



## **MOD Graven Hill, Bicester**

### Protected Species Report

February 2015

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# MOD Graven Hill, Bicester

## Protected Species Report

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### Quality Assurance – Approval Status

This document has been prepared and checked in accordance with Waterman Group's IMS ( BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS OHSAS 18001:2007)

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### Comments

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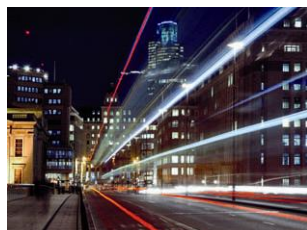
### Comments

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- A. Great Crested Newt Habitat Suitability Index Scores
- B. Great Crested Newt Presence/Absence Survey Results
- C. Landscape Masterplan (ref: EED-AA-74-001-C)



## Disclaimer

This report has been prepared by Waterman Energy, Environment & Design Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporation of our General Terms and Condition of Business and taking account of the resources devoted to us by agreement with the client.

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## 1. Introduction

- 1.1. Waterman Energy, Environment & Design Ltd (Waterman) was commissioned by Cherwell District Council to undertake a range of protected species surveys on land at the MOD Graven Hill, Bicester (hereafter referred to as the 'Site').
- 1.2. The Site is approximately 186 hectares (ha) in area, centred on Ordnance Survey Grid Reference SP587203. The Site consists of two areas of land known as Land Transfer Area 1 (LTA1) which is approximately 101 ha in area and Land Transfer Area 2 (LTA2) which is approximately 85 ha in area (see **Figure 1**).
- 1.3. Outline Planning Permission (ref: 11/01494/OUT) for the redevelopment of the former MOD sites including demolition of existing buildings, development of 1900 homes; local centre to include a 2 form entry primary school, a community hall, five local shops, a pub/restaurant/hotel and parking areas (hereafter referred to as the 'Development') was granted by Cherwell District Council on 8<sup>th</sup> August 2014.
- 1.4. This report has been produced to support the Reserved Matters Application and to allow the partial discharge a number of planning conditions, namely planning condition 74 which states:

*'If the development of Graven Hill hereby approved does not commence within 1 year from the date of this decision, revised species surveys as set out in table 12.3, Chapter 12, Volume 2 of the Environmental Statement shall be undertaken prior to the commencement of the development to establish changes in the presence, abundance and impact on badgers, bats, dormice, great crested newts, reptiles, birds and invertebrates. The survey results, together with any necessary changes to the mitigation plan or method statement shall be submitted to and approved in writing the Local Planning Authority. Thereafter, the development shall be carried out in accordance with the approved details'.*

- 1.5. The majority of this report focuses on potential impacts to LTA1 given Development is proposed to commence in this area in July 2015<sup>1</sup>. Development is proposed to commence in LTA2 in June 2019 and by this time it is considered that the protected species surveys undertaken as part of this assessment would be considered to be invalid, as most local authorities consider that after a significant period of time (usually 2 years) the ecological value of the Site may have changed and should be subject to update surveys.

### Previous Surveys

- 1.6. Previous ecological surveys were undertaken by AMEC Ltd (formally Entec) in 2010 and 2011 to inform the Outline Planning Application for the Site. The findings of these surveys can be found in AMEC's Baseline Biodiversity Report (September 2011)<sup>2</sup>. The surveys undertaken by AMEC include:
  - Update 'Extended' Phase 1 Habitat Survey;
  - Bat Roost Inspections – Building and Tree Survey;
  - Bat Emergence / Re-entry Survey – Building and Tree Survey;
  - Bat Activity Survey;
  - Water Vole Survey;
  - Dormouse Survey;
  - Great Crested Newt Survey;

<sup>1</sup> The 'Boundless' demonstration project

<sup>2</sup> AMEC Environment & Infrastructure UK Limited (September 2011) Defence Infrastructure Organisation: Future Defence storage and Distribution Programme-Redevelopment of MOD Bicester- Baseline Biodiversity Report (Appendix to BIC/OPA/DOC10)

- Reptile Survey;
- Invertebrate Survey; and
- Breeding Bird Survey

## 2014 Surveys

1.7. This report details the survey methodologies and results for the following protected species surveys undertaken in 2014:

- Badger Survey;
- Bat Roost Inspections – Building and Tree Survey;
- Bat Emergence / Re-entry - Building Survey;
- Bat Emergence / Re-entry - Tree Survey;
- Bat Activity Survey;
- Bat Automated Detector Survey;
- Dormouse Survey;
- Great Crested Newt Survey; and
- Reptile Survey.

1.8. Breeding bird and invertebrate surveys are yet to be undertaken, but are proposed for spring/summer 2015. This staggered approach was discussed at a meeting with Natural England and the Local Planning Authority (LPA) Ecologist on 14<sup>th</sup> October 2014 and agreed to be appropriate, as it was accepted that birds and invertebrates were likely to be less important, have less legislative and licence requirements, and thus would have less of an impact on mitigation design. Nevertheless, this report (and the Habitat Creation Plan) will be revised and updated when the results of the bird and invertebrate surveys are known.

1.9. This report also discusses the implications of the findings of the surveys, the consequences of Development in relation to relevant planning policy and legislation and recommended mitigation measures which may be required in accordance with planning condition 73 which states;

*'The development of Graven Hill hereby approved shall be carried out strictly in accordance with the mitigation proposals laid out in table 3.3, chapter 3, page 30 of the Environmental Statement set submitted with the application, which was prepared by AMEC dated September 2011'.*



## 2. Legislation and Planning Policy

2.1. Specific habitats and species receive legal protection in the UK under various legislative provisions. Those relevant to the Site include:

- The Conservation of Habitats and Species Regulations 2010<sup>3</sup> (as amended);
- The Wildlife and Countryside Act 1981 (as amended) (WCA)<sup>4</sup>;
- The Countryside and Rights of Way (CROW) Act 2000<sup>5</sup>;
- Wild Mammals (Protection) Act 1996<sup>6</sup>;
- The Natural Environment and Rural Communities Act 2006<sup>7</sup> (NERC); and
- Protection of Badger Act 1992<sup>8</sup>.

2.2. Where relevant, specific reference to the above is made in the following sections for legally protected species and habitats.

### Badgers

2.3. Badgers *Meles meles* receive legal protection under the Protection of Badger Act 1992 and the WCA. Taken together it is an offence to:

- Wilfully attempt or attempt to kill, injure, ill-treat or take a badger;
- Dig for badgers;
- Use badger tongs or a firearm other than the type specified under the exceptions within the Act;
- Interfere, damage, destroy or obstruct a badger sett;
- Allow or cause a dog to enter a sett or disturb an occupied sett either intentionally or by neglect;
- Sell or offer for sale a live badger;
- Have possession or control of a live badger; and
- Mark or attach a ring, tag or other marking device to a badger.

### Bats

2.4. In summary, all UK bat species are protected by the Conservation of Habitats and Species Regulations 2010 (as amended) and by the WCA. Taken together it is an offence to:

- Deliberately kill, injure or capture a bat;
- Deliberately disturb bats in such a way as to be likely significantly to affect (i) the ability of any significant group of bats to survive, breed, or rear / nurture their young; or (ii) the local distribution of that species;
- Damage or destroy any breeding or resting place used by bats; and
- Intentionally or recklessly obstruct access to any place used by bats for shelter or protection.

<sup>3</sup> HMSO (2010) 'The Conservation of Habitats and Species Regulations (as amended)'

<sup>4</sup> HMSO (1981) 'Wildlife and Countryside Act 1981 (as amended)'

<sup>5</sup> The Countryside and Rights of Way (CROW) Act 2000

<sup>6</sup> HMSO, 1996 'The Wild Mammals (Protection) Act.'

<sup>7</sup> ODPM (2006) 'Natural Environment and Rural Communities Act 2006'

<sup>8</sup> ODPM (1992) 'The Protection of Badgers Act'

- 2.5. Four bat species (lesser horseshoe *Rhinolophus hipposideros*, greater horseshoe *Rhinolophus ferrumequinum*, barbastelle *Barbastella barbastellus* and Bechstein's *Myotis bechsteini*) are listed on Annex II of The Conservation of Habitats and Species Regulations 2010 (as amended). Annex II species may be protected through the designation of European protected sites known as Special Areas of Conservation (SAC).

### **Dormouse**

- 2.6. In summary, dormice *Muscardinus avellanarius* are protected under the WCA and the Conservation of Habitats and Species Regulations 2010 (as amended). Taken together it is an offence to:
- Intentionally or deliberately kill, injure or capture dormice;
  - Intentionally or recklessly disturb dormice;
  - Intentionally or recklessly damage, destroy or obstruct breeding or resting sites or places used for shelter or protection (holts, couches etc) – whether occupied or not;
  - Possess or transport a dormouse (or any part thereof) unless under licence; and
  - Sell or exchange dormice.

### **Great Crested Newts**

- 2.7. In summary, great crested newts *Triturus cristatus* are protected under the WCA and the Conservation of Habitats and Species Regulations 2010 (as amended). Taken together it is an offence to:
- deliberately kill, injure or take a great crested newt;
  - deliberately disturb any such animal while it is occupying a structure or place which it uses for shelter or protection;
  - deliberately obstruct access to any structure or place which any such animal uses for shelter or protection; and
  - deliberately disturb; or deliberately damage or destroy a breeding site or resting place of such an animal.

### **Reptiles**

- 2.8. In summary, common species of reptile including common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix natrix* and adder *Vipera berus* receive protection under the WCA. It is an offence to :
- Intentionally kill, injure or take an animal.
  - Sell, offer to sell, possess or transport any animal for the purposes of sale.
  - Advertise for buying or selling of any of these animals.
- 2.9. It is therefore a potential offence to undertake works on a site that may result in the death or injury of common reptiles.

## National Planning Policy

### National Planning Policy Framework, 2012

- 2.10. The National Planning Policy Framework<sup>9</sup> (NPPF) was adopted in March 2012. Section 11 (outlined below) of the NPPF, ‘Conserving and Enhancing the Natural Environment’, effectively replaces Planning Policy Statement 9: ‘Biodiversity and Geological Conservation’. However, Government Circular 06/05, ‘Biodiversity and Geological Conservation: Statutory Obligations and Their Impact within the Planning System’, remains valid and is referenced within the NPPF.
- 2.11. The NPPF encourages the planning system to contribute to and enhance the natural and local environment (paragraph 109). This should be achieved by:
- *“Protecting and enhancing valued landscapes, geological conservation interests and soils;*
  - *Recognising the wider benefits of ecosystem services; and*
  - *Minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the government’s commitment to halt the overall decline in biodiversity, including by establishing ecological networks that are more resilient to current and future pressures”.*
- 2.12. The NPPF also stipulates that Local Planning Authorities (LPAs), when determining planning applications, should seek to conserve and enhance biodiversity, by applying the following principles, as set out in paragraph 118:
- *“Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;*
  - *Opportunities to incorporate biodiversity in and around developments should be encouraged; and*
  - *Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss”.*
- 2.13. If significant harm resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused (paragraph 118).

### National Planning Policy Guidance, 2014

- 2.14. The Government’s National Planning Policy Guidance<sup>10</sup> (NPPG) has recently been issued and is intended to provide guidance to local planning authorities and developers on the implementation of the planning policies set out within the NPPF. The guidance of most relevance to ecology and biodiversity is the Natural Environment Chapter, which explains key issues in implementing policy to protect biodiversity, including local requirements.

### UK Post-2010 Biodiversity Framework

- 2.15. The Environment Departments of all four governments in the UK work together through the Four Countries Biodiversity Group. Together they have agreed, and Ministers have signed, a framework of priorities for UK-level work for the Convention on Biological Diversity. Published on 17 July 2012, the ‘UK Post-2010 Biodiversity Framework’<sup>11</sup> covers the period from 2011 to 2020. This now

<sup>9</sup> Department of Communities and Local Government (March 2012) ‘National Planning Policy Framework, 2012’.

<sup>10</sup> Department for Communities and Local Government, 2014 ‘National Planning Practice Guidance’. DCLG, London

<sup>11</sup> JNCC and DEFRA (on behalf of the Four Countries’ Biodiversity Group). 2012. UK Post-2010 Biodiversity Framework. July 2012. Available from: <http://jncc.defra.gov.uk/page-6189>.

supersedes the UK Biodiversity Action Plan (UK BAP)<sup>12</sup>. However many of the tools developed under UK BAP remain of use, for example, background information about the lists of priority habitats and species. The lists of priority species and habitats agreed under UK BAP still form the basis of much biodiversity work in the countries.

- 2.16. Although the UK Post-2010 Biodiversity Framework does not confer any statutory legal protection, in practice many of the species listed already receive statutory legal protection under UK and / or European legislation. In addition, the majority of Priority national (English) BAP species are now those listed as Species of Principal Importance (SoPI) in England (listed under Section 41 (S41) of the NERC Act 2006). All public bodies have a legal obligation or 'biodiversity duty' under Section 40 of the NERC Act 2006 to conserve biodiversity by having particular regard to those species and habitats listed under S41.
- 2.17. The following SoPI listed under S41 of the NERC Act are currently relevant to the Site and include:
- Brown long-eared bat *Plecotus auritus*;
  - Noctule *Nyctalus noctula*;
  - Soprano pipistrelle *Pipistrellus pygmaes*;
  - Grass snake *Natrix natrix*;
  - Great crested newt *Triturus cristatus*; and
  - Barbastelle bat *Barbastella barbastelle*.

## Local Planning Policy

### Adopted Cherwell local Plan 1996

- 2.18. The Cherwell Local Plan<sup>13</sup> (adopted in 1996) includes a number of policies relevant to nature conservation which were saved by the Secretary of State in September 2007 and hence are still formally recognised as part of the statutory Development Plan for Cherwell District. The proposed new Cherwell Local Plan (2006-2031) was submitted to the Secretary of State for Communities and Local Government for formal Examination on 31st January 2014. However, the public Examination hearings into the Submission Local Plan were suspended on 4 June 2014 for six months.
- 2.19. A saved policy of the Cherwell Local Plan of relevance to the Site is **Policy C2**, which states that; '*Development which would adversely affect any species protected by schedule 1, schedule 5 and schedule 8 of the 1981 wildlife and countryside act, and by the E.C. habitats directive 1992 will not normally be permitted*'.

### Local Biodiversity Action Plan

- 2.20. As part of the action plan process, Local Biodiversity Action Plans (LBAPs) have been produced by most Councils in the UK. The Site is covered by the Oxfordshire LBAP<sup>14</sup>. The Oxfordshire LBAP is hosted by Oxfordshire Nature Conservation Forum (ONCF). BAP habitat targets are primarily delivered through a network of Conservation Target Areas (CTAs). CTAs identify the most important areas for wildlife where targeted conservation work will have the greatest benefits. The Site does not fall within any CTAs.

<sup>12</sup> HMSO (1994) Biodiversity The UK Action Plan

<sup>13</sup> Cherwell District Council North Oxfordshire (November 1996) Cherwell Local Plan. <http://www.cherwell.gov.uk>

<sup>14</sup> Oxfordshire Local Biodiversity Action Plan (LBAP) [www.oxfordshire.gov.uk](http://www.oxfordshire.gov.uk)

### 3. Methodology

- 3.1. The following section describes the methodologies used for undertaking the protected species surveys detailed within this report. In addition it describes the basis for evaluation of ecological resources.

#### Badgers

- 3.2. A badger survey was undertaken on 6<sup>th</sup> and 7<sup>th</sup> November 2014 to determine the use of LTA1 by badgers. The survey was undertaken both in LTA1 and within 30m of the Site boundary where suitable habitat exists. A GPS tracker (Juno T41) was used to increase the accuracy of recording badger field signs. The survey aimed to record all badger field signs, including:
- Setts: several sett types may be present within a social group territory, ranging from a single hole to numerous interconnecting tunnels. These have been categorised according to **Table 1** (below) into main, annex, subsidiary and outlier (Wilson et al, 1997<sup>15</sup>);
  - Dung pits and latrine sites: badgers characteristically deposit dung in pits, which may be located along the boundaries and within the social group territory. These sites serve as means of inter- and intra-group communication. Several dung pits create a latrine. Dung pits and latrines are often used to mark setts or territorial boundaries;
  - Paths and runs: well used routes between setts and / or foraging areas. Often used by generations of badgers;
  - Snuffle holes and foraging signs: areas of disturbed vegetation often formed by badgers foraging for ground dwelling invertebrates such as earthworms and larvae, subterranean roots and tubers. Snuffle holes are sometimes re-used as dung pits on territorial boundaries;
  - Hair: often found among spoil and bedding outside sett entrances or snagged on fences and vegetation such as bramble *Rubus fruticosus* agg., alongside well-used runs; and,
  - Footprints: easily distinguishable from other large mammal species, such as the fox *Vulpes vulpes* and domestic dog *Canis familiaris*. Often found along paths and runs or in spoil outside sett entrances.
- 3.3. Particular attention was paid to areas where the vegetation and /or the topography offered suitable sett sites. Where dense scrub precluded a thorough search of the area, a targeted examination of the perimeter of the scrub was made for runs or pathways, which may indicate the presence of a sett within the vegetation.
- 3.4. Holes attributed to badgers were classified as well used, partially used or disused in line with the methodology given in the National Badger Survey (Cresswell et al., 1990<sup>16</sup>; Wilson et al., 1997) as detailed in **Table 1** below.

<sup>15</sup> Wilson, G, Harris, S & McLaren, G (1997). Changes in the British Badger population, 1988 to 1997. Peoples Trust for Endangered Species, London.

<sup>16</sup> Cresswell, P., Harris, S. & Jefferies, D.J. (1990). The history, distribution, status and habitat requirements of the Badger in Britain. Peterborough: Nature Conservancy Council.

Table 1: Conventions used in classifying Badger setts (Wilson et al., 1997).

Sett Type	Definition
Main	Several holes (average of 15) with large spoil heaps and obvious paths leading to and from the sett and between sett entrances. Normally the breeding sett and in continuous use.
Annex	Normally less than 150m from main sett and connected by well used pathways. May comprise several holes (6 holes on average), may not be in use all the time even if the main sett is very active but can be as important for breeding as the main sett.
Subsidiary	Usually at least 50m from main sett with no obvious paths connecting to main sett. Fewer holes (5 on average) and may only be used intermittently. 'Ownership' can often only be determined by bait-marking. Can also be as important for breeding as the main sett.
Outlier	Usually comprising one or two holes with little spoil at the entrance(s). No obvious paths connecting to other setts and may only be used sporadically. Often used by foxes.

## Bats

- 3.5. The methodologies for the different types of bat surveys detailed below were undertaken in accordance with current best practice guidelines (Hundt, 2012)<sup>17</sup>.

### Bat Roost Inspection - Building Survey

- 3.6. An internal and external building inspection for bats was undertaken within LTA1 on 30<sup>th</sup> April and 1<sup>st</sup> May 2014. See **Figure 2** for building locations. The survey was led by an experienced ecologist who holds a Natural England Roost Visitor Licence for all species and counties of England.
- 3.7. An assessment of each building was made in terms of its suitability to support roosting bats (both during the active and hibernation periods). The survey consisted of a visual inspection of the interior and exterior of the building for evidence of bat use (e.g. droppings, scratch marks, staining and sightings). A number of factors were considered, including internal conditions, presence of features suitable for use by roosting bats, proximity to foraging habitats or cover and potential for disturbance.
- 3.8. The external survey was aided by the use of close-focusing binoculars, a ladder and a high-powered torch where necessary. The external survey comprised slowly walking the exterior of the property and searching for crevices and potential bat access points that could be utilised by roosting bats.
- 3.9. The internal survey of the building followed a similar approach, roof voids were surveyed (where accessible) for evidence of bats (droppings, prey residues (such as fly or moth wings), urine stains, and bats themselves) with the aid (where necessary) of binoculars, ladders and high powered torches. Notes were made relating to relevant characteristics of features providing potential access points and roosting opportunities for bats.
- 3.10. Based on the findings, a potential rating for the building to be used as a bat roost was assigned, as outlined in **Table 2** below.

<sup>17</sup> Hundt (2012). Bat Surveys – Good Practice Guidelines. Second Edition. Bat Conservation Trust, London.

Table 2: Summary of the Bat Roost Potential Rating Categories

Category (Potential to support roosting bats)	Description
<b>Confirmed roost</b>	Bats discovered roosting within the building, or recorded emerging / entering the building at dusk / dawn. Building found to contain conclusive evidence of occupation by bats, such as bat droppings. A confirmed record (as supplied by an established source such as the local bat group) would also apply to this category.
<b>High potential</b>	Buildings with a large number of features or extensive areas of obvious potential for roosting bats. Generally they have sheltered locations, with a stable temperature regime and suitable bat-access points. Could be suitable for a maternity roost. No evidence of bats found.
<b>Moderate potential</b>	Buildings with some features suitable for roosting bats. Buildings usually of brick or stone construction with a small number of features of potential value to roosting bats e.g. loose roof / ridge tiles, gaps in brickwork, gaps under fascia boards, and / or warm sealed roof-spaces with under-felt. These buildings may be used as occasional or transient roosts in the summer, but are unsuitable for large colonies. No evidence of bats found.
<b>Low potential</b>	Buildings with limited features for roosting bats (e.g. shallow crevices where mortar is missing between building blocks / bricks). They may have open locations which may be subject to large temperature fluctuations and bat-access points may be constrained. No evidence of bats found (e.g. droppings / staining). Buildings may be surrounded by poor or sub-optimal bat foraging habitat. No evidence of bats found.
<b>Negligible potential</b>	Buildings with no features capable of supporting roosting bats. Often these buildings are of a 'sound' well-sealed nature, or have a single skin and no roof void. They tend to have high interior light-levels, and little or no insulation. Buildings without any roofs may also fall into this category.

### Bat Roost Inspection - Tree Survey

- 3.11. A ground based preliminary visual inspection of trees with the potential to be affected by the Development was undertaken on pre-selected trees within LTA1 on 6<sup>th</sup> and 7<sup>th</sup> May 2014. The survey was undertaken by experienced ecologists who hold a Natural England Roost Visitor Licence for all species and counties of England.
- 3.12. Binoculars were used to inspect the trees from the ground to the canopy to look for features indicative of bat roosts. These included:
- Natural or woodpecker holes;
  - Cracks/splits in major limbs;
  - Loose bark;
  - Dense ivy; and
  - Hollows/cavities.



- 3.13. Signs of bat use were also assessed, such as droppings, staining from the fur or urine and scratches around the entry points.
- 3.14. Trees considered to offer potential to support roosting bats during the preliminary visual inspections which would potentially be impacted on by the Development were subject to further detailed, off the ground, climbing inspections, where health and safety restrictions allowed. The climbing inspections were also undertaken on the 6<sup>th</sup> and 7<sup>th</sup> May 2014 by two bat workers who hold licences from Natural England.
- 3.15. An assessment of each tree was made with the aid (where necessary) of a ladder, binoculars, high powered torch and an endoscope.
- 3.16. For the purpose of this report each tree has been assigned an identification code (e.g.T1) and their locations are shown on **Figure 3**.
- 3.17. The trees were then scored according to the criteria set out in **Table 3** to identify their potential to support roosting bats.

Table 3: Bat Conservation Trust Tree Guidelines, 2012

Tree category and Description
<p><b>Known or Confirmed Bat Roost</b></p> <p>Tree with field evidence of the presence of bats, e.g. droppings, scratch marks, grease marks or urine staining.</p>
<p><b>Category 1 * (High)</b></p> <p>Trees with multiple highly suitable features capable of supporting larger roosts.</p>
<p><b>Category 1 (Moderate)</b></p> <p>Trees with definite bat potential, supporting fewer suitable features than category 1 * trees or with potential for use by single bats.</p>
<p><b>Category 2 (Low)</b></p> <p>With no obvious potential, although the tree is of a size and age that elevated surveys may result in cracks or crevices being found; or the tree supports some features which may have limited potential to support bats.</p>
<p><b>Category 3 (Negligible)</b></p> <p>Trees with no potential to support bat roosts.</p>

### Bat Emergence / Re-entry Building Survey

- 3.18. To confirm the presence or likely absence of roosting bats within the buildings within LTA1, evening emergence and dawn re-entry surveys were undertaken at those buildings identified during the internal and external inspections as having potential to support roosting bats, which would be directly or indirectly impacted on by the Development.
- 3.19. Based on current best practice guidelines, buildings which offered low potential to roosting bats (i.e. Rodney House Complex, Buildings E7, E7A, E10A and E10B) were subject to a single evening emergence survey. Any buildings which have been confirmed as a roost (i.e. the Garrison Briefing Centre) based on the building inspections and/or any previous survey results were subject to two evening emergence and a single dawn re-entry survey (not within the same 24 hour period).
- 3.20. The survey effort for any buildings which were confirmed as a roost during the evening emergence surveys (i.e. Building E4) was increased to two evening emergence and a single dawn re-entry



survey if the original rating of the building during the internal and external inspections did not allow for this scope already. See **Figure 2** for building locations.

- 3.21. On each survey visit, surveyors were strategically positioned around the buildings to enable the monitoring of all potential egress points. The structure of each building varied and therefore different numbers of surveyors were required for each assessment. In some circumstances clusters of buildings were monitored at the same time to achieve a better understanding of bat activity within a complex of buildings in close proximity.
- 3.22. The majority of emergence surveys began 15 minutes before sunset and continued for approximately 1.5 to 2 hours after sunset (see limitations). Re-entry surveys began approximately 1.5 to 2 hours before dawn and finished at dawn. Any bats emerging / entering were recorded and the time and species noted.
- 3.23. Any bats observed or heard were recorded. Information included:
- time;
  - emergence or re-entry points;
  - direction of flight;
  - use of landscape;
  - flight characteristics;
  - size;
  - height; and
  - behaviour.
- 3.24. All surveys were undertaken in appropriate weather conditions and within the recognised bat active season (May to September inclusive). **Table 4** below provides a summary of the bat evening emergence/dawn re-entry building surveys undertaken.

Table 4: Dates and weather conditions for evening emergence/dawn re-entry building surveys

Building Surveyed	Survey	Date	Dusk/Dawn Time	Time start/end (GMT+1)	Start Weather conditions	Temp at start	Temp at end
E4	Dusk Emergence	29/05/14	21:05	20:40/ 23:05	BF2, 100% cloud, dry	13°C	12°C
E10A & E10B	Dusk Emergence	29/05/14	21:10	20:40/22:40	BF1, 100% cloud, drizzle	16°C	14°C
Garrison Briefing Centre	Dawn re-entry	30/05/14	04:52	02:40/04:55	BF1, 100% cloud, dry	13°C	12°C
E7 & E7A	Dusk Emergence	05/06/14	21:19	20:50/22:50	BF1, 35% cloud, dry	17°C	16°C
E4	Dawn Re-entry	06/06/14	04:49	02:49/04:49	BF0, 5% cloud, dry	11°C	11°C
Rodney House Complex	Dusk Emergence	23/07/14	21:08	20:53/22:38	BF0, clear sky, dry	22°C	19°C
Garrison Briefing Centre	Dusk Emergence	15/07/14	21:17	21:40/22:50	BF0, 5% cloud, dry	23°C	14°C
E4	Dusk Emergence	05/08/14	20:49	20:35/22:05	BF0, 100%	20°C	17°C

Building Surveyed	Survey	Date	Dusk/Dawn Time	Time start/end (GMT+1)	Start Weather conditions	Temp at start	Temp at end
Garrison Briefing Centre	Dusk Emergence	29/09/14	18:48	18:33/20:18	cloud, dry BF0/1, 75% cloud, dry	19°C	17°C

### Bat Emergence/Re-entry Tree Survey

- 3.25. To confirm the presence or likely absence of roosting bats within the trees within LTA1, a single evening emergence or dawn re-entry survey was undertaken at those trees identified during the inspections as having greater than low potential to support roosting bats, which would be directly impacted on by the Development.
- 3.26. Based on current best practice guidelines, trees which offered **low/moderate** (Category 2/1) potential to roosting bats (i.e. T1 and T11) were subject to a single evening emergence survey. Any trees which offered **moderate/high** (Category 1/1\*) and **high** potential (Category 1\*) to roosting bats (i.e. T2-T10 and T12) based on the tree inspections were subject to a single dawn re-entry survey.
- 3.27. The surveyor was situated near to potential features of value to bats such as natural holes and cracks to ensure complete coverage.
- 3.28. Emergence surveys began 15 minutes before sunset and continued for approximately 1.5 to 2 hours after sunset. Re-entry surveys began approximately 1.5 to 2 hours before dawn and finished at dawn. Any bats emerging / entering were recorded and the time and species noted. Any bats observed or heard were recorded and if possible, their behaviour and characteristics as detailed above described.
- 3.29. All surveys were undertaken in appropriate weather conditions and within the recognised bat active season (May to September inclusive). **Table 5** below provides a summary of the bat evening emergence/dawn re-entry tree surveys undertaken.

Table 5: Dates and weather conditions for evening emergence/dawn re-entry tree surveys

Tree Surveyed	Survey	Date	Dusk/Dawn Time	Time start/end (GMT+1)	Start Weather conditions	Temp at start	Temp at end
T1	Dusk Emergence	05/09/14	20:50	20:20/22:50	BF0-1, 10% cloud, dry	20°C	17°C
T2	Dawn Re-entry	11/07/14	04:59	03:30/05:00	BF0, 20% cloud, dry.	14°C	10°C
T3	Dawn re-entry	11/07/14	04:59	03:30/05:00	BF0, 20% cloud, dry.	14°C	10°C
T4	Dawn Re-entry	16/07/14	05:04	03:04/05:04	BF0, 10% cloud, dry	18°C	9°C
T5	Dawn Re-entry	16/07/14	05:04	03:05/05:04	BF1, 10% cloud, dry	18°C	9°C
T6	Dawn Re-entry	20/08/14	05:56	04:00/05:56	BF0, clear sky, dry	9°C	11°C
T7	Dawn Re-entry	24/07/14	05:14	03:14/05:14	BF2-3, 80% cloud, dry	19°C	14°C
T8	Dawn Re-entry	20/08/14	05:56	04:00/05:56	BF0, clear	9°C	11°C

Tree Surveyed	Survey	Date	Dusk/Dawn Time	Time start/end (GMT+1)	Start Weather conditions	Temp at start	Temp at end
					sky, dry		
T9	Dawn Re-entry	29/07/14	05:22	03:20/05:22	BF0, clear sky, dry	18°C	12°C
T10	Dawn Re-entry	29/07/14	05:22	03:30/05:22	BF0, clear sky, dry	18°C	12°C
T11	Dusk Emergence	26/08/14	20:06	19:50/21:36	BF3, 100% cloud, dry	16°C	16°C
T12	Dawn Re-entry	24/07/14	05:14	03:15/05:15	BF2-3, 80% cloud, dry	19°C	14°C

### Bat Activity Survey

- 3.30. To assess the use of LTA1 by bats, a series of bat activity surveys was undertaken. A single dusk activity survey was undertaken each month from May to July and September 2014 and a single dawn activity survey was undertaken in August 2014.
- 3.31. Six surveyors (in pairs) followed three pre-defined transects around LTA1 during each activity survey. This route covered all areas of LTA1 and adjacent areas considered to be of value to bats such as potential foraging and commuting resources. Each transect also incorporated ten 3 minute listening stops, to allow more time to assess bat activity at these locations. The routes of the three transects and listening stops are shown on **Figure 4**.
- 3.32. During each survey, the transects were walked once at a steady pace. In order to avoid temporal bias at particular sections of the transects, the starting point of each survey was staggered to ensure that areas of the Site were walked at different times in the evening.
- 3.33. The dusk activity surveys commenced 15 minutes before dusk and extended 1.5 to 2 hours thereafter. The dawn survey commenced 2 hours before dawn and was completed 15 minutes after dawn.
- 3.34. All surveys were undertaken in appropriate weather conditions and within the recognised bat active season (May to September inclusive). **Table 6** below provides a summary of the bat activity surveys undertaken.

**Table 6: Dates and weather conditions of bat activity surveys**

Survey	Date	Dusk/Dawn Time	Time start/end (GMT+1)	Start Weather conditions	Temp at start	Temp at end
Dusk Activity Survey (All transects)	22/05/2014	21:00	22:45/23:10	BF0, 95% cloud, dry	19°C	14°C
Dusk Activity Survey (All transects)	19/06/2014	21:30	21:00/23:30	BF0, 40% cloud, dry	21°C	14°C
Dusk Activity Survey (All transects)	01/07/2014	21:27	20:57/22:57	BF0, 10% cloud, dry	23°C	18°C
Dawn Activity Survey (Transect 2 & 3)	15/08/2014	05:50	03:50/05:50	BF0, 20% cloud, dry	13°C	14°C
Dawn Activity Survey (Transect 1 only)	20/08/2014	05:56	03:55/05:56	BF0, clear sky, dry	9°C	11°C

Survey	Date	Dusk/Dawn Time	Time start/end (GMT+1)	Start Weather conditions	Temp at start	Temp at end
Dusk Activity Survey (All transects)	04/09/2014	19:46	19:30/21:00	BF0, 100% cloud, dry	17°C	17°C

### Bat Automated Detector Survey

- 3.35. Two static automated bat detectors (Model Numbers: SM2BAT+) were positioned at suitable monitoring locations along each bat activity survey transect route during each month of the recognised 2014 bat active season (May to September inclusive) (see **Figure 4** for locations). Static detectors were deployed for a recording period of five consecutive nights for each recording session. The automated detectors were programmed to record from 15 minutes prior to sunset until 15 minutes post sunrise.
- 3.36. Additional static automated bat detectors were deployed on Site between July and September. The additional detectors were used to determine the use of the Site by barbastelle bats (one of the rarest bats in the UK), given that this species was recorded on Site during the surveys undertaken between May and June. Further details on these surveys are provided in the results section.

### Analysis

- 3.37. A record of all bat activity (i.e. commuting, foraging, social calls) during the aforementioned bat surveys was noted and mapped, where appropriate. Time expansion (Pettersson D240X) bat detectors were used by all surveyors and data was recorded onto solid state MP3 recorders for the activity and evening emergence/re-entry surveys. Recorded bat calls were later analysed using BatSound 4.2 software, where required. Identification of bat calls was undertaken using the parameters set out by Russ (2012)<sup>18</sup>.

### Dormice

#### Nest Tube Survey

- 3.38. In total 229 dormice tubes were placed within LTA1, including throughout Graven Hill Wood, in April 2014. These nest tubes measure 65mm x 65mm in cross section and 250mm in length and are constructed of a stiff, double-walled black plastic tube and a small plywood tray. This plywood tray forms a sliding insert in the tube, with one end sealed off by a wooden block adjoining the tray and the other with a protrusion of 5cm beyond the tube entrance to allow access by dormice, if present.
- 3.39. Nest tubes were fastened to suitable vegetation at a height of approximately 1.5-2.2m using cable-ties. Each tube was assigned a number and its location recorded (see **Figure 5**). Nest tubes were erected at suitable densities within all areas of Site woodland and hedgerows considered to have the potential to support dormice. These tubes were left in-situ for the duration of the survey (i.e. through to September 2014).
- 3.40. To determine the likelihood of finding dormice in nest tubes during the months of April to November, best practice guidelines refer to using an Index of Probability<sup>19</sup>. The Index of Probability is based on the deployment of 50 Dormouse tubes to determine presence / likely absence of this

<sup>18</sup> Russ (2012) *British Bat Calls: A Guide to Species Identification*. Pelagic Publishing, Exeter

<sup>19</sup> Bright PW, Morris PA and Mitchell-Jones A (2006). *Dormouse Conservation Handbook, 2nd Edition*. English Nature, Peterborough.

species. To ensure adequate survey effort, a total index of 20 or more needs to be obtained when combining survey months shown in **Table 7** below.

**Table 7:** Index of probability of finding dormice present in nest tubes in any one month

Month	Index of Probability
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

- 3.41. The nest tubes were checked once a month from May to September 2013 under conditions appropriate for survey (see **Table 8**), equating to a probability index of 20.

**Table 8:** Dates and weather conditions during dormouse surveys

Date	Time start	Weather conditions	Temp at start
21.05.2014	10:45	80% cloud, BF2, Dry.	12°C
24.06.2014	11:10	20% cloud, BF3, Dry.	17°C
15.07.2014	11:30	15% cloud, BF3, Dry.	19°C
05.08.2014	10:30	25% cloud, BF2, Dry.	16°C
23.09.2014	10:30	50% cloud, BF1, Dry.	17°C

## Nest Search

- 3.42. Nest searches were also carried out during each nest tube survey visit in suitable areas of LTA1 where nests may be found, including dense vegetation such as the shrub layer and bracken, climbing plants, the cleft of saplings and tree holes.

## Great Crested Newts

- 3.43. Great crested newts (GCNs) form meta-populations, whereby they will travel and breed within a number of ponds typically within 500m of each other<sup>20</sup>. Therefore, any water bodies within 500m of the Site with no suitable barriers to prevent newts from entering the Site were assessed for their potential to support GCNs.

## Habitat Suitability Index

- 3.44. An indication of the suitability of water bodies of 33 waterbodies which are located on or within 500m of the Site (connected to the Site by suitable terrestrial habitat) was made using Habitat Suitability Index scores (HSI)<sup>21</sup>. The locations of these water bodies are presented on **Figure 6**. A score was obtained for each water body ranging between 0 – 1; with 0 indicating likely unsuitable habitat and 1 indicating optimal habitat.

<sup>20</sup> Langton, T.E.S., Beckett, C.L., and Foster, J.P. (2001) Great Crested Newt Conservation Handbook. Froglife, Halesworth.

<sup>21</sup> Oldham, R.S. et al. (2000). *Evaluating the Suitability of Habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal, 10, 143-155.

## Presence / Absence Survey

- 3.45. Presence / absence GCN surveys were undertaken on waterbodies on and within 500m of the Site (with suitable terrestrial connectivity to the Site) which were previously surveyed by AMEC in 2011 to inform the Outline Planning Application. The waterbodies surveyed were split between Waterman, White Young Green (WYG) and BSG Ecology<sup>22</sup>, undertaken during the same survey season in 2014. A total of 24 waterbodies, numbered 1-24, were subject to presence/absence surveys and the locations of these waterbodies are presented on **Figure 6**. Waterbodies 22-24 were surveyed in 2014 but were not previously surveyed by AMEC in 2011 due to access restrictions given their Network Rail land ownership.
- 3.46. WYG and BSG have supplied details of their survey methodology, survey dates and weather conditions which have been detailed below.
- 3.47. Waterman GCN presence / absence surveys were undertaken in accordance with best practice guidelines (English Nature, 2001)<sup>23</sup>. As such, surveys comprised four visits between mid-March and mid-June, with at least fifty per cent of the survey visits undertaken between mid-April and mid-May. To estimate population size, an additional two visits were undertaken prior to mid-June at those ponds within which GCN were found to be present during visits 1-4. All surveys were led by surveyors who hold Natural England (NE) GCN licences.
- 3.48. At least three of the survey methods detailed below were undertaken at each visit:
- *Setting of bottle-traps*: This involved the use of funnel traps (made from 2 litre clear plastic bottles with an air bubble / hole) that were secured in the water around the pond margin in the evening before dark, and left set overnight to be checked the following morning;
  - *Egg search*: The egg search is used to determine presence of breeding GCNs, although the data cannot be used to estimate population size. All suitable submerged vegetation was searched for GCN eggs. Newt eggs are characteristically wrapped individually in the submerged leaves of aquatic vegetation, such as brooklime, water forget-me-not, watercress, and floating sweet-grass;
  - *Torch survey*: The accessible margins of the water body were slowly walked once, searching the margins by torchlight (a minimum of one million candlepower) for GCNs. This torch searching was undertaken a minimum of one hour after dark. All GCNs observed in the water were counted and where possible divided as males, females and juveniles;
  - *Netting*: Using a long-handled dip-net the perimeter of the pond was netted for a period of at least 15 minutes per 50m of shoreline. Netting is much less effective at detecting adult GCN presence than bottle trapping, torch survey or egg search;
  - *Terrestrial Search*: Any potential terrestrial refuges such as logs, rocks and debris within proximity of the pond were lifted and searched for the presence of GCNs.
- 3.49. Details of survey dates and weather conditions of each Waterman survey are presented in **Table 9** below.

**Table 9: Dates and weather conditions of Waterman's Great Crested Newt Surveys**

Visit	Waterbodies Surveyed	Date	Temp at start (Evening survey)	Weather Conditions (Evening survey)
1	1, 6, 7, 13, 14, 15, 16, 18 & 20	06/07.05.2014	11°C	80%CC, BF2, Dry

<sup>22</sup> WYG and BSG were independently undertaking GCN surveys for MOD and Network Rail respectively

<sup>23</sup> English Nature (2001) Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.

Visit	Waterbodies Surveyed	Date	Temp at start (Evening survey)	Weather Conditions (Evening survey)
2	1, 6, 7, 13, 14, 15, 16, 18 & 20	07/08.05.2014	11°C	90%CC, BF3, Dry
3	1, 13, 14, 15, 16, 18 & 20	14/15.05.2014	14°C	50%CC, BF1, Dry
4	1, 13, 14, 15, 16, 18 & 20	15/16.05.2014	15°C	60%CC, BF0, Dry
5	1, 14, 16 & 18	20/21.05.2014	16°C	75%CC, BF1, Dry
6	1, 14, 16 & 18	21/22.05.2014	15°C	80%CC, BF1, Dry

3.50. Details of survey dates and weather conditions of each WYG survey are presented in **Table 10** below.

**Table 10: Dates and weather conditions of WYG's Great Crested Newt Surveys**

Visit	Waterbody Surveyed	Date	Temp at start (Evening survey)	Weather Conditions (Evening survey)
1/1	17, 19	23/24.03.2014	10 °C	Fair weather
1/2/1	7, 17, 19	01/02.05.2014	12 °C	No weather conditions provided
1/2/1/1/1/1/1/1/3/3	6, 7, 8, 9, 10, 11, 12, 17, 19	13/14.05.2014	10°C	Dry
4/4	17, 19	19/20.05.2014	12 °C	No weather conditions provided
2/2/2/2/2/2/5	6, 8, 9, 10, 11, 12, 17	22/23.05.2014	12°C	No weather conditions provided
3/3/3/3/3/3/6	7, 8, 9, 10, 11, 12, 17	29/30/05.2014	15 °C	No weather conditions provided
3/4/4/4/4/4	6, 7, 8, 9, 10, 12	02/03.06.2014	16°C	No weather conditions provided
4/5/4/5	6, 9, 11, 12	05/06.06.2014	16°C	No weather conditions provided
6/6	9, 12	10/11.06.2014	16 °C	No weather conditions provided

3.51. Details of survey dates and weather conditions of each BSG survey are presented in **Table 11** below.

**Table 11: Dates and weather conditions of BSG's Great Crested Newt Surveys**

Visit	Waterbody Surveyed	Date	Temp at start (Evening survey)	Weather Conditions (Evening survey)
1	2, 3, 4, 5, 21, 22, 23, 24, 27	13/14.03.2014	4°C	No weather conditions provided
2	2, 3, 4, 5, 21, 22, 23, 24, 27	20/21.03.2014	7°C	No weather conditions provided
3	2, 3, 4, 5, 21, 22, 23, 24, 27	26/27.03.2014	16°C	No weather conditions provided
4	2, 3, 4, 5, 21, 22, 23, 24, 27	02/03.04.2014	12°C	No weather conditions provided
5	2, 3, 4, 5, 21, 22, 23, 24, 27	09/10.04.2014	10°C	No weather conditions provided
6	2, 3, 4, 5, 21, 22, 23, 24, 27	16/17.04.2014	10°C	No weather conditions provided



## Population Size Class Assessment

- 3.52. Once six survey visits have been completed at the waterbodies that support GCN, population size class estimates are made using the maximum count of adult GCN recorded by a single survey method during a single survey visit.
- 3.53. As set out by best practice guidelines (English Nature, 2001), populations can be classed as:  
 ‘small’ for maximum counts up to 10;  
 ‘medium’ for maximum counts between 11 and 100; and  
 ‘large’ for maximum counts over 100.

## Reptile Survey

- 3.54. Owing to the presence of suitable reptile habitat, namely the tall ruderal vegetation, field margins, woodland edge and waterbodies within LTA1, a reptile survey was undertaken following standard methods (Froglife, 1999)<sup>24</sup> to determine the likely presence / absence of reptiles.
- 3.55. In total, 364 refugia measuring approximately 1m x 0.5m, were placed in suitable reptile habitat, areas in LTA1 on 6<sup>th</sup> to 8<sup>th</sup> May 2014 (see **Figure 7** for the reptile mat location plan). These refugia were then left to ‘bed-in’ for a period of over a week.
- 3.56. The refugia were checked on seven separate occasions in suitable weather conditions in line with accepted good practice guidelines (Froglife, 1999). During each visit, the refugia were lifted and any reptiles present, either underneath or on top of the refugia, were recorded. Any incidental observations of reptiles throughout LTA1 were also recorded.
- 3.57. All visits were undertaken during suitable weather conditions and within the active period for reptiles (see **Table 12** below).

**Table 12: Dates, start time and weather conditions of reptile survey visits**

Visit	Date	Time	Temp at start	Start Weather conditions
1	14.05.2014	09:00	14°C	BF1, 10% cloud, dry
2	14.05.2014/ 16.05.2014	15:10/ 15:10	18°C/ 13°C	BF0, 20% cloud, dry/ BF0, clear sky, dry
3	15.05.2014	08:45	13°C	BF0, clear sky, dry
4	20.05.2014	10:45	17°C	BF1, 95% cloud, dry
5	21.05.2014	14:00	16°C	BF1, 30% cloud, dry
6	29.05.2014	09:00	13°C	BF1, 100% cloud, dry
7	30.05.2014	15:15	18°C	BF1, 100% cloud, dry

## Population Size Class Assessment

- 3.58. The size and importance of the reptile population on LTA1 was identified in accordance with Froglife’s Key Reptile Site Assessment method. The maximum number of each species seen on one survey visit (by observation or under suitable refugia placed at ten per hectare) was used to classify LTA1 as having a low, good or exceptional population for each species (see **Table 13** below).

**Table 13: Survey assessment: Key reptile sites/classifying population sizes**

<sup>24</sup> Froglife (1999) Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth



Species	Low Population <i>Score 1</i>	Good Population <i>Score 2</i>	Exceptional Population <i>Score 3</i>
Adder	<5	5-10	>10
Grass snake	<5	5-10	>10
Common lizard	<5	5-20	>20
Slow worm	<5	5-20	>20

3.59. A site can qualify for the Key Reptile Register if it meets at least one of the following criteria:

- 1) Supports three or more reptile species;
- 2) Supports two snake species;
- 3) Supports an exceptional population of one species (see **Table 13**);
- 4) Supports an assemblage of species scoring at least 4; and/or
- 5) Does not satisfy 1-5 but which is of particular regional importance due to local rarity.

## Evaluation

- 3.60. The habitats and species evaluations are based on published guidance from the Institute of Ecology and Environmental Management (IEEM)<sup>25</sup>. The level of value of specific ecological receptors is assigned using a geographic frame of reference, i.e. international value being most important, then national, regional, county (metropolitan), district, local and lastly, within the boundary of the Site only. A negligible value is assigned where the habitat offers no value to wildlife.
- 3.61. Value judgements are based on various characteristics that can be used to identify ecological resources or features likely to be important in terms of biodiversity. These include site designations (such as Sites of Special Scientific Interest), or for undesignated features, the size, conservation status (locally, nationally or internationally), and the quality of the ecological resource. In terms of the latter, 'quality' can refer to habitats (for instance if they are particularly diverse, or a good example of a specific habitat type), other features (such as wildlife corridors or mosaics of habitats) or species populations or assemblages.

## Limitations

### Badgers

- 3.62. A few fields within LTA1 comprising grazed pasture land could not be accessed due to health and safety restrictions as cows were present within these fields at the time of the survey. Access was also restricted in some areas due to dense vegetation.

### Bats

- 3.63. Several trees (namely T8, T10, T14, T18 and T19 as shown on **Figure 3**) were not climbed due to health and safety restrictions such as the presence of power lines in close proximity to the tree or physical restrictions.
- 3.64. During the building inspections internal access was limited for the Rodney House Complex due to health and safety restrictions as asbestos was present in a disturbed state.

<sup>25</sup> IEEM (2006) 'Guidelines for Ecological Impact Assessment in the United Kingdom'.

- 3.65. The evening emergence bat survey undertaken on the Garrison Briefing Centre on 15/07/14 began late, at approximately 23 minutes after dusk. During this survey three individual common pipistrelle *Pipistrellus pipistrellus* bats were recorded entering the building on separate occasions, the earliest of which was at 32 minutes after dusk. It is considered that other bats could have emerged and/or entered the building before this survey began. Based on other survey results, this is not likely to have a significant change on the assessment of the value of the building to bats, although if further surveys are required to inform a European Protected Species (EPS) licence application to Natural England to demolish this building these will be undertaken in 2015.
- 3.66. Bats are highly mobile and invariably move between roost sites, therefore any bat surveys will only provide a snapshot of how bats are using a particular site at that time. However, the transect surveys undertaken have been augmented with automated bat detector surveys in order to increase sampling effort across the Site. It is considered that the surveys undertaken are sufficient to survey the size of the site and the habitat quality.
- 3.67. Automated bat detector surveys are not able to replace transect surveys, and although useful to establish the species of bat using the site and specific features, it is difficult to assess how bats are using a site. Bat passes of one species could also be from one or several bats but this is difficult to assess through automated methods.
- 3.68. On two occasions during the automated bat detector survey, an automated detector failed to record whilst in situ. The automated detectors were placed in the same locations each month and hence in the absence of data from two locations on one occasion we still have sufficient data to assess the use of the features associated with the detector locations.
- 3.69. Some groups of species of bat use echolocation calls of a very similar call characteristics. These similar calls make identification through call analysis difficult, particularly in cluttered environments where positive identification can be impossible to achieve. In cases where the bat cannot be confidently identified to species level it is identified to genus level such as *Myotis sp.*, or *Pipistrellus sp.*. Again analysis of bat calls of serotine bat *Eptesicus serotinus*, noctule *Nyctalus noctula* and Leisler's bat *Nyctalus leisleri* can also be difficult due to similarities between their call characteristics, there in some cases it is not possible to distinguish between these species.
- 3.70. Where *Pipistrellus sp.* is referred to in this report this should be considered as referring to either common pipistrelle *Pipistrellus pipistrellus* or soprano pipistrelle. This should not be interpreted as other species of the *Pipistrellus* genus, such as Nathusius' pipistrelle *Pipistrellus nathusii* which, although it occurs relatively frequently within the UK is not commonly recorded.
- 3.71. Whilst the long-eared bats recorded were not identified to species level (*Plecotus sp.*), it is considered likely that the bats identified as long-eared sp. are brown long-eared bats *Plecotus auritus*. This is due to the fact that the majority of records for grey long-eared bats *Plecotus austriacus* occur along the south coast of England<sup>26</sup>. A search of the National Biodiversity Network (NBN) Gateway<sup>27</sup> found no records for grey long-eared bats within Oxfordshire.

## Great Crested Newts

- 3.72. Visit 1 of the GCN presence/absence survey undertaken by BSG of waterbodies 2, 3, 4, 5, 21, 22, 23 and 24 on 13/04/2014-14/04/2014 was undertaken during sub-optimal weather conditions when the minimum overnight air temperature fell below 5°C. Given that GCN were recorded in several waterbodies during this survey, this is not considered to be a significant constraint and the survey findings are considered to be valid. Best practice guidelines state that 50% of surveys should be presence/likely absence surveys should be undertaken between mid-April and mid-May. BSG only

<sup>26</sup> BCT (2000): 'Distribution atlas of bats in Britain and Ireland 1980-1999'. Bat Conservation Trust

<sup>27</sup> National Biodiversity Network (NBN) Gateway. <https://data.nbn.org.uk/>

undertook one GCN presence/absence survey visit of each waterbody between mid-April and mid-May. 50% of the presence/likely absence surveys undertaken by WYG of several of the waterbodies also did not fall within the period between mid-April and mid-May as recommended by best practice guidelines. Given that the meta-population which will be impacted on by the development of LTA1 has been assessed as being a large breeding population, these limitations are not considered to have a significant impact on the findings of the results of the presence/absence surveys and hence proposed mitigation measures.

### Reptiles

- 3.73. Reptile mats could not be placed in approximately seven fields where cattle were present within LTA1 at the time of survey due to access restrictions from the farmer.

## 4. Results

### Badgers

- 4.1. A preliminary badger survey of the Site undertaken by AMEC in 2011 recorded 22 badger setts throughout LTA1, LTA2 and adjacent areas. Nine of these badger setts were recorded within LTA1 and 30m of the surrounding area. The setts recorded comprised a main and annex sett in a small woodland copse and eight outlier setts. A plan of the locations of the badger setts and a description of other activity recorded is provided in the AMEC's Confidential Badger Annex Report (September 2011).
- 4.2. The badger survey undertaken by Waterman in 2014 was undertaken in LTA1 and within 30m of the surrounding area, where access allowed. The location and classification of setts and field signs recorded are presented on **Figure 8**.
- 4.3. Seven setts were recorded on and in close proximity to the Site and were classified according to the criteria used in the National Badger Surveys (Cresswell *et al.*, 1990 and Wilson *et al.*, 1997).
- 4.4. The main badger sett recorded by AMEC in 2011 within a small woodland and scrub copse to the north of Graven Hill Wood was confirmed as currently active during the 2014 survey (see M<sup>1</sup> on **Figure 8**). It comprised 3 well-used holes and 7 partially used holes when recorded in 2011. It has now grown in size and usage considerably and comprises 34 holes; 16 well-used holes, 11 partially used holes and 7 disused holes. The nearby annex sett recorded by AMEC in 2011 which was recorded as comprising 2 holes in partial use, was recorded during the 2014 survey and now comprises 4 holes in partial use (see A<sup>1</sup> on **Figure 8**). Another annex sett which was not recorded previously by AMEC was recorded in close proximity to the east of the main sett in the woodland copse (see A<sup>2</sup> on **Figure 8**). This sett comprises 2 active well-used holes with signs of recent activity such as a fresh spoil heap and footprints.
- 4.5. Three disused outlier setts were recorded throughout LTA1 and the surrounding area (see O<sup>1</sup>-O<sup>3</sup> on **Figure 8**). One outlier sett comprising one disused hole was recorded on the edge of the coniferous plantation woodland block to the north of the woodland copse which supports the main sett (see O<sup>1</sup> on **Figure 8**). This sett was not previously recorded by AMEC in 2011. The second outlier sett recorded comprised one disused hole and was previously recorded by AMEC as in partial-use. This sett appeared to be located within a drain underneath a road but had recently collapsed (see O<sup>2</sup> on **Figure 8**). The third outlier sett, comprising one disused hole was recorded outside the main survey area, approximately 100m south of the northern LTA1 boundary within an area of broad-leaved woodland (see O<sup>3</sup> on **Figure 8**). This sett was not previously recorded by AMEC in 2011. One active outlier sett (O<sup>4</sup> on **Figure 8**) which was also not recorded by AMEC in 2011, was recorded approximately 25m south of the LTA1 boundary, within a woodland block in St David's Barracks, south of Graven Hill Wood.
- 4.6. An outlier sett recorded south of building E25, the security office by AMEC in 2011 was not recorded during the survey undertaken in 2014. This sett was described as a single partially-used hole on the edge of a rabbit warren. The rabbit warren was recorded during the 2014 survey but no holes which could be attributed to badger were noted. Similarly three partially-used outlier setts recorded in the grazed fields to the north of Graven Hill Wood recorded by AMEC in 2011 were not recorded during the survey undertaken in 2014. Large rabbit warrens were recorded in these locations but no holes considered to be attributed to badgers were recorded.
- 4.7. A couple of fields within LTA1 comprising grazed pasture land could not be accessed due to health and safety restrictions as cows were present within these fields at the time of the survey (see **Figure 8**).



- 4.8. It is also considered possible that further small setts maybe present within areas of scrub on Site, although their presence may be hidden by dense vegetation which could not be accessed, or concealed within large rabbit warrens.
- 4.9. Given that Graven Hill Wood will not be impacted on by the Development only a 30m buffer on the periphery of the woodland, adjacent to LTA1 was searched thoroughly for signs of badger activity.
- 4.10. LTA1 offers suitable foraging habitat for badgers such as large areas of semi-natural and plantation woodland, scrub and semi-improved grassland and arable. Several pathways considered to be attributed to badgers were also recorded within areas of woodland and grassland throughout LTA1 (see **Figure 8**). Other evidence of badger activity recorded in association with the setts and throughout LTA1 includes footprints, dung pits, latrines, badger hair and digging (see **Figure 8**).
- 4.11. Given the findings of the badger survey, the Site is considered to be of **local value** in relation to badgers.


## Bats

### Building Inspections

- 4.12. Numerous buildings are present within the Site boundary (as shown on **Figure 2**). A description of the findings of the external and internal building inspections for buildings within LTA1 is provided in **Table 14**. The location of each building is shown on **Figure 2**.
- 4.13. In summary, six buildings (Rodney House Complex, E7, E7A, E10A, E10B and E4) were considered to be of **low** bat roosting potential, whilst the Garrison Briefing Centre was a previously recorded **bat roost** in 2011. All other buildings (E25, Air Raid Shelters A – H, Substations A – C, 144 QMS Dept, E3, E10 and the Tank) within LTA1 were considered to be of **negligible** bat roosting potential.
- 4.14. Based on the construction of the buildings within LTA1 it is considered they offer limited hibernation potential for roosting bats. As such, reference to hibernating bats within buildings is not discussed any further in this report.

**Table 14: Building Descriptions and Bat Roosting Potential**

Building Reference / Name	Building Description	Building Photographs	Bat Roost Rating
Rodney House Complex	This complex consists of three buildings. The most eastern building is a tower stack measuring approximately 12m in height, with an adjacent single storey section to the north. The walls are constructed of brick and the roofs are flat with a felt covering. Some shallow cracks were noted in the brickwork. Fascia boards are present around the top of the exterior walls. Some gaps were noted between this fascia board and the brick walls. Gaps were also noted (although mostly cobwebbed), between the roofing felt overhang and walls.	 	<b>Low Potential</b>

Building Reference / Name	Building Description	Building Photographs	Bat Roost Rating
	<p>The largest building within the complex is Rodney House which comprises two single storey buildings sited parallel to each other with a single storey flat roofed building connecting them. The parallel buildings have breeze block / brick walls with corrugated asbestos pitched roofs and brick chimneys. Corrugated metal panelling is located at the gable ends of the buildings and the windows are boarded up. Possible bat roosting opportunities include raised lead flashing at the base of the chimney stacks and missing mortar in brick work.</p> <p>A further building is located at the south-west corner of Rodney House. This building is single storey, has concrete walls with an asbestos pitched roof. A wooden fascia board and panelling are present at the top of the exterior walls, with some gaps present beneath.</p>		
<p>E7: Gatehouse</p>	<p>The gatehouse is a single storey flat roofed building with brick walls. There is a soffit box around the perimeter of the top of the exterior walls which is in good condition. A raised concrete cube-shaped extension is present on the roof. This extension is covered in roofing felt and gaps were noted beneath the overhanging roofing felt offering potential opportunities for roosting bats.</p>		<p><b>Low Potential</b></p>
<p>E25: Security Office</p>	<p>A single storey building constructed from brick with a pitched asbestos tiled roof. The windows are PVC framed and a plastic soffit box is present around the top of the exterior wall perimeter. Overall the building is in good condition and provides no opportunities for roosting bats.</p>		<p><b>Negligible Potential</b></p>






Building Reference / Name	Building Description	Building Photographs	Bat Roost Rating
E7A: PPPA/OWS	A single storey flat roofed building with brick walls. There is a soffit box around the perimeter of the exterior walls which is in good condition. A raised concrete cube-shaped extension is present on the roof. This extension is covered in roofing felt and gaps were noted beneath the overhanging roofing felt which could provide crevices for roosting bats.		<b>Low Potential</b>
Air Raid Shelter A	A single storey building, constructed from brick (partially concrete rendered on the exterior) with a pitched corrugated metal roof. The building has wooden doors and window frames. Internally there is a suspended ceiling and the loft space above comprises exposed corrugated metal sheeting. No opportunities for roosting bat were recorded during the inspection.		<b>Negligible Potential</b>
Air Raid Shelter B	A series of dome-shaped metal corrugated air raid shelters. These are single skin metal framed with a 50cm brick base present in parts. At the south-western corner of the most westerly air raid shelter, a single storey building is adjoined. This building has brick walls and a flat roof covered in roofing felt. A fascia board is present around the top of the exterior walls. Some gaps (c.1cm) were noted between the fascia board and the brick walls, however these were all cobwebbed. No potential bat roosting opportunities were noted.		<b>Negligible Potential</b>
Air Raid Shelter C	A single storey building with brick walls and a corrugated asbestos pitched roof. Corrugated asbestos panelling is also present at the gable ends of the building. The space between the panelling and exterior brick walls are limited and where gaps are present these are cobwebbed. A suspended ceiling is present internally. No potential bat roosting opportunities were noted.		<b>Negligible Potential</b>

Building Reference / Name	Building Description	Building Photographs	Bat Roost Rating
Air Raid Shelter D	A metal framed corrugated metal dome-shaped air raid shelter with a concrete base and rendered concrete ends. No potential bat roosting opportunities were noted.		<b>Negligible Potential</b>
Air Raid Shelter E	A corrugated asbestos dome-shaped air raid shelter with a concrete base. No potential bat roosting opportunities were noted.		<b>Negligible Potential</b>
Air Raid Shelter F	A single storey building constructed of brick walls with a concrete slab flat roof. The brick walls are in good condition and no potential bat roosting opportunities were noted during the inspection.		<b>Negligible Potential</b>
Air Raid Shelter G	A single storey building constructed of brick walls with a corrugated asbestos flat roof. Some shallow cracks in the brickwork were observed, but these are not considered extensive enough to support roosting bats.		<b>Negligible Potential</b>
Air Raid Shelter H	A corrugated asbestos dome-shaped air raid shelter with a brick base. No potential bat roosting opportunities were noted.		<b>Negligible Potential</b>
144 QMS Dept	A single storey building with brick walls and a concrete slab flat roof. Some shallow cracks in the brickwork were observed, but these are not considered extensive enough to support roosting bats.		<b>Negligible Potential</b>



Building Reference / Name	Building Description	Building Photographs	Bat Roost Rating
Substation A	A single storey building with brick walls and a concrete slab flat roof. The brick work is in good condition and no opportunities for roosting bats were present.		<b>Negligible Potential</b>
Substation B	A single storey building with brick walls and a concrete slab flat roof. The brick work is in good condition and no opportunities for roosting bats were present.		<b>Negligible Potential</b>
Garrison Briefing Centre	<p>The main part of this building is two storey and constructed from brick walls. Some cracks in the brickwork were noted on the exterior walls. A patch of dense ivy coverage is also present on the exterior wall of the north-east corner of the building. The majority of the building has a corrugated asbestos pitched roof, whilst an adjoining single storey section (on south west facing side) has a flat roof covered in felt. Where the roofing felt extends over the edge of the top of the exterior walls, crevices are created beneath. The single storey section has a wooden fascia board present around the perimeter of the top of the exterior walls. Numerous gaps were noted beneath the fascia board, together with a missing section of wood at the south west corner.</p> <p>Internally, a theatre stage is present, together with several smaller rooms and a basement level. There are a mixture of solid concrete ceilings and suspended ceilings. Two loft spaces (inaccessible) are also present.</p> <p>This building contains several features of bat roosting potential such as gaps under fascia board, crevice under roofing felt, gaps under boarded up windows and features</p>		<b>Previously Recorded Roost</b>

Building Reference / Name	Building Description	Building Photographs	Bat Roost Rating
	potentially present in dense ivy covering.		
E3	<p>A large warehouse with exterior walls comprising brick at the lower parts and corrugated metal panelling on the upper parts. The roof comprises several parallel corrugated metal sections with plastic skylights present. Two adjoining buildings are located on the east and west sides of the main E3 building. These are single storey and flat roofed. A wooden fascia board is present around the top of the exterior walls, however no gaps are present beneath.</p> <p>Internally the roof void is metal framed and open to the pitch. No opportunities for roosting bats were present.</p>		<b>Negligible Potential</b>
E10	<p>A metal/plastic single storey building with a metal hipped roof. No opportunities for roosting bats were present.</p>		<b>Negligible Potential</b>
E10A	<p>A single storey building, constructed of brick with a flat roof covered in metal panelling. A metal garage shutter door is present on the north facing side of the building. A wooden fascia board is located at the top of the exterior brick walls. Beneath the fascia boards are several gaps (mostly cobwebbed) and this is also warped in parts creating a crevice beneath which could provide potential bat roosting opportunities.</p>		<b>Low Potential</b>
Substation C	<p>A single storey substation with brick walls and a shallow sloping roof covered in metal panelling. A wooden fascia board is located at the top of the exterior brick walls. Beneath the fascia boards are some small gaps, however these are cobwebbed.</p>		<b>Negligible Potential</b>

Building Reference / Name	Building Description	Building Photographs	Bat Roost Rating
E10B	A single storey substation with brick walls and a shallow sloping roof covered in metal panelling. A wooden fascia board is located at the top of the exterior brick walls. A gap is present at the south west corner of the fascia boards which could offer opportunities to roosting bats.		Low Potential
E4	A single storey building with three domed roof sections covered in roofing felt. Where the roofing felt overhangs the exterior brick walls, gaps are present. A wooden fascia board is also present on parts of the exterior walls, where several gaps were recorded beneath.  Internally the ceiling and floor are solid concrete.		Low Potential
Tank	A solid concrete tank considered to offer no opportunities for roosting bats.		Negligible Potential

## Tree Inspections

- 4.15. A description of the findings of the tree inspections is provided in **Table 15** below. For the purposes of this report each tree has been assigned an identification code from T1 to T19 as shown on **Figure 3**.
- 4.16. In summary, two trees (T18 and T19) were considered to be of **negligible/low** (Category 3/2) bat roosting potential, six trees (T13, T14, T15, T16 and T17) were considered to be of **low** (Category 2) bat roosting potential, two trees (T1 and T11) were considered to be of **low/moderate** (Category 2/1) bat roosting potential, one tree (T7) was considered to be of **moderate/high** (Category 1/1\*) bat roosting potential and nine trees (T2, T3, T4, T5, T6, T8, T9, T10 and T12) were considered to be of **high** (Category 1\*) bat roosting potential. The remaining trees within LTA1 on Site are considered to be of **negligible** (Category 3) bat roosting potential. No signs of roosting bats were recorded within any of the trees inspected. Those trees which have been identified as having potential to support roosting bats could also provide opportunities for bats during the hibernation period.

Table 15: Results of Tree Inspections

Tree Number	Species	Aerial Inspection Undertaken	Potential bat access and roosting opportunities	Roost Rating*
T1	Horse chestnut	Yes	Semi-mature, located within amenity grassland, 3 x rot holes, 1 x area of peeling bark.	Low/Moderate
T2	Oak	Partial	Mature, located within hedgerow with improved grassland fields adjacent, 2 x rot holes, 2 x woodpecker holes, 1 x split on main trunk approx. 30cm wide.	High
T3	Willow	Partial	Mature, located within hedgerow with improved grassland fields adjacent, 2 x rot holes, 1 x split limb, 1 x fissure.	High
T4	Willow	Partial	Mature, located within hedgerow, several fallen branches resulting in the exposure of cracks.	High
T5	Horse chestnut	Yes	Mature, located within treeline next to road, 1 x rot hole, 1 x area of peeling bark.	High
T6	Willow	Yes	Mature, located at edge of woodland next to a road, 2 x woodpecker holes.	High
T7	Willow	Yes	Mature, located at edge of woodland block, 3 x woodpecker holes.	Moderate/High
T8	Poplar	No	Mature, located within an improved grassland field near the railway line, 5 x woodpecker holes.	High
T9	Oak	Yes	Mature, located within hedgerow with improved grassland fields adjacent, 1 x rot holes, 1 x split limb.	High
T10	Ash	No	Mature, located at end of hedge/treeline within improved grassland field, 2 x rot holes, 4 x woodpecker holes, 3 x areas of loose bark, several cracks/splits.	High
T11	Aspen	Yes	Semi-mature, located within a hedge/treeline adjacent to helipad, 3 x rot holes	Low/Moderate
T12	Aspen	Yes	Semi-mature, located within a hedge/treeline adjacent to helipad, 6 x woodpecker holes.	High
T13	Willow	Yes	Semi-mature, located within amenity grassland, 1 x rot holes.	Low
T14	Willow	No	Mature, approx 60% alive, located within hedgerow in improved grassland field, 1 x rot hole, 1 x area of peeling bark.	Low
T15	Ash	Yes	Mature, located within hedgerow, 2 x rot holes, hollow trunk.	Low
T16	Horse chestnut	Yes	Mature, located next to a road within amenity grassland, 1 x area of shallow peeling bark.	Low
T17	Horse chestnut	Yes	Mature, located within treeline adjacent to the road, 1 x rot hole.	Low



Tree Number	Species	Aerial Inspection Undertaken	Potential bat access and roosting opportunities	Roost Rating*
T18	Willow	No	Mature, located on edge of conifer plantation next to a road, 1 x woodpecker hole.	Negligible/Low
T19	Willow	No	Mature, located on edge of conifer plantation next to a road, 2 x rot holes.	Negligible/Low

### Bat Emergence / Re-entry Building Survey

- 4.17. The following results section should be read in conjunction with **Figure 2** which illustrates the building locations within LTA1 and **Table 16** below which provides full details of the bat emergence and re-entry locations and timings.
- 4.18. Roosting bats were recorded at building E4 and the Garrison Briefing Centre during the bat emergence and re-entry surveys.
- 4.19. A single bat was recorded roosting under the flashing on the western facing aspect of building E4 during the dusk emergence survey conducted on 29.05.2014 and during the dawn re-entry survey conducted on 09.06.2014. The species of bat could not be confirmed as the bat was not echolocating and did not emerge from the building during these surveys. A single common pipistrelle *Pipistrellus pipistrellus* was recorded emerging from under the flashing of this building during the dusk emergence on 05.08.2014.
- 4.20. A single unidentified bat was recorded entering a vent on the eastern facing side of the Garrison Briefing Centre during the dawn re-entry survey conducted on 29.05.2014. The bat was not echolocating upon its entry into the building and therefore the species of this bat cannot be determined. A single common pipistrelle was also recorded during this survey entering a gap in the fascia board on the south western corner of the building. On three further occasions a single common pipistrelle was recorded entering/emerging from the south western corner of this building during the dusk emergence surveys conducted on 15.07.2014 and 29.09.2014.
- 4.21. Based on the findings of the surveys, buildings E4 and the Garrison Briefing Centre are both considered to support summer bat roosts. Given the relatively low number of roosting bats recorded at each building it is considered that none of the buildings at the Site support maternity roosts (where females gather together to form nursery colonies)<sup>15</sup> and as such the buildings are likely to be day roosts for males and/or non-breeding females.
- 4.22. No bats were recorded emerging or re-entering buildings E10A, E10B, E7, E7A or the Rodney House Complex and therefore these buildings are not currently considered bat roosts.
- 4.23. Bat recordings were also made of commuting and foraging bats within the vicinity of buildings. Common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, *Myotis* sp., long eared bat sp. *Plecotus* sp., serotine *Eptesicus serotinus* and Daubenton's bat *Myotis daubentonii* were recorded in the vicinity of the Garrison Briefing Centre. Common pipistrelle, soprano pipistrelle, noctule and *Myotis* sp. were recorded in the vicinity of Rodney House Complex and building E4 and common pipistrelle was also recorded in the vicinity of buildings E7, E7a, E10a and E10b.
- 4.24. Further details on the emergence / re-entry locations and the roost classification of each building are provided in **Table 16** below.

Table 16: Summary of Emergence/Re-entry Building Survey Results

Building Number	Summary of Emergence/Re-entry Building Survey Results	Roost Status
E4	<p>On 29.05.2014 at 21:39 an unidentified bat was seen under the flashing/felt on the western aspect of the building (see location 1 below).</p> <p>On 06.06.2014 an unidentified bat (consistent in size with a Pipistrelle sp. <i>Pipistrellus sp.</i>) was seen under the flashing/felt on the western aspect of the building, near the south western corner (see location 2 below). Two bat droppings considered to be attributed to <i>pipistrelle sp.</i> were recorded in a cobweb on the wall below the roosting location 1 recorded on 29.05.2014.</p> <p>On 05.08.2014 at 21:11 a single common pipistrelle <i>Pipistrellus pipistrellus</i> was recorded emerging from under the flashing/felt on the western aspect of the building (see location 3 below).</p>	<p><b>Single/Low numbers Common pipistrelle Summer Roost</b></p>
		
E7 & E7A	No roosts identified during emergence/re-entry surveys.	
E10A & E10B	No roosts identified during emergence/re-entry surveys.	
Rodney House Complex	No roosts identified during emergence/re-entry surveys.	
Garrison Briefing Centre	<p>On 30.05.2014 at 04:21 an unidentified bat was recorded entering a louvre / vent on the western facing aspect of the building (see photograph below).</p>	<p><b>Single/Low numbers Common pipistrelle Summer Roost &amp; Single unidentified bat Summer Roost.</b></p>
		

Building Number	Summary of Emergence/Re-entry Building Survey Results	Roost Status
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On 30.05.2014 at 04:30 a single common pipistrelle *Pipistrellus pipistrellus* bat was recorded entering the south western corner of the building. The bat entered a small flat roofed section of the building in a hole in the corner of the wooden fascia boarding (see photographs below).

On 15.07.14 at 22:17 a single common pipistrelle bat was recorded entering the south western corner of the building at the same location as described above. At 22:50 a single common pipistrelle bat was recorded entering the building, also at the same location (see photographs below).



On 15.07.2014 at 21:49 a single common pipistrelle bat was recorded entering the building under a board on a window on the eastern aspect of the building (see photograph below).



On 29.09.2014 at 19:25 a single common pipistrelle was recorded emerging from the south western corner of the building at the same location as described previously.

### Bat Emergence / Re-entry Tree Surveys

- 4.25. A single bat was observed exiting a hole on the south facing side of tree T11 (See **Photograph 1** below) at 20:08 during the dusk emergence survey conducted on 26.08.2014. The bat was not echolocating upon its exit from the tree and therefore the species of this bat cannot be determined. No other bats were recorded emerging or entering any of the trees during the surveys.
- 4.26. Bat recordings were also made of commuting and foraging bats within the vicinity of trees. Common pipistrelle was recorded in the vicinity of trees T1, T2, T3, T4, T5, T7, T9, T10 and T11. soprano pipistrelle and *Myotis sp.* were recorded in the vicinity of trees T5, T9, T10 and T11. *Myotis sp.* was also recorded in the vicinity of T12. Noctule was recorded in the vicinity of trees T7 and T8 and long-eared bat sp. was recorded in the vicinity of tree T10.





Photograph 1: Location of bat roost at tree T11

### Bat Activity Survey

- 4.27. The majority of bat passes recorded during all of the activity surveys were from common pipistrelle bats. Frequent passes by soprano pipistrelle, *Pipistrelle sp.*, noctule and *Myotis sp.* were recorded during the surveys. A single pass of a barbastelle *Barbastellus barbastellus* bat was recorded during the June dusk activity survey, and a single pass of a long eared bat sp. was recorded during the July dusk activity survey.
- 4.28. The results of the activity surveys undertaken are summarised below and on **Figures 9 to 13**.

#### *Common Pipistrelle*

- 4.29. This species was the most regularly encountered species at the Site with between twenty-four and forty-one calls recorded per evening activity survey. Only two common pipistrelle calls were recorded during the dawn activity survey undertaken in August 2014, however all bat activity was low during this survey. Common pipistrelles were recorded widely across the Site during all of the activity surveys between May to September. This species was recorded utilising a range of habitats including hedgerows, woodland edge and tree lined roads. This was the only species recorded along the northern edge of Graven Hill Wood.

#### *Soprano Pipistrelle*

- 4.30. This species was recorded in low numbers (between one and three calls) during the activity surveys undertaken in May, August and September 2014. Whilst no soprano pipistrelle were recorded during the June and July 2014 bat activity surveys. This species was recorded at several locations across the Site, notably along the hedgerows around the fields to the south of the railway line in the north of the Site, the tree line adjacent to Circular Road and along Anniversary Road to the south east of building E5.

#### *Pipistrelle sp.*

- 4.31. Four recordings of *Pipistrelle sp.* passes were made during the activity surveys. Three recordings were made along hedgerows around the fields to the south of the railway line in the north of the Site and one recording was made by the gate house.

#### *Noctule*

- 4.32. This species was recorded in low numbers (between two and five calls per activity survey) at several locations across the Site. This species' use of the Site is fairly widespread, however the majority of activity was recorded along the hedgerows bordering the fields to the south of the railway line in the north of the Site. Several noctules were also recorded along Anniversary Road, particularly in proximity to building E5.

#### *Long-Eared sp.*

- 4.33. A single long-eared bat was heard but not seen at the tree line adjacent to Circular Road during the evening activity survey undertaken in July 2014. This bat species was not encountered during any of the other activity surveys undertaken at the Site in 2014.

#### *Myotis sp.*

- 4.34. The *Myotis sp.* were recorded in low numbers (between one and two calls) during the activity surveys undertaken in May, June, July and September 2014. Whilst no *Myotis sp.* were recorded during the August dawn activity survey. Three recordings were made along hedgerows around the fields to the south of the railway line in the north of the Site, two recordings were made along the tree line adjacent to Circular Road and a single recording was made at the southern edge of Pioneer Woodland.

#### *Barbastelle*

- 4.35. A single barbastelle was recorded foraging approximately 3m above ground level along the tree line adjacent to Circular Road during the evening activity survey undertaken in June 2014. This bat species was not encountered during any of the other activity surveys undertaken at the Site in 2014.

### Bat Automated Detector Survey

- 4.36. A summary of the automated bat survey results is provided below.
- 4.37. A total of nine bat species were recorded by the automated detectors deployed within LTA1, namely common pipistrelle, soprano pipistrelle, noctule, *Myotis sp.*, Leisler's bat *Nyctalus leisleri*, serotine, Nathusius pipistrelle *Pipistrellus nathusii*, long eared sp. *Plecotus sp.* and barbastelle *Barbastella barbastellus*. **Table 17** below provides a summary of the amount of registrations of each species recorded each month by the six automated bat detectors, two located on each bat activity transect (denoted as **Detector Locations 1-6** in **Table 17**). **Table 17** should be read in conjunction with **Figure 4** which shows the locations of the automated bat detectors for the surveys.
- 4.38. The data collected from the automated bat detectors supported the findings of the activity surveys undertaken. The six bat species recorded during the activity transect surveys were also recorded by the automated detectors, in addition to serotine, Leisler's bat and Nathusius pipistrelle which were only recorded during the automated detector survey. The majority of registrations were of common pipistrelle and soprano pipistrelle, recorded at both detector locations. Noctule and *Myotis sp.* were also recorded frequently during most monitoring sessions at all detector locations. All other species recorded; Nathusius pipistrelle, serotine, Leislars, barbastelle and *Plecotus sp.* were

recorded in lower numbers and were not recorded consistently during every monitoring session. During some monitoring sessions, the automated detectors at some locations recorded a large anomalous number of calls from these species. For example only one *Nathusius pipistrelle* pass was recorded during all monitoring sessions apart from where 36 passes were recorded by Detector 5 in May and 40 passes were recorded by Detector 2 in September. These anomalies of the high number of passes recorded during these two sessions could be attributed to one individual bat foraging in the location of the detectors. A low number of *barbastelle* bat passes were predominately recorded by Detectors 4 and 5 which were located on a hedgerow towards the west of LTA1 and on the edge of a coniferous plantation woodland block in LTA1. Both detectors were situated in dark locations.

- 4.39. Several calls were difficult to distinguish between serotine, noctule and Leislars, due to the similar call characteristics and therefore some calls have not been defined to a species in **Table 17 below**. During two recording sessions, one of the automated detectors failed to record in situ (**see Table 17**) (as discussed in the limitations section above).

Table 17: Summary of Automated Bat Detector Surveys

Bat Species and Number of Registrations over a five night period														
Month	Detector location	Common pipistrelle	Soprano pipistrelle	Noctule	Leislars	Noctule/Leisler	Serotine	Leislars/Serotine	Nathusius pipistrelle	Barbastelle	Plecotus sp.	Myotis sp.	Total Number of Bat Registrations	Per Month
													Per Location	
May	1	3348	1890	7	0	0	0	0	1	0	4	11	5261	10609
	2	3053	282	10	0	0	0	0	0	0	0	14	3359	
	3	48	1	45	0	0	0	0	0	0	0	1	95	
	4	1191	43	2	0	0	0	0	0	2	1	13	1252	
	5	460	23	9	1	0	0	0	36	2	0	5	536	
	6	104	0	2	0	0	0	0	0	0	0	0	106	
June	1	1681	689	32	5	3	0	0	0	0	0	11	2421	8318
	2	2150	955	9	0	22	0	0	0	0	0	16	3152	
	3	162	6	53	4	9	2	0	0	2	0	4	242	
	4	415	36	634	0	14	4	0	0	12	1	23	1139	
	5	1008	4	180	30	130	8	0	0	1	0	3	1364	
	6 (Recording Failed)	0	0	0	0	0	0	0	0	0	0	0	0	
July	1	2642	19	0	0	0	0	0	0	0	0	1	2662	12304
	2	1823	539	35	0	0	0	4	0	0	0	4	2405	
	3	90	6	41	0	10	0	0	0	0	0	1	148	
	4	1594	274	10	1	1	0	0	0	0	0	20	1900	
	5	1789	178	223	6	4	3	0	0	4	1	33	2241	
	6	1448	27	123	0	0	1	55	0	0	1	11	1666	
August	1	530	132	8	0	0	0	1	0	0	0	26	697	5165
	2	1072	144	53	0	0	2	1	0	0	0	13	1285	
	3	146	4	57	0	1	2	0	0	0	0	1	211	
	4	2497	250	29	0	1	0	0	0	3	0	54	2834	
	5	83	6	0	0	0	0	0	0	0	0	0	89	
	6	48	0	1	0	0	0	0	0	0	0	0	49	
September	1	163	422	3	0	0	0	0	0	0	0	156	744	7769
	2	164	201	19	0	0	0	0	40	0	26	16	466	
	3 (Recording Failed)	0	0	0	0	0	0	0	0	0	0	0	0	
	4	5952	326	39	1	1	0	0	0	1	0	27	6347	
	5	4	1	0	0	0	0	0	0	0	0	7	12	
	6	61	104	14	0	0	0	8	0	0	1	12	200	

4.40. Given that barbastelle bats, one of the rarest bats in the UK (with a population of under 10,000(Wray *et al*, 2007<sup>28</sup>)) were recorded occasionally on Site during the activity surveys and the automated detector survey, additional survey effort was undertaken to ascertain the use of the Site by this species. A series of additional static bat detectors (ranging from 4 to 8) were deployed strategically around the Site (see **Figure 14** for locations) for a recording period of five consecutive nights for each recording session, once a month from July to September inclusive. The automated detectors were programmed to record from 15 minutes prior to sunset until 15 minutes post sunrise. **Table 18** below provides a summary of the amount of registrations of barbastelle bats recorded by the additional automated detectors between July and September. **Table 18** should be read in conjunction with **Figure 14** which shows the locations of the additional automated bat detectors for the surveys.

Table18 : Summary of Additional Automated Bat Detector Surveys

Barbastelle bat registrations recorded on additional static detectors			
Month	Detector Location	Number of registrations	Total Number of Registrations per Month
July	A	0	2
	B	1	
	C	0	
	D	1	
August	E	0	0
	F	0	
	G	0	
	H	0	
	I	0	
	J	0	
	K	0	
	L	0	
September	M	0	0
	N	0	
	O	0	

4.41. Only two additional registrations of barbastelle bats were recorded during the additional automated detector surveys undertaken between July and September. Both these registrations were recorded during the July monitoring session, along hedgerows in dark locations in close proximity to Graven

<sup>28</sup> Wray, S., Wells, D., Long, E. & Mitchell-Jones, T. (2007). *EclA: Specific Issues Associated with Bats*. Presentation at the Mammal Society/Zoological Society of London/IEEM Symposium on Advances in EclA for Mammals.

Hill wood. It is considered that the hedgerows and woodland blocks within LTA1 are being used as occasional commuting corridors and foraging resource by barbastelle bats.

## Summary

- 4.42. Nine bat species have been recorded utilising the Site, although only six of these bat species were recorded utilising the Site during the activity surveys. Bat activity appeared to be recorded relatively evenly distributed throughout LTA1 during the bat activity and automated detector surveys. The bat species most frequently recorded at the Site (i.e. common pipistrelle and soprano pipistrelle) are considered to be common and widespread bat species in the UK (Wray *et al*, 2007). Barbastelle bats which are considered to be one of the rarest bats in the UK were also recorded occasionally on Site. Therefore the Site is considered to be of **county value** with regards to bats.

## Great Crested Newts

### Habitat Suitability Index

- 4.43. An indication of the suitability of 33 water bodies located on or within 500m of the Site (connected to the Site by suitable terrestrial habitat), for supporting GCNs was made using Habitat Suitability Index scores (HSI)<sup>29</sup>. The location of these waterbodies are indicated on **Figure 6**. The western and northern side of the whole Site is bounded by a railway, whilst the north-eastern side is bounded by an A Road: these are considered to provide a substantial dispersal barrier and therefore waterbodies beyond this were not surveyed as part of this assessment. The waterbodies surveyed were split between Waterman, White Young Green (WYG) and Baker Shepherd Gillespie (BSG). A score was obtained for each water body ranging between 0 – 1; with 0 indicating likely unsuitable habitat and 1 indicating optimal habitat. The HSI results for the waterbodies surveyed are provided in **Appendix A**.

### Presence / Absence Survey

- 4.44. Presence / absence GCN surveys were undertaken on 21 waterbodies (numbered 1-21 on **Figure 6**) on and within 500m of the Site which were previously surveyed by AMEC in 2011 to inform the Outline Planning Application. In addition an extra 4 waterbodies (waterbodies 22-24 and 27) which were not surveyed in 2011 due to access restrictions were surveyed in 2014. A total of 25 water bodies, numbered 1 to 24 and 27, were subject to presence/absence surveys and the locations of these water bodies are presented on **Figure 6**. Similarly to the HSI surveys, the waterbodies surveyed for presence/absence of GCN were split between Waterman, WYG and BSG, undertaken during the same survey season in 2014. Waterman surveyed 7 waterbodies (1, 13, 14, 15, 16, 18 & 20) and partially surveyed 2 waterbodies (6 & 7), WYG surveyed 9 waterbodies (6, 7, 8, 9, 10, 11, 12, 17 & 19) and BSG surveyed 9 waterbodies (2, 3, 4, 5, 21, 22, 23, 24 & 27). WYG and BSG survey results were provided and have been collated with Waterman's results in **Table 19** and shown on **Figure 6**.
- 4.45. Waterbodies 1-4 and 8-14 are emergency water tanks (EWT) located within LTA1/LTA2. They are between 33,000 to 62,000 gallons in capacity. They are concrete lined and are bounded by amenity grassland on three sides and hard standing on one side. Waterbody 5 is a medium sized garden pond adjacent to the Site boundary to the north. Waterbodies 6 and 7 are both located off Site, waterbody 6 being in a section of woodland with aquatic vegetation. Waterbody 7 is a circular water tank concrete lined. Waterbodies 15 and 16 are ditches to the east of the Site and run either side of the railway track. Waterbodies 17 to 20 are off Site and are located in private residences.

<sup>29</sup> Oldham, R.S. et al. (2000). *Evaluating the Suitability of Habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal, 10, 143-155.

Waterbodies 17 and 18 are small and shaded by trees. Waterbody 19 held water at the time of HSI but was dry at the time of the presence/absence GCN surveys. Waterbody 20 is a large garden pond with trees to the east half and submerged vegetation. Waterbody 21 is a small, heavily-shaded pond with limited emergent and good marginal vegetation bounded on two sides by railways. Waterbodies 22 was a medium sized pond with a couple of inches of water, with no emergent and marginal vegetation and a large accumulation of leaf litter. Waterbodies 23 and 24 are large ditches located immediately south and north (respectively) of the railway line, both of which are heavily shaded by overhanging willow *Salix sp.* Waterbody 27 is a small ditch densely vegetated and shaded in parts situated adjacent to waterbody 21.

- 4.46. In summary, in 2014 GCN were recorded in waterbodies 1, 2, 3, 4, 5, 6, 9, 12, 14, 16, 17, 18 and 22. Maximum counts of 11<sup>30</sup> (waterbody 1), 193<sup>31</sup> (waterbody 2), 12<sup>32</sup> (waterbody 3), 11<sup>33</sup> (waterbody 4), 7<sup>34</sup> (waterbody 5), 14<sup>35</sup> (waterbody 6), 1<sup>36</sup> (waterbody 9), 1<sup>37</sup> (waterbody 12), 1<sup>38</sup> (waterbody 14), 2<sup>39</sup> (waterbody 16), 10<sup>40</sup> (waterbody 17), 10<sup>41</sup> (waterbody 18) and 4<sup>42</sup> (waterbody 22) were recorded by any one or more method on any one visit.
- 4.47. Similarly to the 2014 surveys, during the survey undertaken by AMEC in 2011, GCN were also recorded in waterbodies 1, 2, 3, 4, 5, 9, 16, 17 and 18. GCN were also recorded by AMEC in waterbodies 13 and 15, but were not recorded as present in these waterbodies in the 2014 surveys. GCN were not recorded in waterbodies 6, 12 and 14 during the 2011 surveys undertaken by AMEC but were recorded in these waterbodies during the 2014 surveys. In addition GCN were recorded in waterbody 22 which was not surveyed by AMEC during the 2011 surveys.
- 4.48. Smooth newts *Lissotriton vulgaris* were recorded in waterbodies 1, 6, 13, 15, 16, 17 and 20. Common frogs *Rana temporaria* were noted in waterbody 17 and tadpoles were recorded in waterbodies 11 and 12. No other amphibian species were recorded in these waterbodies. Information on incidental recordings of other amphibian species within waterbodies surveyed by BSG were not provided.
- 4.49. The results of the GCN presence / absence survey are summarised in **Table 19** below (see **Appendix B** for full survey results).

Table 19: Great crested newt survey results

Waterbody	Surveyor	Peak count of Great Crested Newts recorded						Population Size Class
		Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	
1	Waterman	8	6	3	11	6	6	Medium
2	BSG	34	35	60	182	193	191	Large
3	BSG	2	2	1	4	12	3	Medium

<sup>30</sup> Torching on 15/05/2014

<sup>31</sup> Torching on 09/04/2014

<sup>32</sup> Torching on 09/04/2014

<sup>33</sup> Torching on 16/04/2014

<sup>34</sup> Bottle Trapping on 20/03/2014

<sup>35</sup> Torching on 22/05/2014

<sup>36</sup> Torching on 22/05/2014

<sup>37</sup> Torching on 13/05/2014

<sup>38</sup> Torching on 06/05/2014

<sup>39</sup> Torching on 06/05/2014 & 15/05/2014 and Bottle Trapping on 15/05/2014, 20/05/2014 & 21/05/2014

<sup>40</sup> Torching on 23/04/2014

<sup>41</sup> Bottle Trapping on 07/05/2014

<sup>42</sup> Torching on 09/04/2014 & 16/04/2014



Waterbody	Surveyor	Peak count of Great Crested Newts recorded						Population Size Class
		Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6	
4	BSG	2	0	1	3	7	<b>11</b>	<b>Medium</b>
5	BSG	4	<b>7</b>	5	1	6	4	<b>Small</b>
6	WYG	12	6	6	<b>14</b>	3	5	<b>Medium</b>
9	WYG	0	<b>1</b>	0	0	0	0	<b>Small</b>
12	WYG	<b>1</b>	0	0	0	0	0	<b>Small</b>
14	Waterman	<b>1</b>	0	0	0	0	0	<b>Small</b>
16	Waterman	<b>2</b>	0	1	<b>2</b>	<b>2</b>	<b>2</b>	<b>Small</b>
17	WYG	<b>10</b>	9	6	4	6	4	<b>Small</b>
18	Waterman	2	<b>10</b>	4	2	2	5	<b>Small</b>
22	BSG	0	2	0	0	<b>4</b>	<b>4</b>	<b>Small</b>

### Population Size Class Estimate

- 4.50. In accordance with Natural England guidance (2001)<sup>43</sup> it is possible to estimate the size of a GCN population based on the maximum number of GCN recorded during surveys by any one method on any one evening. In accordance with this, waterbodies 5, 9, 12, 14, 16, 17, 18 and 22 support a 'small' population of GCN, waterbodies 1, 3, 4 and 6 support a 'medium' population of GCN and waterbody 2 supports a 'large' population of GCN.
- 4.51. All waterbodies where GCN were found to be present by AMEC in 2011 apart from waterbody 2 (waterbodies 1, 3, 4, 5, 9, 13, 15, 16, 17 & 18) were classified as supporting a 'small' population of GCN. Waterbody 2 was classified as supporting a 'large' GCN population. These results indicate that the GCN populations recorded in waterbodies 1, 3 and 4 have increased in size between 2011 and 2014, GCN populations have increased their range and are now present in waterbodies 6 and 14, and the GCN populations once recorded in waterbodies 13 and 15 are no longer likely to be present.
- 4.52. One waterbody (waterbody 1) has confirmed presence of GCN located within LTA1, but this waterbody is considered to form part of a wider meta-population present in the north of the Site, including populations present in waterbodies 2, 3, 4, 5, 6 and 22 (located within and directly adjacent to LTA2) which are mostly located within 250m of each other with no significant barriers to dispersal. This meta-population is considered to support a large breeding population of GCN with a peak count of 244 individuals recorded on one visit.
- 4.53. The Site is considered to support three other small populations. The populations within waterbodies 14, 16, 17 and 18 are considered to form a meta-population given the short distances of less than 100m between the four waterbodies. The small population recorded within waterbodies 9 and 12 are considered to form two separate populations given their separation of over 500m from other waterbodies with a confirmed population of GCN present. These three other small meta-populations are not considered to be impacted on by the proposed works to LTA1. Baseline data

<sup>43</sup> English Nature (2001) Great crested newt mitigation guidelines. English Nature, Peterborough.

for these populations has been included to provide context to this assessment, but are not discussed further within this report.

### Terrestrial and Aquatic Habitat

- 4.54. Habitats on Site which are being utilised by GCN both aquatically and terrestrially would appear to be generally of poor quality. Waterbodies 1-4 and 8-14 are emergency water tanks (EWT) which could be legally drained in the event of a fire with potential newt mortality. The general lack of vegetation in the waterbodies hampers breeding and the pond sides may mean newts cannot easily exit the waterbodies. Much of the immediate terrestrial habitat surrounding the waterbodies is sub-optimal amenity grassland and hard standing. The majority of the suitable terrestrial habitats present in LTA1, the northern section of LTA2 and adjacent areas likely to support GCN are plantation woodland, broad-leaved woodland, semi-improved grassland, hedgerows and scrub. These habitats provide foraging habitat, and deadwood, mammal burrows and cracks and crevices in the ground (such as around trees roots) provide opportunities for shelter and hibernation. In addition, there are a number of narrow interconnecting drainage corridors across the Site, some of which are dry. These may provide routes for GCN to move around the Site.
- 4.55. Based on the information detailed above, the Site is therefore considered to be of **district** value in relation to GCNs.

### Dormouse

- 4.56. Dormouse surveys undertaken by AMEC in 2010 and 2011 recorded a single dormouse nest in a nest-tube in September 2011 within LTA1. This was located on the northern edge of Graven Hill Wood. No other evidence of dormouse was recorded during the surveys.
- 4.57. The locations of the dormouse tubes used during the 2014 surveys are presented on **Figure 5**.
- 4.58. No dormice or evidence of this species were recorded during the nest tube surveys and no evidence of dormice was recorded during the nest search. Therefore it is considered unlikely that dormice are currently present on the Site and therefore the Site is considered to be of **negligible** value to this species.

### Reptiles

- 4.59. Twenty reptile survey visits were undertaken by AMEC in 2010 and 2011. The surveys identified that a 'good' population of common lizard and a 'low' population of grass snake on Site. A detailed plan of the locations where reptiles were recorded is not given within the report (see AMEC's Baseline Biodiversity Report (September 2011)), although they appear to have been recorded in the north of LTA1 and within the woodland in LTA1 as well as in the south of LTA2.
- 4.60. The locations of reptile survey mats and findings of the 2014 reptile survey are presented on **Figure 7**.
- 4.61. A peak count of one grass snake and two common lizards were recorded during the seven survey visits undertaken in 2014 (see **Table 20**). The single grass snake recorded was a juvenile indicating that a breeding population is present on the Site. This snake was recorded under mat 117 in a field margin in close proximity to a ditch in the northern eastern section of the LTA1. The common lizards were recorded at two locations on two occasions. The individuals were recorded under mats 30 and 36 in an unmanaged area of tall ruderal vegetation and scrub at the north of LTA1 in close proximity to the Rodney House Complex.

Table 20: Reptile survey results

Visit	Adult common lizard	Juvenile grass snake
1	-	-
2	-	-
3	-	-
4	-	1
5	-	-
6	2	-
7	2	-

- 4.62. Based on the peak count of reptiles recorded on a single visit and Froglife’s ‘Key Reptile Site Register’ (**Table 13**), the grass snake and common lizard population at the Site can be classified as ‘low’.
- 4.63. Given the results of the reptile survey undertaken at the Site, the extent and quality of suitable habitats on the Site of value to reptiles and that similar, habitats for reptiles are present in the local area, the Site is considered to be of value **within the boundary of the Site only** with regard to reptiles.

## 5. Discussion and Recommendations

- 5.1. The findings of the protected species surveys are discussed below, along with recommendations to protect and enhance the ecological value of the Site as part of the 'Development'. Planning condition 73 states that the Development should be '*carried out strictly in accordance with the mitigation proposals laid out in table 3.3, chapter 3, page 30 of the Environmental Statement set submitted with the application, which was prepared by AMEC dated September 2011*'. Therefore the recommended mitigation and enhancement measures as stated in the Environmental Statement (see **Table 21** below) are considered to remain valid unless current survey findings vary significantly from those undertaken by AMEC in 2010 and 2011. If current survey findings have varied significantly from those undertaken in 2010 and 2011, the required mitigation and enhancement measures have been amended accordingly and detailed in species specific sections below.

Table 21: Implementation of Environmental Measures<sup>44</sup>

Environmental Measure	Currently Relevant (Y/N)
Dust, lighting and noise control measures to avoid effects on off-site statutory and non-statutory nature conservation sites and sensitive flora within the Sites including watercourses as outlined in the Environment Agency's Pollution Prevention Guidelines.	Yes
Low level lighting strategy both during construction and operation to avoid effects on bird population using Bicester Wetland Reserve, wildlife using Graven Hill CWS, badgers, bats and reptiles.	Yes
No vegetation clearance to occur during the bird breeding season. Alternatively if this is not possible, vegetation clearance will be supervised by ecological clerk of works to ensure that no nests are damaged.	Yes
Access for recreational users will be restricted to northern part of CWS.	Yes
The drainage scheme has been designed to ensure that the area wet woodland still receives sufficient ground and surface water to sustain this type of habitat.	Yes
New areas of broad-leaved woodland to be planted extending the coverage of Graven Hill Wood as well as creating additionally wooded areas across the Site to mitigate effects from loss of woodland on Site.	Yes - Graven Hill Woodland will be allowed to naturally regenerate and new woodland planting will be include in other areas e.g. adjacent to the current Rodney House Complex
Enhancement of 10.8ha of retained semi-improved grassland to create a wildflower meadow situated amidst a mosaic of other habitat types (i.e. scrub and water bodies). Retention of standard	Yes – Current landscape plans indicate that 22.3 ha of semi-improved

<sup>44</sup> Adapted from Table 3.3, chapter 3, page 30 of the Environmental Statement (AMEC, September 2011)

Environmental Measure	Currently Relevant (Y/N)
trees where possible. Creation of new marginal vegetation and SUSs.	and amenity grassland would be subject to enhancement within LTA1 and the north of LTA2
Creation of approximately 25 – 30 water bodies located on-site, both as part of the SUDs and through enhancement measures for nature conservation.	Yes
Planting of 1.4 km of species-rich hedgerow and standard trees comprising native species of local origin.	Yes – Current landscape plans indicate at least 1.9 km of species-rich hedgerow and standard trees are proposed within LTA1 and the north of LTA2
Translocation of common spotted orchids from within the development area will be translocated to the newly created wildflower meadow.	No - To be confirmed with LPA ecologist – but this is considered unnecessary given that: <ul style="list-style-type: none"> <li>• Common spotted orchid is not rare or uncommon; and</li> <li>• Translocation in this manner is not guaranteed to be successful and it may be preferable to use common spotted orchid seed or plugs in the new meadow areas.</li> </ul>
Incorporation of SUDs to stabilise peak flows mitigation potential changes to drainage and hydrology of Langford Brook as a results of fluctuating water levels.	Yes
Provision of two artificial badger setts, enhanced areas of habitat for foraging badger including additional planting of fruit and nut bearing trees and green corridors linking badger setts across the Site to the wider countryside. Where necessary, sett closures will be carried out under Natural England Licence. Artificial setts are to be located in ‘quiet areas’ of Graven Hill CWS.	No - No active setts which will be directly impacted on by the proposed Development have been recorded during the current survey effort to date, therefore the provision of artificial setts is not currently required. Other enhancement measures are still

Environmental Measure	Currently Relevant (Y/N)
	relevant. Further details are provided in the 'badger' section below.
Provision of alternative roosting sites for bats in advance of any works affecting existing roosts comprising incorporation of bat tiles and bat bricks within new commercial buildings to permit access to roof space and installation of 30 bat boxes in the areas of existing broad-leaved woodland and mature standard trees where appropriate.	Yes
Retention of bat foraging habitat wherever possible. Increased provision of woodland habitat on-site and construction of new ponds within a mosaic of other habitats providing optimal resource. Incorporation of new green corridors within the proposed development design for foraging and commuting bats.	Yes – Additional dark commuting corridors appropriate for barbastelle bats, such as dark hedgerow corridors to be included within the landscape design (further details provided in the 'bat' section below)
Provision of additional areas of broad-leaved woodland and hedgerow incorporating a number of fruit and nut bearing species. Existing hedgerows will also be enhanced for dormice through the incorporation of hazel and fruit bearing species. All habitat to be lost will be replaced on a 'like for like' basis, and where appropriate a phased approach to the removal of dormouse habitat. 50 dormouse boxes are to be installed within Graven Hill Wood. Provision of green corridors linking areas of dormouse habitat across the Site to the wider countryside.	No – Not considered necessary as no dormouse or evidence of this species recorded during current survey effort. However, new woodland and woodland enhancement will include appropriate tree and shrub species.
Provision of new areas of optimal aquatic habitat for GCN. Natural England GCN mitigation licence detailing appropriate mitigation and enhancement measures.	Yes – Further details provided in the 'Great Crested Newt' section below.
Creation of optimal habitat for reptile species. All works to be subject to a reptile mitigation statement method statement to be agreed with Natural England and implemented in advance of the works.	Yes
Provision of adequate cover / refugia for reptiles in newly created areas of habitat. Leaflet drop to new residential areas highlighting conflict between cats and wildlife, and suggesting domestic cats wear bells.	Yes
Enhanced of semi-improved grassland flanking Graven Hill Wood through the creation of a mosaic habitats. This will also include additional planting of blackthorn (for brown hairstreak butterflies), creation of wildflower meadow, rotational management of the grassland and the provision of dead wood and log pyramids.	Yes



Environmental Measure	Currently Relevant (Y/N)
Enhanced provision of optimal habitat for birds and installation of bird boxes around the Site.	Yes - Details to be confirmed following findings of update breeding bird surveys due to be undertaken in 2015.
Public footpaths to be opened within Graven Hill Woodland and the grassland that flanks this. Footpaths restricted to northern half of woodland, to ensure 'quiet' areas retained for nature conservation. Provision of wildlife information boards as an educational resource within Graven Hill Wood.	Yes

## Mitigation and Enhancement Recommendations

### Badgers

#### Potential Impact on Local Badger Population

- 5.2. The active main and annex badger setts recorded within LTA1, located in the southern section of LTA1 are considered to be in use by a single badger social group and hence fall within a single badger territory. The northern section of LTA1 which comprises semi-improved grassland and a small woodland copse is considered to fall within a separate badger territory. Setts recorded by AMEC in 2011 in the area of LTA2 to the west of LTA1, and adjacent areas within Network Rail land, are considered to fall within the same badger territory as the northern section of LTA1. A disused outlier sett (see O<sup>3</sup> on **Figure 8**) recorded in the 2014 survey is also considered to lie within this territory. An active outlier see recorded to the south of LTA1 (see O<sup>4</sup> on **Figure 8**) is considered to fall within a third badger territory, along with previous setts recorded to the south of LTA1 by AMEC in 2011.
- 5.3. No fragmentation of the badger territories recorded within LTA1 are predicted as a result of the proposed Development. The network of 'green corridors' proposed within the Development masterplan (see **Appendix C**) would provide badgers with unrestricted access to retained and created foraging habitats throughout LTA1 to ensure free movement of badgers between social groups which is important in maintaining genetic diversity in the local badger population.

#### Potential Impact on Setts and Mitigation Measures

- 5.4. Based on the current Development masterplan, no active setts currently recorded on Site are considered to be directly impacted on by the Development and all are located over 30m from any proposed built development within the Site. Therefore these setts which include a main sett and two annex setts will remain in situ and protected as part of the Development. Based on the current Development masterplan, one disused outlier sett (see O<sup>2</sup> on **Figure 8**) will be directly impacted on by the Development. This sett will be destroyed using a mechanical digger, under the supervision of an ecologist. The sett will then be backfilled with appropriate materials such as soil, concrete, or rubble and compacted to deter potential future digging by badgers.
- 5.5. Given that badgers are a mobile species and able to readily excavate new setts, it is recommended that badger activity is monitored periodically and an update survey is undertaken prior to each phase of construction work to ensure that agreed mitigation strategies are appropriate and badger interests are safeguarded. During the pre-Development survey, the areas which could not be accessed during the 2014 survey would also be surveyed to confirm the status of the setts

previously recorded by AMEC in 2011, although these areas are not considered to be directly impacted on by the proposed Development.

- 5.6. If any further active badger setts which will be impacted on by the proposed Development are discovered during the pre-Development survey an approved licence from Natural England may be necessary to destroy/disturb the sett. It should be noted that such licences are only granted between July and November inclusive. Natural England can take up to thirty working days to process a licence application and a submission can only be fully determined post the granting of full planning. The exclusion of badgers from a sett, if required would be undertaken in accordance with any Natural England licence conditions. If any active badger setts recorded are impacted on by the proposed Development, mitigation would need to be put in place to retain the value of LTA1 to badgers, which may require the provision of artificial sett/s.

### Recommended Mitigation Measures during Construction Phase

- 5.7. It is recommended that an appropriate mitigation strategy is implemented in order to reduce any potential indirect impacts to the retained setts during construction activities as well as post Development. The mitigation strategy would include the provision of temporary fencing (e.g. Heras security fencing, which does not restrict badger movement) erected around each sett to create sett protection zones. This fencing should remain throughout the duration of the construction works to prevent disturbance, habitat damage and potential sett interference resulting from accidental encroachment of machinery into the protection zone. Other mitigation measures include:
- Signage on fencing to prevent site workers / machinery coming into close proximity to the badger sett;
  - No night time working and if security lighting is required it should be directed away from the sett protection zones;
  - Any trenches left open overnight will be fenced off, and a ramp will be positioned at a 45° angle to enable badgers and other mammals to escape if they fall into the trench;
  - Any temporary exposed open pipe system should be capped in such a way as to prevent badgers gaining access;
  - Tool box talks for construction workers which will ensure that all workers are aware of the presence of badgers on the Site, informed of the restricted protection zones delineated by exclusion fencing and signage and informed of the protection of badgers afforded under the Protection of Badgers Act 1992;
  - Chemicals and fuels should be stored carefully and as far away from the sett protection zones as possible and in accordance with the Code of Construction Practice and the Environment Agency's Pollution Prevention Guidelines;
  - During construction, vigilance will be exercised for signs of badger, particularly on any unfenced spoil mounds as these may be attractive to badgers for establishing a new sett; and
  - Tree felling within 30m of any setts should be undertaken in accordance with forestry guidelines (Forestry Commission, 1995).
- 5.8. Given the mitigation detailed above, it is considered that any impacts to badgers during the construction works are reduced to an acceptable level.

### Potential impacts on Foraging Habitat and Mitigation and Enhancement Measures

- 5.9. Based on the current masterplan, the Development within LTA1 would result in the permanent and temporary loss (the temporary loss includes areas that will become amenity grassland and gardens) of foraging habitat. Approximately 25.79% of foraging habitat would be permanently lost

as part of the Development, although a significant proportion of optimal foraging habitat (57.19ha/65%), predominately broad-leaved woodland, plantation woodland and grassland would be retained as part of the Development. As part of the Development proposals new habitat of value to badgers such as grassland and hedgerows would be created. Green corridors would be created throughout the Development to allow free movement of badgers within and between territories. The proposals would include the enhancement of the retained and created habitats for badgers. New planting throughout the Development would include fruit and nut producing species of trees and shrubs to provide enhanced foraging resources for badgers. Retained and created habitat will be managed to retain the value of LTA1 for badgers.

- 5.10. Details on further enhancement measures and management of habitats is detailed within the Habitat and Creation Management Plan (ref: EED13983-102\_R\_2\_1\_3\_SR) produced by Waterman EED.

## **Bats**

### **Roosts**

- 5.11. Common pipistrelle were confirmed roosting at building E4 and the Garrison Briefing Centre during the evening emergence and dawn re-entry surveys. Unidentified bat species were also recorded roosting at these buildings. Although the species of these bats cannot be confirmed, for the purposes of this report and the mitigation and enhancement detailed below, they are considered likely to be common pipistrelle given that this species has been confirmed roosting at building E4 and the Garrison Briefing Centre. A peak count of one common pipistrelle was recorded at building E4 and a peak count of three common pipistrelles were recorded at the Garrison Briefing Centre. These roosts are best described as summer roosts and are likely to support only a few individuals most likely non-breeding females or males.
- 5.12. Tree T11 was confirmed as a bat roost. A peak count of one unidentified bat species was recorded at this tree.
- 5.13. The surveys concluded that no evidence of roosting bats were present at any other buildings or trees at the Site other than those described above.
- 5.14. Based on the Development masterplan, building E4 and the Garrison Briefing Centre will be removed as part of the proposals. It is not clear from present proposals whether Tree 11 would be removed as part of the proposed Development. This will be confirmed following a proposed arboricultural survey. On the basis of the survey findings, it is anticipated that the demolition / removal of buildings / trees with bat roosts present, would need to be carried out under a Natural England (NE) European Protected Species (EPS) licence. NE requires objective evidence that the activity proposed fits the purpose set out in Regulation 53(2) (e) of The Conservation of Habitats and Species Regulations (as amended). Therefore, an EPS licence would normally be granted on receipt of planning permission and if it could be demonstrated that the proposed activities meet the following three criteria:
  - the Development must be in the interest 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; and
  - that the action authorised will not be detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range.

- 5.15. An EPS Licence application has to provide sufficient evidence to demonstrate that all three criteria are met before a licence can be issued. In addition, the proposal must be on full receipt of planning permission prior to submitting an EPS Licence application.
- 5.16. The EPS licence application would detail suitable mitigation and enhancement measures to compensate for the loss of bat roosts at the Site. This is likely to include the provision of bat roosting opportunities at the Site, as detailed in **Table 21**.
- 5.17. It should be noted that Natural England can take up to thirty working days to process a licence application and can only be fully determined post the granting of full planning. In addition the survey work used to support the NE EPS development licence would need to be within 18 months of age, to be considered valid by NE. As such, it is recommended that update evening emergence / dawn re-entry bat surveys are undertaken if a NE EPS licence is not applied for within 18 months of the completion of the surveys. Prior to the Development works commencing on the Site, contractors should be made aware of the potential for buildings / trees to contain opportunist bats and the legislation relating to the protection of bats.
- 5.18. Bats are highly mobile and tree roosts can be sporadically used by roosting bats for only several days over the course of a year. Given this and the quality of roosting features recorded, the future use of these trees on the Site by roosting bats cannot be ruled out. Therefore if any trees with potential to support roosting bats are to be removed to facilitate the Development, an inspection or emergence / re-entry survey should be undertaken immediately prior to felling. If any roosting bats are discovered, then works would have to cease until a NE EPS Licence (details provided above) is sought.

### Potential Impacts on Foraging and Commuting Habitat and Mitigation and Enhancement Measures

- 5.19. Six bat species; common pipistrelle, soprano pipistrelle, *Pipistrelle sp.*, noctule, *Myotis sp.*, long eared bat sp., and barbastelle were recorded during the activity transect surveys. The six bat species recorded during the activity transect surveys were also recorded by the automated bat detectors, in addition to serotine, Leisler's bat and Nauthusius pipistrelle which were only recorded during the automated detector survey.
- 5.20. Barbastelle is the only species of bat which was not recorded during AMEC's previous bat survey work. Barbastelle bats are listed on Annex II of The Conservation of Habitats and Species Regulations 2010 (as amended) and are considered one of the rarest bat species in the UK<sup>45</sup>. Given the low number of recordings of this species it is considered likely that a few individuals are using the site sporadically to forage and/or commute to off-Site foraging areas. Given the recordings were predominately made within an hour of dusk and dawn, this indicates barbastelle bats may be roosting in close proximity to the Site.
- 5.21. Areas of bat foraging and commuting habitat such as small areas of woodland, scrub and hedgerows will be lost to the Development. Bat mitigation and enhancement measures for the loss of bat foraging and commuting habitat as part of the Development are provided in **Table 21**. Barbastelles were not recorded on the Site when AMEC prescribed these mitigation and enhancement principles (see **Table 21**) and therefore additional measures specific to this species are required given their high conservation value. Barbastelle bats typically forage along woodland edge and rides and will use hedgerows, streams and rivers for commuting (Hundt, 2012). Specific mitigation and enhancement measures for this species are provided below:

<sup>45</sup> Bat Conservation Trust/JNCC (2014). The state of the UK's bats 2014.

- Current Development proposals would retain the vast majority of habitats of greatest value to foraging and commuting barbastelles i.e. hedgerows and woodland. This would retain foraging and commuting opportunities for barbastelles at the Site;
  - Green infrastructure would be created as part of the Development and this would provide and enhance commuting corridors for barbastelles across the Site. In summary, habitats of value to foraging and commuting barbastelles which would be created include woodland, hedgerows, species rich grassland, swale corridors and ponds/SUDS;
  - Creation of ‘hop overs’<sup>46</sup> to facilitate barbastelles in crossing roads. These would comprise planting of mature trees on either side of the road intersections. The trees would increase in height from 2m, 4m and then 6m the nearer they are located to the road intersections to form a ‘ramp’ to allow barbastelles and other bat species to follow these linear features and cross these roads at a greater height and avoid being struck by cars;
  - Upwards directional bollard lighting would also be employed and would be located at the hedgerow and road intersections. Given that barbastelles are also light sensitive, this bollard lighting would act as secondary measure to force them to fly at a greater height and follow the line of ‘ramping trees’, where light levels would lower, whilst they cross the road; and
  - Development and implementation of an appropriate lighting mitigation strategy using low level/directional lighting along woodland edges to retain and create dark corridors.
- 5.22. Details on further enhancement measures and management of habitats is detailed within the Habitat and Creation Management Plan (ref: EED13983-102\_R\_2\_1\_3\_SR) produced by Waterman EED.

## Great Crested Newts

### Potential Impacts on Aquatic and Terrestrial Habitats

- 5.23. One waterbody (waterbody 1) located within LTA1 has been confirmed as supporting GCN. This waterbody is considered to form part of a wider meta-population present in the north of the Site, including populations present in waterbodies 2, 3, 4, 5, 6 and 22 (located within and directly adjacent to LTA2) which are mostly located within 250m of each other with no significant barriers to dispersal. This meta-population is considered to support a large breeding population of GCN.
- 5.24. Based on the masterplan, the Development of LTA1 will result in the loss of waterbody 1 and the Development of the northern part of LTA2 will potentially result in the loss of waterbodies 3 and 4. Pond 2, containing a large GCN population is set to be retained. The Development will also result in the loss of potential GCN terrestrial habitat.
- 5.25. This report concentrates on the Development of LTA1 and as such only discusses the recommendations and mitigation measures required for the loss of waterbody 1, an emergency water tank recorded as supporting a medium breeding GCN population, a series of drainage ditches which are potentially used by GCN to migrate around the Site and terrestrial habitat to be lost and impacted on within LTA1. A total of 26.04ha of potential terrestrial habitat for GCN would be permanently lost to the Development and a total of 2.66ha of potential terrestrial habitat would be temporarily lost as part of the Development. A large proportion of the potential terrestrial habitats to be lost as part of the Development comprise amenity grassland, and as such is sub-optimal.
- 5.26. On the basis of the survey findings, it is anticipated that the loss of aquatic and terrestrial GCN habitat present, would need to be carried out under a Natural England (NE) European Protected

<sup>46</sup> Sétra (2009): ‘Bats and Road Transport Infrastructure. Threats and Preservation Measures. Information Note’. Economics Environment Design 91. Translated May 2011.

Species (EPS) licence. NE requires objective evidence that the activity proposed fits the purpose set out in Regulation 53(2) (e) of The Conservation of Habitats and Species Regulations (as amended). Therefore, an EPS licence would normally be granted on receipt of planning permission and if it could be demonstrated that the proposed activities meet the three criteria described above in the 'bat' section (para 5.14).

- 5.27. An EPS Licence application has to provide sufficient evidence to demonstrate that all three criteria are met before a licence can be issued. In addition, the proposal must usually be on full receipt of planning permission prior to submitting an EPS Licence application.
- 5.28. The EPS licence application would detail suitable mitigation and enhancement measures to avoid the injury and killing of individuals, such as the translocation of GCN out of the construction zone prior to works and compensate for the loss of GCN habitat as detailed below.
- 5.29. It should be noted that Natural England can take up to thirty working days to process a licence application and can only be fully determined post the granting of full planning. In addition the survey work used to support the NE EPS development licence would need to be within 18 months of age, to be considered valid by NE. As such, it is recommended that update presence / likely absence surveys for GCN are undertaken if a NE EPS licence is not applied for within 18 months of the completion of the surveys. Prior to the Development works commencing on the Site, contractors should be made aware of the potential for GCN on Site and the legislation relating to the protection of this species.

### Mitigation and Enhancement Measures

- 5.30. To compensate for the loss of habitat, new habitat will be created and habitat will be enhanced to increase opportunities for GCN. To compensate for the loss of waterbody 1, two ponds specifically designed for GCN, totalling 0.025ha in area, will be created in an area of enhanced species-rich grassland. The waterbodies will be surrounded by areas of enhanced species-rich grassland, tree and shrub planting and newly created allotments, all considered to be optimal for GCN. As an additional enhancement measure, log piles and hibernacula will also be created within the area of grassland surrounding the new ponds. In addition, at least 1 km of SuDs ditches which will be managed appropriately to create suitable GCN habitat will be created within LTA1 and the north of LTA2, along with 0.70ha of drainage ponds (with permanent open water GCN habitat). Although the SuDs waterbodies cannot be considered as compensation for the effects on GCN as part of the Development, GCN will benefit from the creation of these waterbodies and associated vegetation.
- 5.31. Further habitat and enhancement measures will be provided within the Development to increase the commuting, foraging and shelter opportunities for GCN within LTA1 include:
  - Planting of at least 1.4 km of species rich hedgerow;
  - Inclusion of modified wildlife friendly pavement kerbs and gully pots to allow the safe passage of GCN at key crossing locations;
  - Regeneration of 1 ha broadleaved woodland extending the coverage of Graven Hill woodland;
  - Creation of GCN tunnels / modified culverts to provide connectivity between the GCN meta-populations recorded in LTA1 and LTA2;
  - The creation of at least 4 ha amenity / parkland areas in LTA1 and the north of LTA2; and
  - Management of retained and created habitats to retain the value of LTA1 for GCN.
- 5.32. Details on further enhancement measures and management of habitats is detailed within the Habitat and Creation Management Plan (ref: EED13983-102\_R\_2\_1\_3\_SR) produced by Waterman EED.



## 6. Conclusions

- 6.1. This report has been produced to support the Reserved Matters Application and to allow the partial discharge a number of planning conditions, namely planning condition 74. This report discusses the findings of the following protected species surveys which have been undertaken at the Site:
- Badger Survey;
  - Bat Roost Inspections – Building and Tree Survey;
  - Bat Emergence / Re-entry - Building Survey;
  - Bat Emergence / Re-entry - Tree Survey;
  - Bat Activity Survey;
  - Bat Automated detector Survey;
  - Dormouse Survey;
  - Great Crested Newt Survey; and
  - Reptile Survey.
- 6.2. The results of the above surveys show that the Site and adjacent habitats are of value to badgers, roosting, commuting and foraging bats, great crested newts and reptiles. Whilst dormice are considered likely to be currently absent from the Site.
- 6.3. In line with relevant legislation and planning policies, recommendations have been made within this report with regard to the appropriate protection of those protected species present on and adjacent to the Site. Recommendations have also been made to enhance the Site and adjacent areas to achieve a net gain for biodiversity.
- 6.4. To fully discharge planning condition 74, further protected species surveys, including breeding bird and invertebrate surveys are to be undertaken and reported to discuss the implications of the findings of the surveys, the consequences of Development in relation to relevant planning policy and legislation and recommended mitigation measures which may be required in accordance with planning condition 73.
- 6.5. Should a period of 18-24 months or more pass from the dates on which the surveys detailed within this report were undertaken without works being carried out, these surveys may be required to be updated. These updated surveys would be required to determine whether the use and value of those habitats and species on and adjacent to the Site significantly changed.
- 6.6. It is considered that if the advice within this report relating to flora and fauna on the Site is followed and that an appropriate level of ecological enhancement measures is incorporated within the Development where required, there is no ecological reason why the Site cannot be developed with regard to protected species in accordance with the relevant planning policy and legislation.

## Figures

Figure 1: Land Transfer Areas (EED13983-101\_GR\_PSR\_EC\_1B)

Figure 2: Building Location and Results of Building Inspection & Emergence / Re-entry Survey (EED13983-101\_GR\_PSR\_EC\_2A)

Figure 3: Tree Inspection and Emergence / Re-entry Survey Results (EED13983-101\_GR\_PSR\_3A)

Figure 4: Bat Activity Survey Transects and Automated Bat Detector Locations (EED13983-101\_GR\_PSR\_4A)

Figure 5: Dormouse Tube Locations (EED13983-101\_GR\_PSR\_5A)

Figure 6: Waterbody Locations and Findings of Great Crested Newt Presence / Absence Survey (EED13983-101\_GR\_PSR\_6B)

Figure 7: Reptile Mat Locations and Findings of Presence/ Absence Survey (EED13983-101\_GR\_PSR\_7A)

Figure 8: Results of Badger Survey (EED13983-101\_GR\_PSR\_8A)

Figure 9: Results of Dusk Activity Survey (22/05/14): Transects 1,2 & 3 (EED13983-101\_GR\_PSR\_9A)

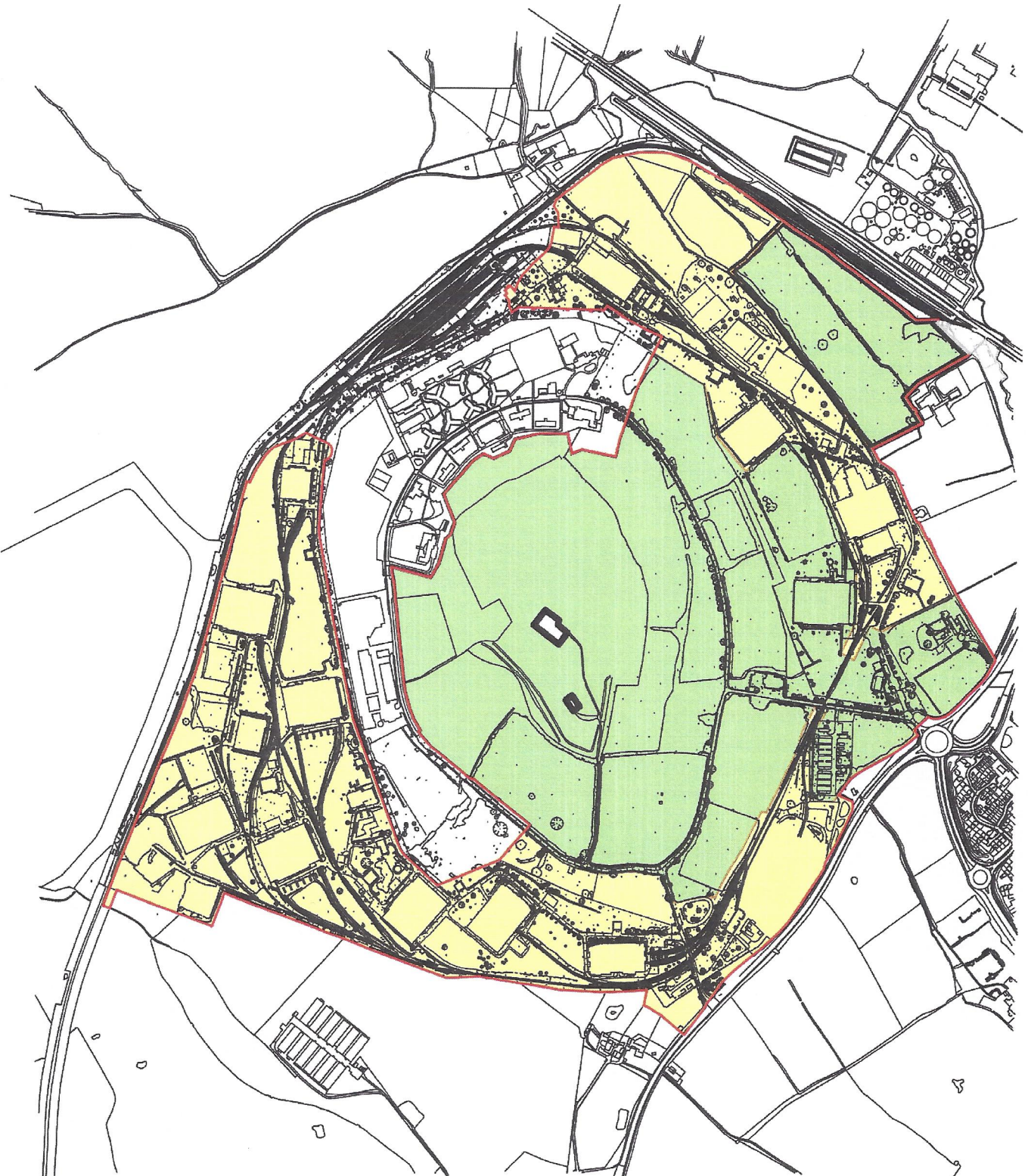
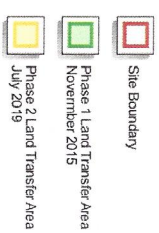
Figure 10: Results of Dusk Activity Survey (19/06/14): Transects 1,2 & 3 (EED13983-101\_GR\_PSR\_10A)

Figure 11: Results of Dusk Activity Survey (01/07/14): Transects 1,2 & 3 (EED13983-101\_GR\_PSR\_11A)

Figure 12: Results of Dawn Activity Surveys (15/08/14): Transects 2 & 3 and (20/08/14): Transect 1 (EED13983-101\_GR\_PSR\_12A)

Figure 13: Results of Dusk Activity Surveys (04/09/14): Transects 1, 2 & 3 (EED13983-101\_GR\_PSR\_13A)

Figure 14: Additional Automated Bat Detector Locations (EED13983-101\_GR\_PSR\_14A)



**Project Details**  
EED13983-102: MOD Bicester

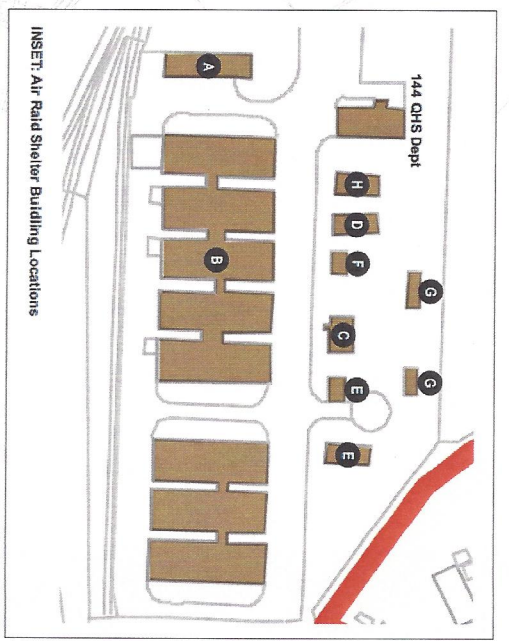
**Figure Title**  
Figure 1: Land Transfer Areas

**Figure Ref**  
EED13983-102\_GR\_PSR\_1B

**Date**  
February 2015

**File Location**  
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- Building Inspection and Emergence / Re-entry Survey Results
- Previously Recorded Roost
- Low Potential
- Negligible Potential
- \* Confirmed Roost (During Emergence / Re-entry Surveys)



**Project Details**  
 EED13983-102: MOD Bicester

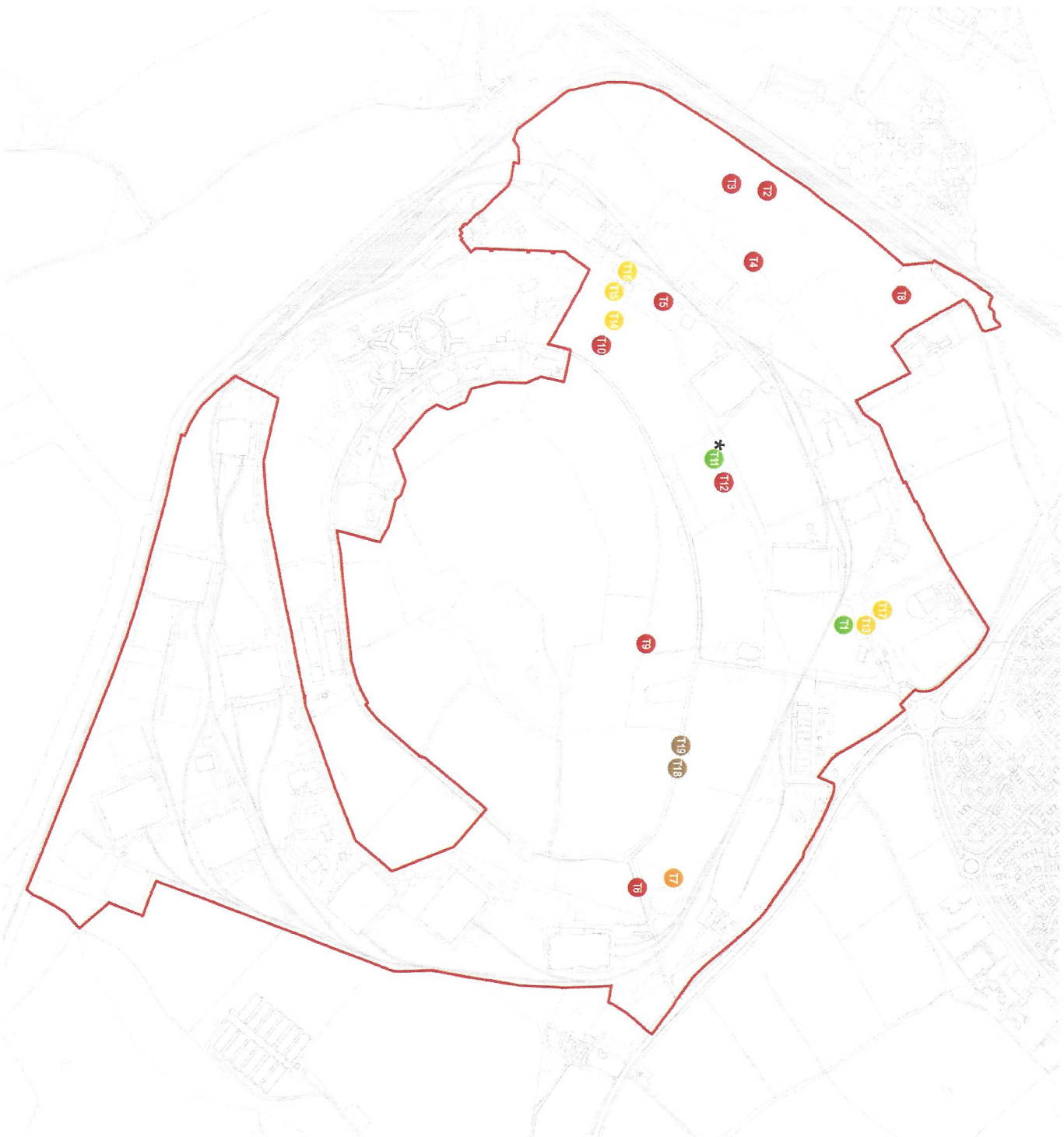
**Figure Title**  
 Figure 2: Building Location and Results of Building Inspection & Emergence / Re-entry Survey

**Figure Ref**  
 EED13983-102\_GR\_PSR\_2A

**Date**  
 October 2014

**File Location**  
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- Tree Survey Results**
- High Potential Tree
  - Moderate / High Potential Tree
  - Low / Moderate Potential Tree
  - Low Potential Tree
  - Negligible / Low Potential Tree
  - Confirmed Tree Root  
(During Emergence Survey on 26/08/14)



**Project Details**  
EEDI/3983-102: MOD Bicester

**Figure Title**  
Figure 3: Tree Inspection and Emergence / Re-entry Survey Results

**Figure Ref**  
EEDI/3983-102\_GR\_PSR\_3A

**Date**  
October 2014

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