecological survey work which has been undertaken since the submission of the Order application to help refine the mitigation proposals as described in the ES.

### ECOLOGY SURVEYS

- 2.3 The Addendum to the ES submitted in April 2010 (CD/1.22) contained the findings of bat hibernation surveys which were undertaken in Wolvercot Tunnel between December 2009 and February 2010, and a draft Bat Mitigation Plan. The Addendum also contained a statement about the findings of badger bait marking survey work undertaken in March 2010. The detailed findings of the badger bait marking survey have not been published, although the details have been made available to NE. The legal protection which is afforded to badgers is largely to protect the animals from persecution such as baiting. As a result it is best practice, and endorsed by statutory authorities such as NE, not to make detailed information on sett locations publicly available. This approach was also taken in the ES for reporting the findings of the badger surveys undertaken as part of the EIA.
- 2.4 Several stand alone ecological documents were published at the time of the Second Addendum <sup>(1)</sup> (CD/1.22/1) in addition to the ecological information contained within the Addendum. To allow further refinements to the Bat Mitigation Plan, a spring swarming survey was undertaken at Wolvercot Tunnel in April / May 2010 (CD/2.27) along with a separate survey using an Anabat bat detector (CD/2.28). Other documents included a Reptile Mitigation Plan (CD/2.26) and a report on wintering bird surveys undertaken over the winter of 2009/10 (CD/2.29).
- 2.5 My evidence refers to those other ecological reports which have been completed since the Second Addendum, and which are attached as Appendices. These comprise a summer bat survey at Wolvercot Tunnel (Appendix ASC5) and Great Crested Newt report and draft mitigation plan (Appendix ASC6).

<sup>(1)</sup> to the ES.

## HABITATS REGULATIONS ASSESSMENT

### APPROACH

- 2.6 Guidance relating to the application of the Habitats Regulations <sup>(1)</sup> to any assessment of a new project or plan's effect on a Natura 2000 site suggests that such an assessment should be carried out in four stages, in order to decide whether the project or plan can proceed. The first two of these stages are concerned with establishing first the significance of any effect and then whether any such effect could have an adverse effect on the integrity of the site of conservation interest. Subsequent stages relate to alternative solutions and matters of public interest, which are not required to be invoked here.
- 2.7 Stage 1 concerns the significance of the effect that any project or plan might have on a Natura 2000 site. This is sometimes referred to as the 'Screening' stage and seeks to identify whether any effects are significant, either alone or in combination with other plans or projects.
- 2.8 In the ES (Chapter 13 Air Quality and Dust) the primary threshold for significance in relation to the additional air pollution impacts has been taken as 1% of the critical level or critical load <sup>(2)</sup>. This is consistent with the joint approach taken by the Environment Agency and Natural England in relation to the assessment of new projects assessed under the Integrated Pollution Prevention and Control (IPPC) regulations. (See Appendix ASC1 for the relevant EA Work Instruction noting that the EA adopts a different sequence of numbers for its assessment stages from the EU guidance referred to above).
- 2.9 Stage 2 of the assessment procedure relates to the detailed consideration of the impact the plan or project has on the *integrity* of the Natura 2000 site, either alone or in combination with other plans or projects, with respect to the site's conservation objectives and its structure and function. This stage is also referred to as 'appropriate assessment'.
- 2.10 I have applied these two assessment stages to the designated sites that might be affected by the Chiltern Railways (CR) proposal. Strictly speaking, only the Oxford Meadows SAC site qualifies for this approach, given its status as a Natura 2000 site. However, for consistency, I have also applied it to the SSSIs.

### DESIGNATED SITES – OXFORD MEADOWS SAC

#### *Description*

- 2.11 Oxford Meadows Special Area of Conservation (SAC) covers 265.89 hectares (ha) and lies immediately west of the Order Scheme boundary (see Figure 1, Appendix ASC2). The SAC comprises four Sites of Special Scientific Interest (SSSI), Port Meadow with Wolvercote Common and Green SSSI (166.7 ha), Pixey and Yarnton Meads SSSI (85.6 ha), Wolvercote Meadows SSSI (9.2 ha) and Cassington Meadows SSSI (7.03 ha). The SAC is designated primarily

<sup>(1)</sup> See for example, European Commission guidance at [http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura\\_2000\\_assess\\_en.pdf](http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf).

<sup>(2)</sup> A critical level refers to the airborne concentration of a pollutant at which harm is thought to occur and a critical load refers to the threshold deposition rate of acidity or nutrient nitrogen at which harm is thought to occur for a habitat.

for supporting lowland hay meadow habitat (dominated by *Alopecurus pratensis* (meadow foxtail) and *Sanguisorba officinalis* (great burnet) (also known under National Vegetation Classification <sup>(1)</sup> (NVC) as MG4 grassland); and also because it supports the species *Apium repens* (creeping marshwort). The Joint Nature Conservation Committee (JNCC) website <sup>(2)</sup> describes the site as representing lowland hay meadows in the Thames Valley, with unique vegetation communities reflecting the influence of long-term grazing and hay cutting. The site has benefited from the survival of traditional management, which has been undertaken for several centuries, and so exhibits good conservation of structure and function. Port Meadow (part of the Oxford Meadows SAC) is the larger of only two known sites in the UK for creeping marshwort, which is listed on Annex II and IV of the EC Habitats Directive because of its scarcity and decline in Europe.

2.12 The Natura 2000 standard data form for the SAC <sup>(3)</sup> describes the site as critically dependent upon groundwater levels and annual flooding and very sensitive to changes in groundwater levels. The site is dependent upon traditional hay-cutting and grazing. Port Meadow is registered Common Land with common grazing rights. Stocking levels are high and grazing takes place throughout the year and *Apium repens* is certainly tolerant of, if not dependent upon, this management regime.

2.13 Surveys undertaken by ERM in 2010 indicate that the central parts of the SAC comprise the NVC communities MG11 (*Festuca rubra* (red fescue) – *Agrostis stolonifera* (creeping bent) – *Potentilla anserina* (silverweed)) and MG13 (*Agrostis stolonifera* (creeping bent) – *Alopecurus geniculatus* (marsh foxtail)), which appear to be tolerant of nitrogen as they are well grazed and yet these communities are still in good condition. The remaining areas, including the sections within the north and south of the SAC, are MG6 (*Lolium perenne* (perennial ryegrass) – *Cynosurus cristatus* (crested dog's-tail)), a less important habitat in nature conservation terms and which, in many areas, is in poor condition. No MG4 (*Alopecurus pratensis*-*Sanguisorba officinalis*) was recorded on the site and NE have also confirmed from their monitoring surveys that it is not present within the SAC.

2.14 The *Apium repens* occurs in the central belt of the site, where it is wet and is grazed by livestock, as shown on Figure 1, Appendix ASC2.

As part of the EIA, a Habitat Regulations Screening Assessment was undertaken (see Annex F1 to the ES). This concluded that the potential impacts on the SAC could come from three main sources; direct damage/disturbance during construction, air pollution (resulting in nutrient enrichment or smothering in dust) and hydrological change. The ES concluded that construction will not result in any significant changes to the groundwater levels and that the risk of water pollution will be minimal and can be managed through the Code of Construction Practice (CoCP)(CD/1.24). Direct damage/disturbance to the SAC from construction activities is covered later on in my evidence. Dust can be controlled through the CoCP and no significant adverse impacts are predicted to result from this source. The

<sup>(1)</sup> Rodwell et al. (1991 et seq) British Plant Communities. Cambridge University Press.

<sup>(2)</sup> <http://www.jncc.gov.uk/protectedsites/sacselection/sac.asp?EUcode=UK0012845>

<sup>(3)</sup> <http://www.jncc.gov.uk/protectedsites/sacselection/n2kforms/UK0012845.pdf>

following paragraphs deal specifically with the potential for impacts on the SAC as a result of air emissions from the operating railway.

*Potential Air Quality Impacts*

- 2.15 Additional airborne concentrations and deposition rates resulting from operation of the proposed Order Scheme will be greatest adjacent to the source, ie the railway line. For locations within the SAC further from the railway line, the impact decreases sharply with distance.
- 2.16 Trains presently emit air pollution. The most significant impact from an increase in trains will be the additional concentrations of NO<sub>x</sub>. The SAC boundary is close to the railway at its southern end and so is predicted to experience the largest impact. In the ES, this maximum additional concentration is reported as being 4 µg m<sup>-3</sup> as an annual average. This represents 13% of the relevant critical level (30 µg m<sup>-3</sup>). The specific habitat of interest within the SAC (Port Meadow) is further from the railway line and so the additional concentration here would be lower than the maximum impact, at 5-10% of the critical level. This distribution of additional pollution is shown in Appendix ASC3, with the area of *Apium repens* shown clearly.
- 2.17 The magnitudes of other air quality impacts were also quantified in the ES, notably the additional concentrations of SO<sub>2</sub> and the deposition rates of acidity and nutrient nitrogen. In comparison to the increase in NO<sub>x</sub> concentrations as a fraction of the critical level, none of these was as great, expressed as a fraction of the critical level or critical load. In particular, the deposition rate for nitrogen is predicted to be 0.58 kg N ha<sup>-1</sup> year<sup>-1</sup> at the most affected part of the site, which gives a total deposition rate of 14.5 kg N ha<sup>-1</sup> year<sup>-1</sup>. Significantly, this is 48% – 72% of the critical load for this habitat, which is given as 20 – 30 kg N ha<sup>-1</sup> year<sup>-1</sup>. Using the Environment Agency's complete method for assessing significance, this would lead to a conclusion that the effect of nitrogen deposition arising from the Order Scheme was insignificant. (A criterion is that the new source contribution plus that of the background should be less than 70% of the critical load).
- 2.18 On the other hand, an increase in NO<sub>x</sub> concentrations arising from the Order Scheme of approximately 10% of the critical level cannot be described as 'insignificant' and therefore some consideration should be given to the Stage 2 of the procedure, which is to decide upon the effect, if any on the site's integrity, with regard to the conservation objectives of its designation.
- 2.19 It is important to recognise that simply exceeding the percentage thresholds of the critical loads/levels does not automatically mean that there will be significant impacts on the habitats of the designated sites. In the ES it was clearly stated that the impacts on habitats and plant species from pollutants such NO<sub>x</sub> and deposited nitrogen are difficult to predict. This is a position supported by experts in the effects of air pollution on habitats at the Centre for Ecology and Hydrology (CEH). It is entirely possible that the emissions from the trains will not result in any adverse effects on the habitats in the designated sites.
- 2.20 The balance of nitrogen effects in grassland habitats is often complicated by the existing management regimes including grazing and mowing. Whilst grazing adds nitrogen to the habitat through urine and faeces from the livestock, it also contributes to removal of nitrogen, as does mowing when the

cut grass is taken offsite. Information on the UK Air Pollution Information System (APIS) website <sup>(1)</sup> indicates that livestock contributes the largest source of aerial nitrogen deposition to the Oxford Meadows SAC (37%), largely through deposition of ammonia and ammonium compounds. In contrast, the current railway emissions account for a mere 3%. Road transport contributes 13%. The SSSI citation for Port Meadow with Wolvercote Common and Green (see Appendix ASC2) states that it is a common, and the grazing rights for cattle and horses are held by a number of groups including the inhabitants of Wolvercote and the Freemen of the City of Oxford. It is likely that the extent of grazing varies considerably over the year, and hence the direct nitrogen input with it. It is therefore likely that the plant species present on the SAC have become accustomed to this regime and to the current aerial nitrogen deposition attributable to road and rail traffic.

2.21 As described earlier, the Oxford Meadows SAC is designated for Hay Meadow Habitat and the plant species *Apium repens*. The potential impacts from air emissions likely to arise from the Order Scheme on both qualifying interests are considered in the following paragraphs.

#### *Lowland Hay Meadow*

2.22 The neutral grassland communities recorded on the Oxford Meadows site, as described above, consist of the NVC communities MG11 (*Festuca rubra – Agrostis stolonifera – Potentilla anserina*) and MG13 (*Agrostis stolonifera – Alopecurus geniculatus*) and MG6 (*Lolium perenne – Cynosurus cristatus*). The MG11 and MG13 communities are present within the central belt of the SAC; both communities are UKBAP Priority Habitats. The other community present on the site is MG6. This community is of lesser biodiversity value and the example present on the SAC is very species poor and contains an abundance of invasive species including primarily *Urtica dioica* (common nettle), with occasional *Cirsium arvense* (creeping thistle) and *Cirsium vulgare* (spear thistle).

2.23 Condition Assessment surveys undertaken by ERM in June 2010 were only undertaken on the MG11 and MG13 and not the areas containing the MG6 community as the assessments are only applicable to communities of botanical value. The Condition Assessments confirmed that the MG11 and MG13 communities present within the centre of the site were in favourable condition.

2.24 The favourable conditions on the site are attributable to intensive grazing and flooding on the site. The grazing in the central belt of the site is very intensive due to cattle and horses grazing close to stagnant water remaining in the centre of the site. This is apparent from the very short grassland within these areas on the site. This result of this is that in the central part of the site contains a high nitrogen level from grazers on the site; NH<sub>3</sub> being the largest contributor of nitrogen on the SAC (as described above). However, both the MG11 and MG13 communities on the SAC did not appear to be negatively effected by the increased nitrogen levels; on the contrary they appear to benefit from the current conditions present on the site.

2.25 Predicted impacts from the Order Scheme include increased levels of NO<sub>x</sub>, above critical load levels. Impacts on the MG11 and MG13 communities are

<sup>(1)</sup> <http://www.apis.ac.uk/>

difficult to predict. However, as the current communities are in favourable condition and NH<sub>3</sub> from grazers is high specifically within these areas, the likely increase in air borne nitrogen is not predicted to have any material adverse effect on impact the MG11 and MG13 communities.

### *Apium Repens*

- 2.26 *Apium repens* is listed on Annex I and IV of the EC Habitats Directive (CD/5.9), Appendix I of the Berne Convention, and is protected under the Habitats Regulations 2010 (CD/5.30), and Schedule 8 of the Wildlife and Countryside Act 1981 (and as amended)(CD/5.15). *A. repens* is classified as a Critically Endangered plant species in the UK and a Vulnerable plant species in Europe because of a number of factors as a result of habitat destruction and inappropriate management.
- 2.27 *A. repens* is currently recorded at only two sites within the UK. The main population is present at Oxford Meadows SAC; and a smaller population has been recorded in Essex.
- 2.28 The habitat that *A. repens* is associated with is flood plain pastures. It requires open environments with plenty of light and very moist/ wet soils. The sites associated with this species are subject to substantial disturbance from grazing, trampling and mowing; which are considered to indirectly aid *A. repens*, as it has a higher tolerance to disturbance than its competitors <sup>(1)</sup>. *A. repens* is not however, tolerant of shade from competitive species and is also intolerant of salt, specifically soil anoxia in prolonged flooding periods <sup>(2)</sup>.
- 2.29 The *A. repens* population present on Oxford Meadows SAC is sustained by the management of the site and so the management prescriptions on the site are important in ensuring the species is maintained in a favourable condition. Critical prescriptions include the maintenance of appropriate ground water levels; annual flooding; and intensive grazing to control vegetation height.
- 2.30 Potential impacts of the Order Scheme, as described earlier, include from NO<sub>x</sub> emissions and the deposition of nitrogen on Oxford Meadows SAC, including within areas that the *A. repens* is known to occur. Potential adverse impacts raised by Natural England in their Statement of Case and subsequent correspondence include indirect impacts from increased nitrogen levels and subsequent increase in competitive, nitrogen loving plant species, and therefore a potential decrease in *A. repens*.
- 2.31 *A. repens* is not known to be sensitive to high nitrogen levels. On the contrary, it has a preference for habitats that are nitrogen rich, being associated with areas that are heavily poached by livestock, specifically cattle and horses, in very eutrophic conditions (Gowing D *et al.*(2005)) with heavy ammonia (NH<sub>3</sub>) from grazers. In the English Nature report 706 (2006), the authors state very clearly that *A. repens* is 'tolerant of nitrogen and salt levels which are somewhat higher than usual in inland unimproved soils'. Additionally, ERM has discussed these issues with Camilla Lambrick, one of the authors of the EN Research Report, and member of the Oxford Rare Plant Group. She confirmed that the *A. repens* is nitrogen tolerant; and in her

<sup>(1)</sup> Burmeier S & Jensen K, 2009, Experimental Ecology and Habitats Specificity of the Endangered Plant *Apium repens* (Jacq.) Lag. at the northern end of its range. *Plant Ecology and Diversity* 2:1 65-75.

<sup>(2)</sup> McDonald AW & Lambrick CR 2006. *Apium repens* creeping marshwort. Species Recovery Programme 1995-2005. English Nature Reports, No 706.

opinion, overshadowing from nitrophillic plants (competitive, nitrogen loving species) would not occur on the site if current grazing and flooding continued to suppress vegetation growth.

2.32 Based on this evidence, I conclude that the additional airborne concentrations of NO<sub>x</sub> and the additional nitrogen deposition predicted to result from operation of the Chilterns Railway Scheme will not adversely affect the integrity of or the qualifying interests in the Oxford Meadows SAC.

2.33 Whilst my view is that the impacts of airborne and deposited nitrogen are not expected to result in adverse effects on the SAC, a precautionary approach was agreed with NE at the time of the ES. The approach comprised a monitoring regime to detect any changes, which included sampling of the soil and vegetation, and monitoring of the air quality. The need for and type of any mitigation measures would then be based on the findings of the surveys, and largely focused around habitat management measures including changes to grazing, mowing and targeted removal of unfavourable species. In the ES it was stated that the details of the air pollutant and habitat monitoring regime would be agreed with NE as part of a planning condition. However, since then, substantial practical difficulties associated with implementing such a strategy have come to light, as the implementation would require agreement to be reached with all parties with interests at Port Meadows. Given the multiplicity of interests there, this may not be possible.

2.34 At the time of the ES and since its submission, CR has given detailed consideration to options for reducing emissions at source, but I can confirm that none is achievable as part of the Order Scheme. The success of the Order Scheme depends on the increased level of service as described in the respective evidence of Mr Dave (CRCL/P/2/P) and Mr Eyles (CRCL/P/5/P), and hence reducing the number of trains is not an option. There are also no plans to operate electric trains on this line in the foreseeable future and provision for this does not form part of the Order application. The Order Scheme design does, however, include passive measures to allow for future electrification where these can be accommodated. The Order Scheme will utilise existing rolling stock and there are currently no catalytic converters that can be retrospectively fitted to trains.

2.35 The Order application is for a scheme that will have a lifetime measured in decades. In the longer term, it is very reasonable to suppose that emissions of NO<sub>x</sub> from trains using the line, and emissions from other sources in the area, will be much lower than they are today.

*Direct Damage/Disturbance*

2.36 The ES reported a loss of 13m<sup>2</sup> from the margins of the Oxford Meadows SAC due to the creation of a bridge link to maintain access into the allotments north of Aristotle Lane.

2.37 The Chiltern Railways' team met on site with NE in early June 2010 to discuss the bridge link into the allotments. NE requested that the detailed bridge option be designed to maintain the existing access of cattle to the area, to avoid altering the current habitat management. A workable design for the bridge link which maintained sufficient clearance for cattle has not proved possible. Alternative options to the bridge have been discussed with NE, which entails raising the height of the existing footpath, by a maximum of

500mm. The footpath could be raised within the footprint of the existing bare earth path, thereby avoiding the permanent loss of habitat from within the Oxford Meadows SAC that was described in the ES.

- 2.38 There will be a need for a temporary works site of 140sq. metres. This will be located immediately north of the section of footpath to be raised, as this location comprises the least sensitive area ecologically adjacent to the footpath. A geotextile (or similar) will be laid over the existing habitat to reduce the risk of damage to it during the construction period of approximately two months. The works area will only be used for dry storage, and no substances which could cause pollution to the SAC habitats will be stored there. It has been agreed with NE that the raised footpath option will not affect the integrity of the SAC. Under the terms of the proposed planning conditions, all construction activities undertaken within or adjacent to the SAC will be undertaken in accordance with a Method Statement agreed with the local planning authority and NE prior to the start of works. Best working practises will be employed. Natural England's views on the two alternative designs for raising the footpath are awaited.
- 2.39 The Habitat Regulations Screening Assessment (see Annex F1 to the ES) remains valid and my evidence concludes that the potential impacts from the Order Scheme will not affect the integrity of the SAC.

#### *DESIGNATED SITES - SSSIs*

##### *Wendlebury Meads and Mansmoor Closes SSSI*

###### *Description*

- 2.40 This SSSI extends to 73.2 hectares and is designated for unimproved neutral meadows, calcareous grassland and wet grassland habitats. The citation for the site <sup>(1)</sup> states that '*Wendlebury Meads consists of a series of traditionally-managed unimproved neutral meadows supporting a complex variety of plant communities that have developed in response to varying management, drainage and soils. The measures are amongst the few surviving examples of calcareous clay pasture communities which were widespread throughout southern England at the turn of the century, but now rare owing to agricultural improvement and urbanisation.*' The site is considered by Natural England (August 2010) to be in favourable condition <sup>(2)</sup>.
- 2.41 The specific communities present on the site are UKBAP Priority Habitats, MG5 (*Cynosurus cristatus* - *Centaurea nigra* grassland) and MG4 (*Alopecurus pratensis* - *Sanguisorba officinalis* grassland). These communities are found throughout the SSSI. The SSSI is divided into eight units for the purposes of management and land ownership. Condition Assessments carried out on the SSSI by ERM in 2010 confirmed that a majority of the SSSI is in favourable condition. Many of the units on the site are managed as hay meadows and as such adopt a regime that includes a late summer cut and autumn grazing. However, some of the units on the SSSI are not appropriately managed, including summer grazing which is not an appropriate form of management for a MG5 (*Cynosurus cristatus* - *Centaurea nigra* grassland) and MG4

<sup>(1)</sup> [http://www.english-nature.org.uk/Special/sssi/sssi\\_details.cfm?sssi\\_id=1001141](http://www.english-nature.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1001141)

<sup>(2)</sup> <http://www.english-nature.org.uk/Special/sssi/reportAction.cfm?report=sdrt13&category=S&reference=1001141>

(*Alopecurus pratensis* - *Sanguisorba officinalis* grassland) community, and as such these units are in unfavourable condition. In addition, there are units on the SSSI that are MG7 (*Lolium perenne* leys) which is not a UKBAP habitat and is very species poor community type, but forms part of the SSSI as a whole unit.

#### *Potential Air Quality Impacts*

- 2.42 Potential impacts from increased nitrogen on the site include a decline in species richness and an increase in grass species that are more tolerant of higher nitrogen levels. Other potential impacts include an increase in unfavourable species, including invasive species that are associated with higher nitrogen levels.
- 2.43 This designated site is predicted to experience the largest air pollution impacts as a result of the Order Scheme. This is because, unlike alongside Oxford Meadows, the line at this point will accommodate a much larger percentage increase in the number of trains. The additional NO<sub>x</sub> concentration at the most affected part of the site is predicted to be 11.5 µg m<sup>-3</sup>, as reported in the ES. The additional nitrogen deposition rate is, however, relatively small in comparison with the critical load for this habitat and the total deposition rate for nitrogen (including the background) is predicted to be 25 kg N ha<sup>-1</sup> year<sup>-1</sup>, which is in the middle of the estimated range for the critical load of 20-30 kg N ha<sup>-1</sup> year<sup>-1</sup>.
- 2.44 As described above, the SSSI is largely in favourable condition. The different management regimes adopted on the site highlight the sensitivities that the communities have to inappropriate management, and that livestock is currently the largest contributor to aerial nitrogen deposition from high ammonia (NH<sub>3</sub>) concentrations and deposition of ammonium compounds. As described above, current NO<sub>x</sub> concentrations and nitrogen deposition rates in the vicinity of the SSSI are currently influenced by livestock, and also by transport contributions, including both the current railway that runs through the centre of the site and the M40 which is located along the north eastern edge of the site.
- 2.45 Botanical survey work undertaken in 2009 and 2010 has established that the current nitrogen levels/ loads from transport sources have not had a significant impact on the SSSI, as the units on the site closest to both the railway and M40 (where NO<sub>x</sub> concentrations and nitrogen deposition rates are at their highest levels) are currently in favourable condition and there is no indication of a reduction of species richness or an increased presence of negative plant species, even at the very edge of the site where the site sits immediately next to the motorway.
- 2.46 Additionally, the aim of the Order Scheme is to promote sustainable transport links in the region and it will provide an alternative travel option to the M40 which is a significant source of NO<sub>x</sub> and contributor to nitrogen deposition. In future years, this source of nitrogen could diminish, as vehicles continue to improve in their environmental performance.

#### *Direct Damage/Disturbance*

- 2.47 Under the proposals in the TWA Order application, Holts Farm, Beebont, Home Farm and Manor Farm crossings will be closed and replaced by a

bridge to the south west of Holts Farm. The disused Lane Crossing will also be closed. To ensure that access for landowners is accommodated, a hardened access track is required alongside the railway along the edge of the SSSI from Beebont Crossing to Home Farm Crossing. Details of these proposals are set out in Appendix ASC4.

- 2.48 This will result in the permanent loss of approximately 675 sq. metres of the SSSI. Mitigation for this loss of SSSI habitat includes restoring 1,450 sq.m of land, which is currently under an existing farm building and hard-standing. The farm building would be relocated and the land would be returned to pasture and seeded with plant species drawn from the adjacent part of the SSSI. The relocation of the building and access provision are essential for the continued effective management of the SSSI. Other works as set out in Appendix ASC4 are required outside the SSSI.
- 2.49 Given the small scale of these works, there is no need for detailed on site investigation of the hydrology or hydro-geology. Based on our desk top study and site visits, we are satisfied that the accommodation works can have no measurable adverse impacts on the hydrology of the SSSI and will, in consequence, have no impact on the plant communities.
- 2.50 Under the terms of the proposed planning conditions, all construction activities undertaken within or adjacent to the SSSI will be undertaken in accordance with a Method Statement agreed with the local planning authority and NE prior to the start of works. Best working practises will be employed to ensure that there are no pollution incidents or ground water contamination. With these mitigation measures in place no significant impact is predicted.

#### *Hook Meadows and Trap Grounds SSSI*

##### *Description*

- 2.51 This SSSI extends to 11.3 hectares, and is designated as a series of unimproved neutral meadows containing a wide range of species associated with grasslands. The citation for the site <sup>(1)</sup> describes it as '*a series of unimproved neutral meadows of a type which were widespread in southern England at the turn of the century, but have become increasingly rare following agricultural improvement and intensification. They contain a wide range of plant species typically associated with grasslands which have received traditional management without ploughing, reseeding or the application of fertilisers or herbicides. Individual differences in the flora are attributable to variations in management (usage for hay or summer grazing), the extent of ground waterlogging and changes in soil.*' The site is divided up into two units for management purposes. Unit 1 is considered by Natural England (August 2010) to be in unfavourable condition (no change) and Unit 2 is considered to be in unfavourable condition (recovering).
- 2.52 Botanical surveys carried out on the site by ERM in June 2010 confirmed that the site is in largely unfavourable condition. The condition of the site reflects the lack of regular management on the site, with only occasional cattle grazing on the SSSI. The NVC community MG4 (*Alopecurus pratensis* - *Sanguisorba officinalis*) grassland is present within the north western section of the site (the

<sup>(1)</sup> [http://www.english-nature.org.uk/citation/citation\\_photo/1002183.pdf](http://www.english-nature.org.uk/citation/citation_photo/1002183.pdf)

section that is located on the western side of the railway). The NVC community within the north-eastern section of the SSSI, where the largest section of the site is located, is MG1 (*Arrhenatherum elatius* grassland); and at the southern end of the site it is S7 (*Carex acutiformis* swamp), with varying grades of the two communities through the centre of the site.

- 2.53 Condition Assessments carried out on the site by ERM in June 2010 found that the MG4 community to the north-west of the SSSI was the only section on the site that was in favourable condition. Whilst the MG1 (*Arrhenatherum elatius* grassland) and S7 (*Carex acutiformis* swamp) were relatively species rich, they did not fit into one of the UKBAP communities therefore condition assessments were not carried out on these communities.

#### *Potential Air Quality Impacts*

- 2.54 The ES reports that the Order Scheme contribution to NO<sub>x</sub> concentrations at the most affected part of this designated site will be 8 µg m<sup>-3</sup> and the contribution to nitrogen deposition rate will be 1 kg N ha<sup>-1</sup> year<sup>-1</sup>. In fact, this is a very pessimistic view of the impact on the whole site, where the additional concentrations and deposition rates are likely to be much lower. The values given in the ES are for the part of the site immediately adjacent to the railway line. Even at this deposition rate, the total deposition rate for nitrogen (ie in addition to the background) is only 22.5 kg N ha<sup>-1</sup> year<sup>-1</sup>, which at the lower end of the range given for the critical load for this habitat of 20 – 30 kg N ha<sup>-1</sup> year<sup>-1</sup>.

- 2.55 Impacts on the SSSI as a result of the increased level of NO<sub>x</sub> concentrations brought about by the Order Scheme are not predicted to have a significant effect on the qualifying features on the site because the areas of favourable habitat, located to the north west of the site, are not immediately adjacent to the railway corridor. Therefore in those areas a majority of the NO<sub>x</sub> will be reduced to a maximum of 4 µg m<sup>-3</sup> and at this level is not predicted to influence the communities on the site. The sections of the site that are currently in unfavourable condition, to the east of the railway, are in unfavourable condition due to lack of regular management and due to a change in hydrological conditions on the site as a result of a leak in the neighbouring Oxford Canal. This has resulted in a change in the plant communities present on the site. The likely increase in nitrogen deposition does not result in a total deposition that exceeds the upper end of the critical load range for the site, and not considered to be significant in comparison to these other influencing factors.

#### *Direct Damage/Disturbance*

- 2.56 There will be no direct land take from the Hook Meadows and Trap Grounds SSSI. Construction activities within the vicinity are limited to the construction of the new railway line within the boundary of the current railway corridor. Under the terms of the proposed planning conditions, all construction activities undertaken within 500 m of an SSSI will be undertaken in accordance with a Method Statement agreed with the local planning authority and NE prior to the start of works. This will include maintaining a buffer between the construction works and the site, and adhering to best work practise to ensure that there are no pollution incidents or ground water contamination. With these mitigation measures in place no significant adverse effect on the integrity of the SSSI is predicted.

*NON-STATUTORY DESIGNATED SITES – GAVRAY MEADOWS AND WENDLEBURY PONDS*

- 2.57 The ES reported residual impacts on two non-statutory designated sites, Gavray Meadows Country Wildlife Site (CWS) and Wendlebury Ponds CWS. Since the ES was submitted BBOWT has informed us that Wendlebury Ponds has been de-designated, and is no longer a CWS.
- 2.58 The ES reported that approximately 1.8 ha of the Gavray Meadows CWS will be lost to accommodate the Bicester Chord Line. Since the submission of the Order application, a Landscape and Ecology Enhancement Strategy has been developed to mitigate the ecological effects on the CWS, by enhancing an area of the existing CWS which lies immediately east of Charbridge Lane, and which is to be acquired as part of the Order to provide replacement open space. This strategy (see Mr Gilder’s evidence, Appendix IMG 13), has been issued to Berkshire, Buckinghamshire and Oxford Wildlife Trust (BBOWT) for consultation (see Section 3 of my evidence). Implementation of the strategy will maintain and enhance the existing habitats and create additional habitat for amphibians and reptiles, and create a new breeding pond to encourage amphibians including great crested newts.

*PROTECTED SPECIES*

*PROTECTED SPECIES LICENSING*

- 2.59 Any disturbance to European Protected Species (EPS) can only be undertaken in accordance with the licences, and the conditions they contain, which will be issued by NE to comply with the provisions of The Conservation of Habitats and Species Regulations, 2010 (CD/ 5.30). Badgers are subject to separate licensing under the Protection of Badgers Act, 1992 (CD/5.8) but will also be issued by NE.
- 2.60 EPS licences can only be approved once permission for the Order Scheme has been granted (ie the Order has been made). Applications for these licences are already being prepared in accordance with best practice, so that they can be granted concurrently with the TWA Order. This must not be seen as pre-empting the outcome of the Inquiry, rather as the Scheme Promoter providing further information to NE who will ultimately determine the licence application concurrently with the determination of the TWA application. If the Order Scheme is approved it will also allow the licences to be issued more quickly than would otherwise have been the case.
- 2.61 The licence applications draw extensively on the information which has been presented in the relevant mitigation plans that form part of the Core Documents or are attached to my evidence.
- 2.62 In order for a licence to be granted, NE has to be satisfied that the three tests under the Regulations <sup>(1)</sup> can be met. These are:

<sup>(1)</sup> The Conservation of Habitats and Species Regulations 2010.

- that the licence is for the purposes of “*preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment*”;
- “*that there is no satisfactory alternative*”;
- “*that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range*”.

The need for the Order Scheme and the lack of any satisfactory alternatives, have been described in the evidence given by Allan Dare [CRCL/2/A].

2.63 The evidence that the third test of maintaining favourable conservation status of bats and great crested newts can be met is contained in the respective mitigation plans. The information in these plans will form the basis for the licence application to NE, and include the detailed measures that will be implemented and may form conditions attached to the licence.

2.64 The badger mitigation plan has been issued to NE for consultation, and the details within the plan will form the basis for the licence application.

2.65 These plans are being agreed with NE and there is every likelihood that the licences will be granted.

2.66 I will now explain how the Order Scheme will affect the protected species identified including bats, great crested newts, reptiles and badgers.

#### *Bats*

2.67 The ES presented the findings of bat surveys undertaken in 2009. The findings of the surveys concluded that a possible Bechstein’s bat (protected under Annex II and IV of the EC Habitat and Species Directive) was recorded on the Anabat recording device, and potentially swarming around/ within the tunnel. Since the ES was completed scientific advances in bat call analysis has established that bat call analysis of *Myotis* species, and especially for Bechstein’s bats, cannot be relied upon to distinguish the individual species. Therefore Bechstein’s bats cannot be confirmed as using the tunnel during the 2009 surveys, and I can only confirm that further *Myotis* species were recorded. Furthermore, the ES included measures to mitigate impacts to bats using the tunnel throughout the year. It also referred to the need to undertake additional surveys to help refine the detailed mitigation.

2.68 The findings of winter hibernation surveys confirmed the use of the Wolvercot Tunnel as a hibernation roost and helped inform the draft bat mitigation plan which was published as part of the first ES Addendum (CD/1.22).

2.69 Further surveys in spring (CD/2.27 and 2.28) and summer (see Appendix ASC5), found no spring swarming activity and no evidence of the tunnel being used as a maternity roost site. Hence the mitigation measures for these activities included in the ES and draft mitigation plan are no longer required.

- 2.70 The findings of surveys in autumn 2009 also suggested that small numbers of swarming bats were present at Wolvercot Tunnel. The August and September 2010 mist netting surveys found no evidence of bat swarming activity; and subsequent Anabat analysis found only occasional nights with increased social calls, suggesting that there is either only a small number of individual *Myotis* bats using the tunnel to swarm or that the increased activity was influenced by prevailing weather conditions on those nights. In addition, the Anabat results found that the tunnel is also used as a lekking site (a site used by males to call females to their harem (a temporary roost site)) by a small number of common and soprano pipistrelles.
- 2.71 The autumn survey findings also found that bats are commuting through the tunnel and foraging within it and along the railway corridor. Bats were also observed roosting in holes and crevices within the tunnel. The survey and Anabat results suggest that the peak roosting period is in mid-September with a maximum of 14 *Myotis* bats, four common pipistrelle and one soprano pipistrelle recorded. The Anabat analysis confirmed that *Myotis* bats are using the tunnel to commute; the majority of these species passes were recorded during the middle of the night, therefore suggesting that they were not using the tunnel to roost in. As well as common *Myotis* species, during the mist netting survey one bat was caught which was identified as either a Whiskered, Brandt's or Alcatheo bat (all vulnerable bat species in the UK).
- 2.72 In addition, a single Barbastelle bat (Annex II and IV of the EC Habitat and Species Directive) recording was found on the Anabat in August 2010. This species is also considered to show use of the tunnel for commuting and foraging, rather than roosting as Barbastelle bats have a known preference for tree roosts.
- 2.73 Given the large number of bats that use the tunnel to commute and forage, and the amount of artificial lighting in surrounding areas, the surveys have confirmed that the railway corridor is an important corridor for bats.
- 2.74 The findings of the recent surveys indicate that there is no longer a requirement for an artificial hibernaculum adjacent to the tunnel (described in the first ES Addendum (CD/1.22)). It is instead proposed to retain the current features in the tunnel and create additional deep roosting opportunities for bats within the tunnel by creating artificial 'voids'. It was also proposed in the draft Bat Mitigation Plan to use some deterrent lighting/noise sources to discourage bats from swarming at the tunnel entrance. As swarming is thought to occur, but at most, only by a very low number of *Myotis* bats, this measure is no longer considered necessary.
- 2.75 There will be a requirement for core sampling work to be undertaken within the tunnel to inform the detailed construction work. The works will be undertaken in a manner which does not affect bats, and hence will not require a licence.
- 2.76 A bat mitigation plan is being developed in consultation with NE to ensure that the favourable conservation status of bat species is maintained.

## *Great Crested Newts*

- 2.77 The assessment in the ES was based on the likelihood of the Order Scheme causing no loss of breeding ponds for great crested newts, but temporary and permanent loss of great crested newt terrestrial habitat. Further consideration of the Order Scheme construction has found that two waterbodies will be lost in addition to the loss of habitat. These waterbodies contain a low-medium great crested newt population. The waterbodies contain one ditch which runs along the side of the railway embankment (west of the Water Eaton crossing), and an existing pond south west of Islip. These waterbodies support low-medium great crested newt populations. They will be lost during the construction of the Order Scheme.
- 2.78 Following consultation with Natural England a Draft Great Crested Newt Mitigation Plan was produced (see Appendix ASC6) and is currently with Natural England for comment.
- 2.79 Mitigation detailed in the Plan includes measures to off-set the temporary loss of the waterbodies and permanent and temporary loss of the terrestrial habitat. Mitigation for the loss of the waterbodies will include the creation of two waterbodies for each one lost. For loss of the ditch habitat, ditches within the Order Scheme boundary, which are currently not suitable for great crested newts will be enhanced to accommodate great crested newts. The loss of the pond south west of Islip will be replaced by two additional ponds; both of which will be located within the same field as the pond to be lost. The exact locations of the new replacement ponds are still to be confirmed but will be located within 250m of the current location of the pond to be lost. Additionally, following the completion of construction, the pond lost during construction will be designed appropriately to allow great crested newts to re-colonise.
- 2.80 Loss of great crested newt terrestrial habitat includes permanent loss due to the provision of railway infrastructure, bridges, the Water Eaton Park and Ride site and minor roads in the Langford Lane area; and temporary loss during the construction of the Order Scheme. As part of the mitigation for the loss of both permanent and temporary terrestrial habitat all soft areas will be sensitively landscaped to provide a mosaic of habitat for great crested newts. Additionally, refugia piles will be placed intermittently along the length of the route to provide additional shelter and hibernation for great crested newts during and post construction.
- 2.81 A great crested newt disturbance licence will be obtained for the works described prior to construction of the Order Scheme, and the mitigation measures detailed in the Draft Great Crested Newt Mitigation Plan (see Appendix ASC6) will be used as a basis for the licence application.

## *Reptiles*

- 2.82 The findings of presence / absence surveys for reptiles were reported in the ES. Three sites where reptiles were recorded were surveyed to determine the size of the reptile populations in April / May 2010. A fourth site, for which access was not available at the time of the ES, was also surveyed. These surveys confirmed that the reptile populations were of local importance, and

that the Order Scheme will have a temporary impact on habitats that are suitable for reptiles.

- 2.83 A mitigation plan has been developed (CD/2.26) and agreed with NE that will include the enhancement of existing reptile habitats within the Network Rail corridor, creation of new habitats, and localised relocation of reptiles from affected areas to land adjacent to the Order Scheme boundary. Where relocation of reptiles in adjacent land is not possible due to unsuitable habitat or lack of access, reptiles will be relocated to a receptor area. The proposed receptor area is land which will be acquired within the Gavray Drive Meadows CWS as replacement open space. A Landscape and Ecology Enhancement Strategy has been drawn up for this land which includes measures to enhance the area for reptiles.

### *Badgers*

- 2.84 The ES reported the presence of badgers within and surrounding the Order Scheme boundary, and the need for new artificial setts to be built to replace setts that could not be retained by the Order Scheme. Additional bait marking studies have been undertaken in March 2010, and the findings have been used to inform a mitigation plan for badgers. Natural England has been consulted on this plan.
- 2.85 The additional bait marking studies in March 2010 have shown that sett closures are required within the territories of eight social groups. Only one of these social groups requires sett closures due to direct impacts of the Order Scheme. The remainder are not within the footprint of the development, and the construction works are not predicted to result in a disturbance level that would require sett closure. However, the tunnels of these setts are located in the railway embankments. There are therefore health and safety risks to retaining setts that tunnel under the railway corridor given the increased service and speed of the operational Order Scheme. The required sett closures and creation of new artificial setts will be carried out under a sett interference licence from NE and in accordance with the conditions of that licence. Given our consultations and agreement with NE, I believe that an interference licence will be approved from NE.
- 2.86 No significant impacts are predicted as a result of fragmentation of territory boundaries from the increased service and speed. Badgers currently cross the railway and fragmentation from the existing railway is not evident. The locations of new artificial setts will be in good foraging areas within the territories of the relevant social groups, but they will also be sufficiently distant from the line to reduce the reliance of the badgers on the trackside habitat. This will also allow the badgers to continue to forage whilst acclimatising to the increased train movements. The Order Scheme will also result in a lower service during the night when badgers are more active compared with the day time.
- 2.87 Another potential impact from the Order Scheme is an increase in badger mortality as a result of collision with trains. A number of mitigation options have been considered to reduce this risk. Consideration has been given to installing badger tunnels to facilitate crossings, but it is not practical to install badger proof fencing, along the length of the track due to the distances

involved. In addition, if fencing were employed, a badger might get access to the wrong side of the fencing, in effect trapping the animal between two fences adjacent to the tracks. The risk of mortality would increase while the stressed animal attempted to escape from between the fencing. Installation of fencing would sever commuting routes and therefore potentially result in increases to territory fragmentation.

- 2.88 Mitigation for the identified potential increases in mortality will instead be implemented through careful consideration of the placement of the proposed artificial main setts.
- 2.89 The new main setts will be constructed at suitable, secure locations which are located as far from the railway line and proposed working area as possible while still within the territory of the badger Social Group. This increase in distance is likely to reduce badger track crossings and therefore potential fatalities due to the following factors:
- badger activity is centralised around main setts, so relocating the setts will relocate the foci of activity away from the tracks;
  - social activity at emergence time, including grooming, dragging of bedding and play, which occurs in close proximity to the main sett will be removed from the trackside location; and
  - females with cubs forage close to their setts to enable regular trips back for suckling and once above ground cubs do not move far from sett after emergence (Brown J. A., 1993); so for a number of months each spring, activity and crossing of tracks by suckling females and young cubs will be reduced by relocation of main setts away from track.
- 2.90 A long term increase in mortality is considered unlikely given greater separation of the main setts from the trackside. There is not considered to be any significant effect in terms of badger territory fragmentation or increased mortality.
- In addition, the revised route at Langford Lane, detailed in the Second ES Addendum (CD/1.22/1), includes the re-route of minor roads in the Langford Lane area. This is not predicted to have any additional impacts to badgers, to that described in the ES.
- 2.91 I have set out the procedure which Chiltern Railways is following in order to secure the necessary Protected Species Licences, including agreeing mitigation plans with NE. Licence applications will be made in the near future, so that NE can consider them now, discuss the issues further and then they can be granted concurrently with the TWA Order.

## SUMMARY OF RESIDUAL IMPACTS OF THE ORDER SCHEME

### *DESIGNATED SITES*

#### *Oxford Meadows SAC*

- 2.92 Based on the evidence provided in my evidence and the documents referenced, I conclude that the additional airborne concentrations of NO<sub>x</sub> and the additional nitrogen deposition predicted to result from operation of the Chilterns Railway Scheme will not adversely affect the integrity of or the qualifying interests in the Oxford Meadows SAC. Direct impacts on Oxford Meadows SAC have been minimised by proposals to raise the height of the footpath rather than construct a new footbridge. The approach to construction of the raised footpath and appropriate mitigation has been developed in consultation with NE and will not affect the integrity of the SAC.

#### *Wendlebury Meads and Mansmoor Closes SSSI*

- 2.93 The additional nitrogen deposition rate predicted to result from the Order Scheme is relatively small in comparison with the critical load for this habitat. Botanical survey work has established that the current nitrogen levels/ loads from transport sources have not had a significant impact on the SSSI, as the units on the site closest to both the railway and M40 (where NO<sub>x</sub> concentrations and nitrogen deposition rates are at their highest levels) are currently in favourable condition. The increase in nitrogen deposition is therefore not anticipated to affect the integrity of the SSSI.

- 2.94 Construction of a new access track will result in a loss of approximately 675 sq. metres SSSI habitat. However, mitigation measures developed in consultation with NE will result in an overall gain in the habitats of interest and the access track will ensure that access for management of the SSSI is secured. There will be no measurable adverse impacts on the hydrology of the SSSI and therefore no material impact on the plant communities present on the site. The Order Scheme is not anticipated to result in an adverse effect on the integrity of the SSSI.

#### *Hook Meadows and Trap Grounds SSSI*

- 2.95 This site is in largely unfavourable condition as a result of lack of regular management and changes in hydrology on the site. The total deposition rate for nitrogen (ie in addition to the background) is within the range given for the critical load for this habitat. Therefore, increases in NO<sub>x</sub> concentrations are predicted to have an insignificant impact in comparison to the current influencing factors on the site.

- 2.96 There will be no direct land take from the Hook Meadows and Trap Grounds SSSI. Construction activities within the vicinity are limited and will be undertaken in accordance with a Method Statement agreed with the local planning authority and NE prior to *the start of works*. With these mitigation measures in place no significant impact on the SSSI is predicted.

#### *Gavray Meadows and Wendlebury Ponds CWS*

- 2.97 Approximately 1.8 ha of the Gavray Meadows CWS will be lost to accommodate the Bicester Chord Line. A Landscape and Ecology Enhancement Strategy has been developed to mitigate this impact and to enhance the site in the long term.

## ***PROTECTED SPECIES***

### *Bats*

- 2.98 Bats have been recorded commuting through Wolvercot tunnel and foraging and within and surrounding the railway corridor. Bats also roost in holes and crevices within the tunnel. There are potential impacts from the modifications to the tunnel that are required during construction and an increase in train frequency during operation. A bat mitigation plan is being developed in consultation with NE to ensure that the favourable conservation status of bat species is maintained.

### *Great Crested Newts*

- 2.99 The Order Scheme will result in the loss of two waterbodies and some permanent and temporary loss of terrestrial habitat. A Draft Great Crested Newt Mitigation Plan is being developed in consultation with NE to ensure that the favourable conservation status of this species is maintained. See *Annex E*. Prior to construction a great crested newt licence will be obtained which will set licence conditions to ensure that the works do not significantly disturb or harm this species.

### *Reptiles*

- 2.100 A reptile mitigation plan has been developed (CD/2.26) and agreed with NE that will include the enhancement of existing reptile habitats within the Network Rail corridor, creation of new habitats, and localised relocation of reptiles from affected areas to land adjacent to the Order Scheme boundary. Implementation of the plan will ensure that there are not any significant adverse impacts on reptiles.

### *Badgers*

- 2.101 Where badger setts require to be relocated, artificial setts will be provided within the appropriate territory and the existing setts closed under licence from NE. A badger mitigation plan is being developed in consultation with NE to ensure that this species gets adequate protection from the Order Scheme during construction and operation. Disturbance licences will be obtained where necessary and all the licence conditions adhered to. Therefore construction and operational impacts are not predicted to significantly adversely affect the local badger population.

### 3 OBJECTIONS RAISED IN RELATION TO ECOLOGY

#### NATURAL ENGLAND (OBJ/246)

- 3.1 Natural England has objected to the Order Scheme on the following grounds:
- The applicant has not submitted sufficient information to enable the competent authority to undertake a complete Appropriate Assessment of the Oxford Meadows SAC.
  - Habitat loss from the SAC due to a bridge link for access to the allotments.
  - Potential impacts on the SAC and SSSI from access across Port Meadows to the allotments.
  - The effects on the SAC and SSSIs from air emissions as a result in an increase in the number of trains.
  - Potential impacts on Wendlebury Meads and Mansmoor Closes SSSI.
  - Potential impacts on bats that roost and swarm at Wolvercot Tunnel as a result of an increased number and speed of trains.
- 3.2 I have already addressed all of these issues in my evidence therefore I do not propose to revisit these matters.

#### BBOWT (OBJ/211)

- 3.3 BBOWT has objected to the Order Scheme on the following grounds:
- Land-take from SAC for the bridge ramp at Aristotle Lane
  - Hydrological impacts on the SAC and SSSIs
  - Further detail on impacts and mitigation from increased air emissions from the Order Scheme on the SAC and SSSI
  - Further information on mitigation plans for bats, great crested newts and bats
  - Access to Woodsides Meadow Meadow Nature Reserve SSSI
  - Further clarity on impact to Gavray Drive CWS
  - Increased mitigation for Wendlebury Ponds
  - Further information on proposed impacts and mitigation on *Thecla betulae* (Brown hairstreak) and *Tolypella intricata* (tassel stonewort).
- 3.4 I have already addressed the first four of these issues in my evidence, therefore I do not propose to revisit these matters further. I will however address the latter four issues that are not covered elsewhere in my evidence.
- 3.5 I can also confirm that Chiltern Railways is committed to addressing concerns raised by BBOWT, and is currently seeking BBOWT's agreement to suggested solutions. I will take each matter in turn.
- 3.6 Chiltern Railways has confirmed that it intends to grant a right of access to BBOWT to maintain access to their Woodside Meadow Reserve. This will be achieved via the replacement Holts Farm Bridge and the Bridleway to the edge of the Woodside Meadow Reserve, as described in Appendix ASC4 (Holts farm).

- 3.7 Clarification has been provided to BBOWT about the effects of the Order Scheme on the Gavray Drive County Wildlife Site (CWS). The landtake due to the Order Scheme has been confirmed as 14.5% of the site, this includes 11.8% for the proposed Landscape and Habitat Management Plan (See Mr Gilder's evidence, Appendix IMG 13) and 2.7% for land-take for the Scheme that runs along the northern boundary of the CWS (this includes 8,480 sq metres; 3,984 sq metres of permanent land-take and 4,496 sq metres of temporary land take). The Landscape and Ecology Enhancement Strategy for Gavray Drive Meadows CWS, has been developed for the land to the east of Charbridge Lane which contains measures to enhance the ecological value of the area, whilst managing the increased recreational pressure which is envisaged in this location. In particular the Strategy includes enhancement measures for reptiles and great crested newts, and brown hairstreak butterfly (a priority Biodiversity Action Plan (BAP) species).
- 3.8 In their objection letter, BBOWT informed us that the Wendlebury Ponds CWS was de-designated in 2009. Despite this I can confirm that the Order Scheme proposals will still include measures to enhance the wet woodland habitat of this former CWS, and in doing so seek to assist in regaining some of the value at the site which has been lost.
- 3.9 The assessment in the ES did not include reference to *Tolypella intricata* (tassel stonewort), a priority BAP species, at Wendlebury within the bridleway that leads off Mansmoor Lane to the level crossing. The assessment assumed that the track was not to be hardened and hence the *Tolypella intricata* was not going to be affected. This matter is addressed in para of Appendix ASC4 (Holts Farm) the most appropriate mitigation to maintain the *Tolypella* population will be discussed further with BBOWT, taking into account advice stonewort specialists.

#### **CPRE OXFORDSHIRE BRANCH (OBJ/195)**

- 3.10 In paragraph 3.28 of CPRE Oxfordshire Branch Statement of Case, they note that the Environmental Statement has gone to considerable lengths to appraise impacts on natural habitats, archaeology and cultural heritage thoroughly. They note the proximity of the line to Oxford Meadows SAC and presume that Natural England will make a full appraisal of the potential impacts.
- 3.11 As described earlier in my evidence, Natural England raised the issues regarding the potential impacts of the Order Scheme on Oxford Meadows SAC in their Statement of Case. We have since undertaken further assessment in discussion with NE and, as I set out in this evidence, have concluded that the Order Scheme will not result in any adverse impacts on the Oxford Meadows SAC.

#### **GOSFORD & WATER EATON PARISH COUNCIL (OBJ/033)**

- 3.12 Section 17 of Gosford and Water Eaton Parish Council's objection relates to the demolition of Water Eaton Grain Silo and the effects of that on wildlife. They explain that since the grain silo was closed in 2000, the silo and separate outbuilding is used by nesting birds, in particular swallows. The Parish Council '*wish for a conservation project to be actioned in accordance*

*with the Wildlife & Countryside legislation to help support swallows and other summer nesting visitors.'*

- 3.13 Swallows migrate from Africa to the UK to spend the summer here (March to October). Swallows and their nests are fully protected under the *Wildlife and Countryside Act 1981* as amended (CD/5.15), which makes it an offence to intentionally kill, injure or take any wild bird. It is an offence to intentionally take, damage or destroy the eggs, young or nest of a swallow whilst it is being built or in use. They are categorised as a Species of European Conservation Concern, so have been given Amber status under the 2009 UK birds of Conservation Concern (Eaton *et al.*, 2009) <sup>(1)</sup>.
- 3.14 The Water Eaton Grain Silo will be demolished between November and February to prevent impacts on swallows. Provision of suitable nesting opportunities will be provided in the station buildings to be constructed on this site.

#### **THE NORMAN TRUST (OBJ/192)**

- 3.15 In the objection letter from the Norman Trust at Point 4, they request further information on potential impacts on marsh fritillary butterfly, given that the Order Scheme has direct impacts on the Gavray Drive County Wildlife Site (CWS).
- 3.16 A record search for protected and UK Biodiversity Action Plan invertebrates within 500 m of the Order Scheme boundary only found a record for brown hairstreak butterfly, a UK BAP species, recorded within Gavray Drive CWS. The site citation mentions the presence of butterflies including large skipper, ringlet, common blue, small heath and marbled white; marsh fritillary is not noted to occur on the site.
- 3.17 We fully recognise the local importance of the site for wildlife as discussed above in relation to the BBOWT objection. The total loss for Order Scheme development from the CWS will be minimal at 2.7% this includes 8,480 sq metres in total; 3,984 sq metres of permanent land-take and 4,496 sq metres of temporary land take. Compensation for the loss of land from the CWS for the Order Scheme proposals will be integrated into the proposals for the 'replacement right of way land'. It is proposed that compensation will include both habitat management and creation within the eastern section of the CWS; which is currently unmanaged. A Landscape and Ecology Enhancement Strategy (see Mr Gilder's evidence, Appendix IMG 13) has been developed for the land to the east of Charbridge Lane which contains measures to enhance the ecological value of the area, whilst managing the increased recreational pressure which is envisaged in this location. In particular the Strategy includes enhancement measures for reptiles and great crested newts, and brown hairstreak butterfly (a priority Biodiversity Action Plan (BAP) species). This strategy has been developed in consultation with BBOWT. The Enhancement Strategy is being developed to tie in with the mitigation and enhancement measures that are part of the adjacent proposed residential development.

(1) Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD (2009) *Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man*. British Birds 102, pp296-341.

**MR PAUL MILLER (OBJ/241)**

- 3.18 Mr Miller's objection is primarily in relation to impacts on Wendlebury Meads SSSI and access to it.
- 3.19 These issues have been addressed earlier in my evidence and Appendix ASC4 - *Accommodation works at Holts Farm Bridge and Potential Impacts on Wendlebury Meads SSSI*).

## 4 CONCLUSIONS

- 4.1 The information provided in my evidence and the documents referenced demonstrate that the assessments conducted in relation to protected sites and species are robust and provide sufficient information to enable the Inspector to make a judgement on the likely significant effects of the Order Scheme on them.
- 4.2 Chiltern Railways is committed to protecting the natural environment as far as possible whilst delivering the proposed Order Scheme. To that end, they have engaged with Natural England and BBOWT throughout the impact assessment process and are developing mitigation and enhancement plans which seek to mitigate adverse ecological impacts and provide long term enhancement of ecological interests.
- 4.3 Where potential adverse effects on European protected species are predicted, all the evidence indicates that, applying the relevant statutory tests set out in the Habitats Regulations 2010, licences to disturb these species in a controlled way will be obtained from NE subject to appropriate mitigation being provided for and all licence conditions adhered to.
- 4.4 I have addressed Matters 7, 8 (a) to (d) and 10 (e) from the Statement of Matters. The Secretary of State can be confident that the mitigation measures being developed with NE are sufficient to protect the integrity of the protected sites and the conservation objectives of the protected species. Discussions continue with NE and others with regard to the withdrawal of their objections; the outcome of which will be confirmed to the Inquiry.