

Former Railway Land at Radstock: Site Re-Development:

**Assessment of the potential impacts of proposed re-development on the
Mells and Bath & Bradford on Avon SACs**

by

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1. The greater horseshoe bat is an endangered species listed on Annex II of the 'Habitats' Directive, brought into UK law by the Conservation (Natural Habitats &c.) Regulations, 1994 (as amended); replaced by Schedule 2 of the Conservation of Habitats and Species Regulations 2010, from 1st April 2010. The Habitat Regulations Directive required that Special Areas for Conservation (SACs) were designated in member states as Natura 2000 sites, in order to conserve certain populations of endangered species and threatened habitats.
2. Greater horseshoe bats are conservation dependent, in the UK, since they are at the extreme limits of their geographic range which is determined by climate and habitat. Essentially horseshoe bats are Mediterranean in origin, and need to forage at intervals through the winter hibernation period. They also selectively forage on a limited range of nocturnal insects, particularly large moths and dung beetles. Finally, they will only forage over habitats that have the right physical structure. This is normally woodland edge adjacent to some grazed pastures. Alternatively, substantial hedgerows which are tall and at least 3 metres wide, can provide suitable foraging habitat if they border grazed pastures, rather than arable land.
3. Mells Valley is a 28.22 ha site in Somerset (SAC EU code UK0012658; Centroid ST657476). Bath and Bradford on Avon is a 107.16 ha site in Bath and North East Somerset and Wiltshire (SAC EU code UK0012584; Centroid ST834688). The Mells Valley Sac is adjacent to the Bath and Bradford on Avon SAC, and the Iford SSSI (0.39 ha; ST802589). Mells is not designated for its Annex 1 habitats, but its semi-natural dry grasslands and scrubland facies on calcareous substrates, plus caves that are not open to the public are qualifying features. The primary reason for its SAC designation is the presence of an Annex II bat species. The SAC supports a significant greater horseshoe bat (*Rhinolophus ferrumequinum*) population, including a large maternity roost and hibernation sites nearby, and other unknown sites forming about 12% of the UK population.

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4. The Bath and Bradford on Avon SAC is not designated for its Annex 1 habitats, nor for any qualifying habitat features. The primary reason for its SAC designation is the presence of two Annex II bat species. As for Mells Valley, this SAC also supports a significantl greater horseshoe bat (*Rhinolophus ferrumequinum*) population, which forms about 15% of the UK population. It includes several maternity roosts and many hibernation sites, mostly located within disused oolitic limestone mines. The second Annex II bat species is the Bechstein's bat (*Myotis bechsteinii*). The Sac contains a number of known hibernation sites for this species, but no known maternity roosts. The Lesser horseshoe bat (*R. hipposideros*) is listed as a qualifying Annex II species for this SAC.
5. The 20 ha Former Railway Land, Radstock site is not part of either SAC, nor the Iford SSSI. However, it lies close to them. Furthermore, the foraging and commuting areas of Annex II bats within a SAC are protected even if they are outside it. Normally only radio-tracking studies are able to determine foraging and commuting routes that are associated with specific nursery roosts. Geoff Billington conducted radio-tracking studies of greater horseshoe bats at the Mells nursery roost in June 2000, and at the Byfield Mine nursery roost, Combe Down in May and August, also in 2000. His results showed that some of the radio-tracked bats foraged close to, but not over, the site.
6. In 2006 and 2011, bat detector surveys were carried out on the proposed development site by two different environmental consultancies (LDA Design in 2006 and Michael Woods Associates in 2011). The 2006 surveys failed to record the presence of either horseshoe bat species. The 2006 study was handicapped by repeated equipment failure and survey abandonment due to poor weather. However, subsequently, bat-detector surveys were conducted by a local resident in 2009 and 2010. Her data showed the existence of a small lesser horseshoe roost just off site, and commuting over parts of the site by both species.
7. The 2011 Michael Woods Associates studies carried out bi-monthly bat-detector surveys from May to September, and checked for bat roosts both on and off site. Their results essentially confirmed the preliminary findings of the local resident and established the use made of the site by the two horseshoe bats. (Bechstein's bats cannot be identified from other Myotis species by bat-detector studies.) This study showed that greater horseshoe bat activity over the site probably involved only one or two bats that mainly commuted through the site along water courses, to and from unknown roosts. On only one occasion was foraging detected over the site. The 2011 study also confirmed the presence and level of use of the off-site lesser horseshoe roost within a rift in the three-channelled Culvert 1. Nine exit counts conducted in 2011 from May to September showed from 1 to 9 bats occupied the roost. Numbers were highest in May and from mid August to early September. Lesser horseshoe bat passes were the fifth most numerous ones recorded by the 11 surveys, despite their calls being relatively weak and highly

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directional compared to those of pipistrelles, serotines and Myotis bats. These bats commuted and foraged over much of the site. It will be the horseshoe bat species that is most affected by the proposed development in the absence of appropriate mitigation.

8. The Michael Woods Associates report's impact assessment concluded that the site was of County value to greater horseshoe bats due to its low site use and rarity. The site was assessed to be of District value to lesser horseshoe bats, despite the greater numbers using the site, and their higher level of dependence on it for foraging.
 9. The loss of the whole site for greater horseshoe bats would have a minimal effect on the large populations known to be present in the two SACs. The number of bats using the site has been shown to be very low, and foraging use was rare. Commuting along the water courses was the main activity recorded, and these routes will be safeguarded by the implementation of the mitigation measures proposed in the Michael Woods Associates report.
 10. The loss of the whole site for lesser horseshoe bats would be much more problematic, since up to 9 bats were shown to use the culvert roost, and bats foraged as well as commuted over the site for significant periods of the summer. They may well also make regular and critical use of the site throughout the winter period, since lesser horseshoe bats are regular winter foragers. This aspect was not studied, and would be much more difficult to carry out. The loss of the site to these bats would have a small impact on the integrity of the Bradford on Avon SAC, which included designation as a qualifying bat species, and the Mells Valley SAC.
 11. Most radio-tracking studies carried out in the late 1990's and 2000's have shown that adult greater horseshoe bats usually travel from 3 to 5 km from maternity roosts to foraging areas. Exceptionally these bats can travel up to 22 km from habitat-stressed maternity roosts. The Mells nursery roost is 6.8 km to the south of the site, and so is well within this range. However, no greater horseshoe bats were recorded foraging over, or very close to the railway site in the 2000 study. Mells bats mainly foraged within the Mells valleys, the Asham Quarry and hedgerows to the south-west of Chantry. Byfield Mine is about 11.5 km from the railway site. Although greater horseshoe bats from Byfield mainly foraged within the Horsecombe and Southstoke valleys to the south of Combe Down, one bat foraged and night-roosted just north-east of Radstock, some 11 km from Byfield, at Writhlington, and another night-roosted at Ammerdown Park. It is possible that one or two similar individuals occasionally commuted across the railway site in 2011, as shown by the Michael Woods Associates study.
 12. Long-term ringing studies have shown that individual greater horseshoe bats use various types of roost throughout their lives. They are born within a nursery or
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maternity roost, and subsequently use up to three types of hibernation roosts (hibernacula) annually. Type 1 hibernacula are usually close to, or even within the nursery roost site, if it is an underground cave or mine system. Clusters of bats, consisting of young of the year, immature bats of both sexes, and mature males in mid winter. Type 2 hibernacula have few young of the year, but clusters of immature bats of both sexes and mature males may occur in mid winter. Type 3 hibernacula are used as mating sites by single mature males which are visited by small groups of mature females in autumn and spring. A viable population needs at least one Type 1, several Type 2 and many Type 3 hibernacula associated with its nursery roost. In addition, night roosts may briefly be occupied whilst foraging if the weather deteriorates. Heavy rain and wind will often force them into using small structures, such as porches or open barns that are unsuitable as day roosts.

13. Greater horseshoe bats from different nursery roosts associate at all types of hibernacula. Genetic interchange occurs at the mating sites where males from other nursery roosts may meet unrelated females and mate with them. Out-breeding is known to be beneficial to the survival of male greater horseshoe bats, so having many Type 3 sites spread over a wide area is beneficial to populations.
 14. Ringing data from greater horseshoe bats collected over many decades show that these bats can travel up to 110 km between their various roosts. Such long distances are rare, and usually permanent. However, individuals can regularly travel to and from roosts that are up to 50 km apart. Ringing and DNA studies currently being undertaken show that genetic interchange occurs among all of the nine nursery roosts that exist within a 50 km radius of Bath. Interchange takes place continuously through either mating at Type 3 hibernacula, or from occasional permanent emigration/immigration movements.
 15. Obstacles to greater horseshoe bat commuting journeys, both long and short, may involve wide roads, including motorways, large bodies of water, and well-lit areas alongside roads or urban developments. Greater horseshoe bats are known to be particularly vulnerable to their impacts around dusk. However, gaps of about 10 to 12 metres in linear features used by these bats around dusk, seem not to be as important as barriers later on in complete darkness. Ringed greater horseshoe bats have travelled from Brockley Stables to a cave near Uley near Stroud, and from Mells to Woodchester, near Stroud. Such journeys involve crossing at least one motorway. Greater horseshoe bats, even young of the year, regularly cross the River Severn to reach important hibernacula in the Forest of Dean from Woodchester Mansion. They seem to cross open water that is at least 150 metres wide, as well as the open areas on either side.
 16. It is advisable to minimise any factor that could delay the emergence of bats around dusk, such as street or other lights, because most insects are available at that time, and delays can adversely impact on bat's energy budgets. However,
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the proposed development should not cause significant harm to lesser horseshoe bats emerging and commuting along the deep water courses if the mitigation proposed in the Michael Woods Associates report is implemented.

17. This assessment, for the reasons reviewed above, concludes that, with the implementation of all of the mitigation proposals, the impact of the proposed development in its entirety will have no significant harmful impacts on greater horseshoe bat populations present in the Mells Valley and Bath and Bradford on Avon SACs, or the Iford SSSI. Since lesser horseshoe bats show similar behaviour and roost needs, the same should be true of them with regard to commuting around the site. As much of the existing wooded areas as possible should be retained, and compensatory woodland should be developed away from development and lighted areas as specified by the Michael Woods Associates report.

BIBLIOGRAPHY

- Billington, G. (2000) Radio tracking study of greater horseshoe bats at Mells, near Frome, Somerset in June 2000. *English Nature Research Reports No. 403*, 1-24.
- Billington, G. (2000) Combe Down Greater Horseshoe Bats: radio tracking study
Project commissioned by Bat Pro Ltd on behalf of Bath and North East Somerset Council. 1-31 (*unpub.*).
- Billington, G. (2002) Radio tracking study of greater horseshoe bats at Brockley Hall Stables Site of Special Scientific Interest, May – August 2001. *English Nature Research Reports No. 442*, 3-36..
- Billington, G. (2008) Radio tracking study of Greater Horseshoe Bats at Dean Hall, Littledean, Cinderford. *Natural England Research Report NERR012*, 1-19.
- Duvergé, P.L., Rydell, J., Jones, G. & Ransome, R.D. (1999) Functional significance of emergence timing in bats. *Ecography* **23**, 32-40.
- JNCC 2011 Bath and Bradford-on-Avon Bats – Special Area of Conservation –SAC – Habitats Directive
- JNCC 2011 Mells Valley – Special Area of Conservation –SAC – Habitats Directive
- Jones, G. and Billington, G. E. (1999) Radio tracking study of greater horseshoe bats at Cheddar, North Somerset. *English Nature (unpub.) Contract Ref: F14/01/572* 1-44
- Jones, G., Duvergé, P.L. & Ransome, R.D. (1995) Conservation biology of an endangered
Impact Assessment of proposed development on Former Railway Land to Mells Valley and Bath & Bradford on Avon SACS

Bat Pro Ltd (01453) 545177 roger@batpro.co.uk

species: field studies of greater horseshoe bats. In *Bats: Behaviour, Ecology, Evolution* (ed. P.A. Racey & S.M. Swift) Symp. Zool. Soc. Lond. **67**, 309-324.

LDA Design (2008) Radstock Railway Lands. Bat Survey 2006. 1-9.

Michael Woods Associates (2011) Bat Surveys. Former Railway Land, Radstock. Commissioned by Linden Homes. 1-61.

Ransome, R.D. (1968) The distribution of the Greater horseshoe bat, *Rhinolophus ferrumequinum*, during hibernation, in relation to environmental factors. *J.Zool. Lond.* **154**, 77-112.

Ransome, R.D. (1989) Population changes of Greater horseshoe bats studied near Bristol over the past twenty-six years. *Biol. J. Linn. Soc.* **38**, 71-82.

Ransome, R.D. (1996) The management of feeding areas for greater horseshoe bats. *English Nature Research Reports No. 174*, 1-74.

Ransome, R.D. (1997a) The management of greater horseshoe bat feeding areas to enhance population levels. *English Nature Research Reports No. 241*, 1-63.

Ransome, R.D. (1997c) Survey of current and historical use by hibernating Greater Horseshoe Bats of the Disused Mines at Combe Down, Bath. *Report to English Nature, Avon & Somerset Team. Contract Ref: F14/01/527*.

Ransome, R.D. (1998a) The impact of maternity roost conditions on populations of greater horseshoe bats. *English Nature Research Reports No. 292*, 1-80.

Ransome, R.D. 2000. Monitoring diets and population changes of greater horseshoe bats in Gloucestershire and Somerset. *English Nature Research Reports, No. 341*,

Ransome, R.D. 2002. Winter feeding studies on greater horseshoe bats. *English Nature Research Reports, No. 449*, 1-47.

Mitchell-Jones, A.J. & Ransome, R.D. (1998) Conserving greater horseshoe bat feeding areas: II. Environmental prescriptions. *Myotis* **36**, 71-76.

Rossiter, S.R., Jones, G., Ransome, R.D. & Barratt E.M. (2001) Outbreeding increases offspring survival in wild greater horseshoe bats (*Rhinolophus ferrumequinum*). *Proc. R. Soc. Lond. B.* **268**, 1055-1061.

Ransome, R.D. (1990) *The natural history of hibernating bats*. London: Christopher Helm. 235 pages.

Williams, C (2002) The winter activity of the *Rhinolophus hipposideros*, the lesser Impact Assessment of proposed development on Former Railway Land to Mells Valley and Bath & Bradford on Avon SACS

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horseshoe bat. PhD thesis. The Open University. 248 pp.