

**QINETIQ SITE, FORT HALSTEAD,
KENT**

ECOLOGICAL MITIGATION STRATEGY

A Report to: QinetiQ

Report No: RT-MME-150872-06 Rev B

Date: June 2021



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REPORT VERIFICATION AND DECLARATION OF COMPLIANCE

This study has been undertaken in accordance with British Standard 42020:2013 "Biodiversity, Code of practice for planning and development".

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The information which we have prepared is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

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CONTENTS

1. INTRODUCTION	4
1.1 PROJECT BACKGROUND	4
1.2 SITE DESCRIPTION AND CONTEXT	4
1.3 DESCRIPTION OF DEVELOPMENT	5
1.4 DOCUMENTATION PROVIDED	5
1.5 MITIGATION STRATEGY STRUCTURE	5
1.7 FEATURES SCOPED OUT OF INCLUSION WITHIN THE EMS	5
1.7.1 Terrestrial Invertebrates	5
1.7.2 Great Crested Newt and Common Amphibians	6
1.7.3 Otter, Water Vole and White-Clawed Crayfish	6
1.7.4 Other Species / Species Groups	6
1.7.6 Invasive Non-Native Plant Species	6
2. NATURE CONSERVATION SITES	7
2.1 BASELINE DATA	7
2.1.1 Desk Study	7
2.2 IMPACT ASSESSMENT	8
2.2.1 Pre- and Mid-Development / Construction Phase Impacts	8
2.2.2 Long-Term Impacts	8
2.3 AVOIDANCE AND MITIGATION MEASURES	8
2.3.1 Construction Phase Measures	8
2.3.2 Operational Phase Measures	9
2.4 COMPENSATION AND ENHANCEMENT MEASURES	9
2.5 POST-DEVELOPMENT MANAGEMENT AND MONITORING	9
3. HABITATS	10
3.1 BASELINE DATA	10
3.1.1 Field Survey	10
3.2 IMPACT ASSESSMENT	10
3.2.1 Pre- and Mid-Development / Construction Phase Impacts	10
3.2.2 Long-Term Impacts	11
3.3 AVOIDANCE AND MITIGATION MEASURES	11
3.3.1 Habitat Retention	11
3.3.2 Construction Phase Measures	11
3.3.3 Operational Phase Measures	11
3.4 ENHANCEMENT MEASURES	11
3.5 POST-DEVELOPMENT MANAGEMENT AND MONITORING	12
4. BATS	13
4.1 BASELINE DATA	13
4.1.1 Desk Study	13
4.1.2 Field Surveys	13
4.2 IMPACT ASSESSMENT	13
4.2.1 Pre- and Mid-Development / Construction Phase Impacts	13
4.2.2 Long-Term Impacts	14
4.3 AVOIDANCE AND MITIGATION MEASURES	14
4.3.1 Bat Protection Strategy	14
4.3.2 Bat Mitigation Strategy and Natural England Bat Licence Application/s	14
4.3.3 Further Surveys (if required)	14
4.3.4 General Construction Phase Measures	15
4.3.5 Operational Lighting Strategy	16
4.4 COMPENSATION AND ENHANCEMENT MEASURES	16
4.4.1 Bat Roosting Boxes	16
4.4.2 Habitat Creation and Enhancement	17
4.5 POST-DEVELOPMENT MANAGEMENT AND MONITORING	17
5. DORMICE	18

5.1	BASILINE DATA.....	18
5.1.1	Desk Study.....	18
5.1.2	Field Survey.....	18
5.2	IMPACT ASSESSMENT.....	18
5.2.1	Pre- and Mid-Development Impacts.....	18
5.2.2	Long-Term Impacts.....	18
5.3	AVOIDANCE AND MITIGATION MEASURES.....	18
5.3.1	Licensing Requirements for Vegetation Clearance.....	18
5.3.2	General Construction Phase Measures.....	19
5.4	COMPENSATION AND ENHANCEMENT MEASURES.....	19
5.4.1	Dormice Nest Boxes.....	19
5.4.2	Habitat Creation and Enhancement.....	19
5.5	POST-DEVELOPMENT MANAGEMENT AND MONITORING.....	19
6.	TERRESTRIAL MAMMALS: BROWN HARE AND HEDGEHOG.....	20
6.1	BASILINE DATA.....	20
6.1.1	Desk Study.....	20
6.1.2	Field Survey.....	20
6.2	IMPACT ASSESSMENT.....	20
6.2.1	Pre- and Mid-Development Impacts.....	20
6.2.2	Long-Term Impacts.....	20
6.3	AVOIDANCE AND MITIGATION MEASURES.....	20
6.3.1	Construction Phase Measures.....	20
6.3.2	Operational Phase Measures.....	20
6.4	POST-DEVELOPMENT MANAGEMENT AND MONITORING.....	20
7.	BIRDS.....	21
7.1	BASILINE DATA.....	21
7.1.1	Desk Study.....	21
7.1.2	Field Surveys.....	21
7.2	IMPACT ASSESSMENT.....	22
7.2.1	Pre- and Mid-Development Impacts.....	22
7.2.2	Long-Term Impacts.....	22
7.3	AVOIDANCE AND MITIGATION MEASURES.....	22
7.3.1	Construction Phase Measures.....	22
7.3.2	Operational Phase Measures.....	22
7.4	COMPENSATION AND ENHANCEMENT MEASURES.....	23
7.4.1	Replacement Nest Boxes.....	23
7.4.2	Habitat Creation and Enhancement.....	23
7.5	POST-DEVELOPMENT MANAGEMENT AND MONITORING.....	23
8.	REPTILES.....	24
8.1	BASILINE DATA.....	24
8.1.1	Desk Study.....	24
8.1.2	Field Survey.....	24
8.2	IMPACT ASSESSMENT.....	24
8.2.1	Pre- and Mid-Development Impacts.....	24
8.2.2	Long-Term Impacts.....	24
8.3	AVOIDANCE AND MITIGATION MEASURES.....	24
8.3.1	Herpetofauna Mitigation Strategy.....	25
8.3.2	General Construction Phase Measures.....	26
8.4	COMPENSATION AND ENHANCEMENT MEASURES.....	26
8.5	POST-DEVELOPMENT MANAGEMENT AND MONITORING.....	26
9.	SUMMARY.....	28
10.	DRAWINGS.....	29
	REFERENCES AND BIBLIOGRAPHY.....	33
	APPENDICES.....	34

1. INTRODUCTION

1.1 PROJECT BACKGROUND

In August 2020, QinetiQ commissioned Middlemarch Environmental Ltd to develop an Ecological Mitigation Strategy (EMS) associated with the strategic redevelopment of QinetiQ owned land within Fort Halstead. A full description of the proposals is provided in Section 1.3.

A range of ecological surveys were completed by Waterman Group between 2006 and 2013 and by Middlemarch Environmental Ltd in 2018, with further updated surveys in 2020, to inform a separate hybrid planning application associated with the redevelopment of the wider Fort Halstead site. Land surveyed as part of these assessments included QinetiQ owned land.

Middlemarch Environmental Ltd was subsequently instructed to undertake a full suite of targeted surveys of the QinetiQ owned land, comprising:

- Preliminary Arboricultural Assessment (Report RT-MME-150872-01);
- Arboricultural Impact Assessment (Report RT-MME-150872-02 Rev A);
- Preliminary Ecological Appraisal (Report RT-MME-150872-03 Rev A., Appendix 2);
- Preliminary Bat Roost Assessment (Report RT-MME-150872-04 Rev A, Appendix 3);
- Badger Survey (Report RT-MME-150872-05 Rev A, Appendix 4);
- Dusk Emergence and Dawn Re-Entry Bat Surveys (Report RT-MME-153340-01 Rev B, Appendix 5); and,
- Winter Hibernation Bat Survey (Report RT-MME-153704-02 Rev B).

A separate Bat Protection Strategy (Report RT-MME-150872-08 Rev A) relating to Building X78 and a separate Bat Mitigation Strategy (Report RT-MME-153704-01 Rev A) relating to Building X9 have also been prepared.

Middlemarch Environmental Ltd has also prepared a Construction Ecological Management Plan (CEcMP, Report RT-MME-153844-03 Rev C), undertaken a Biodiversity Net Gain Assessment (Report RT-MME-153844-02 Rev B) and prepared a Landscape and Ecological Management Plan (LEMP, Report RT-MME-153844-03 Rev B) for the QinetiQ redevelopment.

Implementation of the control measures and mitigation proposals outlined in the EMS will ensure that the works proceed without breaching wildlife legislation, and that the favourable conservation status of potential ecological receptors will be maintained. The content of this document is guided by wildlife legislation and relevant planning policy and biodiversity targets.

During development of this EMS the ecological mitigation hierarchy has been applied in accordance with the principles set out in the British Standard for Biodiversity (BS42020):

- Avoid;
- Mitigate;
- Compensate; and,
- Enhance.

1.2 SITE DESCRIPTION AND CONTEXT

The wider Fort Halstead site is located off Star Hill Road in Halstead, Kent, centred at National Grid Reference TQ 4970 5922. It is an irregular shaped parcel of land that measures 131.89 ha in size. The wider Fort Halstead site is bordered by the A224 Polhill to the north-east and Star Hill Road to the south-west. A mixture of arable and pastoral fields, pockets of woodland and farm buildings surround the site. The wider landscape is dominated by a rural setting, consisting of agricultural land interspersed with pockets of woodland and small settlements.

The planning application site extends to 15.8 ha and sits within the wider Fort Halstead site. The site is known as the QinetiQ enclave and is located on the southern-most boundary of the wider Fort Halstead site. The application site is bound by Crow Road to the north, the Scheduled Ancient Monument to the east, ancient woodland to the west and the existing site perimeter fence to the south.

At the time of the survey, the QinetiQ enclave comprised a defence research facility which contained a number of buildings with associated areas of hardstanding, surrounded by parcels of semi-natural and plantation woodland. Areas of neutral grassland, calcareous grassland and amenity grassland were also present, as well as patches of scrub and tall ruderal vegetation.

1.3 DESCRIPTION OF DEVELOPMENT

The proposals for the site are as follows:

Works to the proposed QinetiQ enclave comprising the erection of perimeter security fence, erection of a new reception building, creation of a new main site entrance along Crow Road, refurbishment of existing buildings including plant installation, creation of a new surface level car park and access, installation of two new explosive magazine stores and surrounding pendine block walls, demolition of existing buildings, installation of 6no. storage containers, installation of new site utilities and landscaping works.

1.4 DOCUMENTATION PROVIDED

The conclusions and recommendations made in this report are based on information provided by the client regarding the scope of the project. Documentation made available by the client is listed in Table 1.1.

Document Name / Drawing Number	Author
Proposed Site Plan / 30002236-BHK-00-XX-DR-A-003	Baker Hicks

Table 1.1: Documentation Provided by Client

1.5 MITIGATION STRATEGY STRUCTURE

Chapters 2 to 8 of this report focus on each of the ecological features that have been identified as potential constraints to the development of the site, as follows:

- Chapter 2: Nature Conservation Sites
- Chapter 3: Habitats
- Chapter 4: Bats
- Chapter 5: Dormice
- Chapter 6: Terrestrial Mammals: Brown hare and hedgehog
- Chapter 7: Breeding and Wintering Birds
- Chapter 8: Reptiles

Each chapter provides a summary of the potential impacts of the proposed development on the ecological feature in the absence of mitigation, and then outlines avoidance, mitigation, compensation and enhancement proposals that will be implemented to address each of these impacts and ensure no loss of favourable conservation status. Detail regarding post-development safeguarding and monitoring is also provided, where known.

Chapter 9 of this report provides a summary of the mitigation strategy. A separate confidential chapter relating to badgers has been prepared (Appendix 1) and should be read in conjunction with this report.

1.7 FEATURES SCOPED OUT OF INCLUSION WITHIN THE EMS

1.7.1 Terrestrial Invertebrates

A Terrestrial Invertebrate Survey (Report RT-MME-127947-08) was undertaken to inform a separate planning application for the wider Fort Halstead site by Middlemarch Environmental in 2018. This confirmed that the most important area for invertebrates is the area of chalk grassland (unimproved calcareous grassland) in the southern part of the site, part of which falls within the QinetiQ site boundary. This habitat is being retained as part of the development and as such the most notable invertebrate species will not be displaced from the site as a result of works. Furthermore, it is anticipated that the general habitat retention, creation and enhancement measures outlined in Chapter 3 of this report will increase the suitability of the site for a range of species groups, including invertebrates.

No records of stag beetle were provided in the desk study. However, this species is predominantly distributed across south-east England, and the site supports suitable habitat for this species, including dead wood. The majority of woodland habitat is being retained, including all ancient woodland, and therefore stag beetle, if present, is unlikely to be displaced from the site. The enhancement of the woodland and provision of more dead wood will further increase the suitability of the site for stag beetles.

As such, a separate chapter for terrestrial invertebrates has not been included within this document.

1.7.2 Great Crested Newt and Common Amphibians

There is no aquatic habitat suitable for breeding within the site. Reference to Ordnance Survey mapped data identified three waterbodies within a 250 m radius of the wider Fort Halstead site, but these are located over 470 m away from the proposed works footprint and therefore it was considered unlikely that any amphibians, particularly great crested newts, will be encountered during the development works.

The measures outlined in Chapter 8 of this report to ensure that reptiles are protected throughout the works will also safeguard common amphibians, should they be present within suitable terrestrial habitats within the site.

1.7.3 Otter, Water Vole and White-Clawed Crayfish

There are no watercourses or waterbodies on or adjacent to the site, and as such, otter, water vole and white clawed crayfish are not notable considerations with respect to the proposed development.

1.7.4 Other Species / Species Groups

The following species / species groups have been scoped out of further assessment due to a lack of desk study records and/or the absence of suitable habitats within the site and its surroundings: pine marten *Martes martes*, polecat *Mustela putorius* and red squirrel *Sciurus vulgaris*.

1.7.6 Invasive Non-Native Plant Species

No invasive non-native plant species were identified within the QinetiQ site during the 2020 Phase 1 Habitat Survey. Although several invasive plant species have previously been identified within the wider Fort Halstead site, these specimens were located in the northern part of the wider site, a significant distance from the QinetiQ site. It is considered highly unlikely that the proposed works within the QinetiQ site will cause any breaches of legislation with regards to invasive species.

2. NATURE CONSERVATION SITES

2.1 BASELINE DATA

2.1.1 Desk Study

The desk study completed as part of the Preliminary Ecological Appraisal (Report RT-MME-127947-01 Rev A, Appendix 2) for the wider Fort Halstead site in 2018 included a search for European statutory nature conservation sites within a 5 km radius of the site (extended to 10 km for any statutory site designated for bats) and a search for UK statutory nature conservation sites and ancient woodland sites within a 2 km radius, using the Multi-Agency Geographic Information for the Countryside website.

Desk study data provided by Kent and Medway Biological Records Centre included records for UK non-statutory nature conservation sites within a 2 km radius of the site.

Nature conservation sites located in proximity to the site are summarised in Table 2.1 and are shown on Drawing C150872-06-01 in Chapter 10 of this report.

Site Name	Designation	Proximity to QinetiQ Site	Description
UK Statutory Sites			
Westerham Mines	SSSI	6.93 km south-west	The principal interest of this site is the use of its abandoned ragstone mines by a variety of hibernating bats. With the increasing scarcity of bats in south-east England and the continued loss of the few suitable hibernacula remaining available to them, these mines represent an important winter refuge for bats in the county. Five species have been recorded hibernating here: Brandt's bat <i>Myotis brandti</i> , brown long-eared bat <i>Plecotus auratus</i> , Daubenton' bat <i>Myotis daubentoni</i> , Natterer's bat <i>Myotis nattereri</i> and whiskered bat <i>Myotis mystacinus</i> . The number of bats using the mines declined from the 1950s onwards, largely because of disturbance, but the fitting of grilles (allowing access for bats but not humans) and devices to maintain the air flow through the mines is thought to have led to an increase in numbers in recent years. However, it is very difficult to locate all the bats using the tunnels, and different species use them at different times during the winter. Thus, it is extremely hard to estimate the true numbers using the mines. There is also evidence that some use is made of the mines by bats in summer.
Non-statutory Sites			
Chevening Estate	LWS	280 m south-west	Reference to aerial imagery indicates that this LWS comprises woodland.
Crown Meadow Wood	WT Reserve	1.22 km south-east	No information provided.
Chevening Churchyard	LWS	1.22 km south-west	No information provided.
Woodlands West of Shoreham	LWS	1.33 km north-east	Encompasses several parcels of ancient semi-natural and replanted woodland.
Polhill Bank	KWT Reserve	1.33 km north-east	Comprises almost 4 ha of chalk grassland on a south-east-facing slope.
Key: SSSI: Site of Special Scientific Interest LWS: Local Wildlife Site KWT: Kent Wildlife Trust WT: Woodland Trust			

Table 2.1: Summary of Nature Conservation Sites

There are no SSSIs located within a 2 km radius of the site, however, the site does fall within an SSSI Impact Risk Zone for Sevenoaks Gravel Pits SSSI, which is located c. 2.5 km to the south-east.

In addition to the sites detailed in Table 2.1, 81 parcels of ancient woodland located within a 2 km radius of the wider Fort Halstead site were identified in the 2018 desk study, one of which falls within of the QinetiQ site.

2.2 IMPACT ASSESSMENT

2.2.1 Pre- and Mid-Development / Construction Phase Impacts

UK Statutory Sites

Due to the spatial separation between the site and Westerham Mines SSSI, which is designated for supporting hibernating bats, is unlikely to be adversely affected by construction works associated with the proposed development.

Non-Statutory Sites

All non-statutory sites identified in the desk study are located at least 280 m from the site (with the majority located over 1 km from the site) and are unlikely to be adversely affected by construction works associated with the proposed development.

Ancient Woodland

All ancient woodland within the site will be retained. A section of new perimeter fencing will be installed within ancient woodland to the east of the site, however no habitat loss is anticipated to accommodate these works. In all other areas, a buffer of at least 15 m between the woodland and the construction footprint will be implemented. However, retained ancient woodland habitat within and adjacent to the site could be temporarily adversely impacted during the construction phase of the development as a result of a localised increase in air pollutants (e.g nitrogen and dust deposition) from construction traffic and activities, leading to a decline in conservation status.

2.2.2 Long-Term Impacts

UK Statutory Sites

The ancient woodland within and adjacent to the site has the potential to form part of the foraging range for populations of bats supported by Westerham Mines SSSI. As such, increased illumination associated with operational lighting could lead to the severance of commuting routes or a reduction in suitable foraging habitats for these bats. However, given the distance between the site and the SSSI and the fact that the site is already subject to some illumination from street lighting, any effect on local bat populations is considered to be minimal.

Although the site falls within a SSSI Impact Risk Zones for Sevenoaks Gravel Pits SSSI, the proposed development does not fall within any of the categories of concern (infrastructure such as airports and helipads; quarries or oil/gas exploration; livestock or poultry units; or, discharges of water of more than 5m³/day to ground or surface water).

Non-Statutory Sites

All non-statutory sites identified in the desk study are located at least 280 m from the site (with the majority located over 1 km from the site) and no adverse impacts are anticipated during the operational phase of the proposed development.

Ancient Woodland

Although some ancient woodland is located within the site, due to the type of development (i.e. refurbishment of existing laboratories and offices) within the existing development footprint, no significant increases in recreational disturbance are anticipated. Ancient woodland habitats are unlikely to be adversely impacted as a result of the operational phase of the proposed development.

2.3 AVOIDANCE AND MITIGATION MEASURES

2.3.1 Construction Phase Measures

To avoid and mitigate for construction impacts on nature conservation sites, the following measures will be implemented:

- A buffer zone of a minimum of 15 m around all ancient woodland, in accordance with standing advice from Natural England and the Forestry Commission (2018);

- Installation of protective fencing (e.g. Heras fencing) to demarcate the works area. Retained woodland, trees and hedgerows will be protected in accordance with British Standard 5837:2012 "Trees in relation to design, demolition and construction - recommendations";
- Standard best practice pollution prevention measures; and
- Control of lighting, noise and vibration in accordance with best practice guidance.

These measures will be implemented through the use of the CEcMP (Report RT-MME-153844-03 Rev C), which will be submitted in support of the planning application.

2.3.2 Operational Phase Measures

Implementation of a Landscape and Ecological Management Plan (LEMP)

An Outline LEMP (Report RT-MME-151857-03) was prepared to support the planning application for the development of the wider Fort Halstead site. This document provides an overview of how all retained and created habitats will be managed in the long-term.

A detailed LEMP for the QinetiQ site has subsequently been prepared (Report RT-MME-153844-03 Rev B), informed by the measures provided in the Outline LEMP. This detailed LEMP includes proposals for monitoring, to allow the success of management to be assessed and to inform requirements for any changes in management practices. The detailed LEMP will be submitted in support of the current application.

Implementation of an Operational Lighting Strategy

The planning application for the wider Fort Halstead site included outline plans for the lighting scheme across the site, incorporating low level and directional lighting in proximity to woodland areas and other habitats of ecological value to ensure that retained and created dark corridors would be provided. The lighting scheme for the QinetiQ site will align with the proposals for the wider site. Further details regarding bats and lighting are provided in Section 4.3.3.

2.4 COMPENSATION AND ENHANCEMENT MEASURES

A series of enhancement measures were proposed in support of the planning application for the wider Fort Halstead site, including maintaining and enhancing woodland connectivity and including native woodland infill and scrub planting.

These measures, including the enhancement of areas of woodland within the site boundary, have been carried forward as part of the proposals for QinetiQ site and are included within the detailed LEMP (Report RT-MME-153844-03 Rev B).

2.5 POST-DEVELOPMENT MANAGEMENT AND MONITORING

The detailed LEMP (Report RT-MME-153844-03 Rev B) outlines how ancient woodland within the QinetiQ site will be managed and monitored in the long-term. This document will be submitted in support of the planning application.

3. HABITATS

3.1 BASELINE DATA

3.1.1 Field Survey

As part of the Preliminary Ecological Appraisal (Report RT-MME-150872-03 Rev B, Appendix 2) an Extended Phase 1 Habitat Survey of the site was undertaken over two site visits in August 2020. Table 3.1 provides a list of the habitats recorded during this survey and their conservation status. A summary of the existing habitats is illustrated on Drawing C150872-06-02, provided in Chapter 10.

Habitat	Description	Habitat of Principal Importance?
Broadleaved semi-natural woodland	A parcel of broadleaved semi-natural woodland is located in the southern part of the site a portion of which is ancient semi-natural woodland. Further areas of this habitat type are present within the wider Fort Halstead site. This habitat is classed as 'Lowland Mixed Deciduous Woodland', a Habitat of Principal Importance and Kent Biodiversity Strategy priority habitat.	✓
Scattered trees	Early-mature and mature trees are present throughout the site. These trees have intrinsic ecological value and cannot be replaced in the short to medium-term.	-
Unimproved calcareous grassland	This habitat dominates the southern part of the site, and meets the criteria to be classed as 'Lowland Calcareous Grassland', a Habitat of Principal Importance and Kent Biodiversity Strategy priority habitat.	✓
Amenity grassland, poor semi-improved grassland, scattered scrub and tall ruderal vegetation.	Although not national or local priority habitats, the amenity grassland, poor semi-improved grassland, scattered scrub and tall ruderal vegetation contribute to the structural and species diversity within the site.	-
Buildings, fencing and hardstanding.	These habitats have negligible intrinsic ecological value.	-

Table 3.1: Summary of Habitats within QinetiQ Site

A Botanical Survey (Report RT-MME-127947-07) was undertaken to inform a separate planning application for the wider Fort Halstead site in 2018, which included an assessment of the unimproved calcareous grassland located within the QinetiQ site boundary. This survey confirmed the following with regards to habitats within the QinetiQ site boundary:

- CG2a *Festuca ovina* – *Avenula pratensis* grassland; *Cirsium acaule* – *Asperula cynanchica* sub-community to CG3 *Bromus erectus* grassland occupies the southern part of the site. This unimproved calcareous grassland supported a high diversity of species and had high potential to support notable vascular plants associated with chalk grassland in Kent, though no such species were observed during the surveys.
- Both the grassland and woodland areas showed signs of deterioration through encroaching scrub.
- No protected plant species were observed during the suite of survey work. Numerous indicator species for calcareous grassland and ancient woodland were observed, contributing to the overall diversity and value of the habitats on site.
- Overall, the woodland and grassland on site were considered to be of district value, with potential for improvement through implementation of appropriate management.

Section 3.2 summarises the extent of habitat loss that will be required to allow the proposed development to proceed. Section 3.3 details those key habitat types that will be retained and protected and will form part of the landscaped areas, and Section 3.3 provides details regarding habitat creation and enhancement.

3.2 IMPACT ASSESSMENT

3.2.1 Pre- and Mid-Development / Construction Phase Impacts

The proposed development has been designed to fall predominantly within the existing built footprint, with the most important habitats, including woodland and unimproved calcareous grassland, being retained. The majority of habitat loss will be limited to common and widespread habitats of low or negligible ecological value. Some scattered trees may need to be removed to accommodate the works.

During construction, there is the potential for retained woodland and scattered tree habitats to be subject to root compaction and damage from construction vehicles and machinery.

Retained unimproved calcareous grassland could be adversely impacted during construction works from pollution due to emissions from construction vehicles, machinery and run-off and dust deposition from incorrect use of machinery or storage of materials. These impacts could lead to a decline in the grassland habitat's quality, function or ability to support wildlife.

3.2.2 Long-Term Impacts

Due to the type of development (i.e. refurbishment of existing laboratories and offices) within the existing development footprint, no significant increases in recreational disturbance of retained habitats are anticipated. However, limited or inappropriate management of retained and created habitats could lead to a decline in their conservation status in the long-term. For example, inappropriate management of woodland could result in vegetation becoming too dense, which could reduce its value to support nesting birds and other fauna, and inappropriate management of retained grassland areas could result in a loss of botanical diversity and succession to coarser vegetation types.

3.3 AVOIDANCE AND MITIGATION MEASURES

3.3.1 Habitat Retention

As detailed in Section 3.2.1, the development has been designed to avoid impacts on the most valuable habitats. Areas of key habitat (woodland and unimproved calcareous grassland) will be retained and protected.

3.3.2 Construction Phase Measures

The implementation of the measures outlined in Section 2.3.1 to protect ancient woodland sites will also ensure that retained habitats are protected throughout construction works. These measures will be implemented through the use of the CEcMP (Report RT-MME-153844-03 Rev C), which will be submitted in support of the planning application.

3.3.3 Operational Phase Measures

The detailed LEMP (Report RT-MME-153844-03 Rev B) provides an overview of habitat management techniques (for ten years post-development) for all retained and created habitats within the QinetiQ site, which, if implemented, would ensure that declines in the conservation status of habitats are avoided. Specific enhancement measures are detailed in Section 3.4 below; the LEMP provides a mechanism through which these measures can be delivered.

The LEMP also includes proposals for monitoring of habitat types to allow the success of management to be determined and the requirement for any changes in management practices to be determined.

This LEMP will be submitted in support of the planning application.

3.4 ENHANCEMENT MEASURES

The following enhancement measures will be implemented within the QinetiQ site:

- Provision of a carefully designed programme of cutting regimes (a single hay cut a year), with arising's removed from the calcareous grassland area;
- Management of encroaching trees and scrub in the unimproved calcareous grassland to provide a habitat mosaic and maximise the ecological value of this area;
- Management of other areas of semi-improved grassland;
- Restoration of the structural diversity of all areas of woodland through appropriate management, such as canopy thinning, re-coppicing and planting of native species;
- Provision of a more graded woodland edge through planting within the 15m buffer zone;
- Planting of trees, where possible, including fruiting varieties; and,
- Creation of green infrastructure corridors to increase connectivity.

These measures have been incorporated into the detailed LEMP (Report RT-MME-153844-03 Rev B) for the QinetiQ site.

3.5 POST-DEVELOPMENT MANAGEMENT AND MONITORING

The detailed LEMP (Report RT-MME-153844-03 Rev B) outlines the ongoing management measures required for the retained and created habitats. If the measures within this document are implemented, it is considered that valuable habitats within the site will fulfil their biodiversity potential and continue to support a range of species.

The proposed work schedule associated with the habitat creation works is not yet known, as these works will be phased and coordinated with the construction works schedule. A detailed timetable for habitat creation works will be determined once planning permission has been granted and the phasing schedule is fully understood.

4. BATS

4.1 BASELINE DATA

4.1.1 Desk Study

The 2018 desk study revealed records of at least seven species of bat (common pipistrelle, soprano pipistrelle, noctule, Leisler's bat, Natterer's bat, serotine and brown long-eared bat) within a 2 km radius of the wider Fort Halstead site, in addition to records of unidentified pipistrelle, *Myotis*, and long-eared bat species. The most recent records dated from 2016 and the nearest records were attributable to common pipistrelle, Leisler's bat, Natterer's bat, brown long-eared bat and a *Myotis* species, all located on site (within the wider Fort Halstead boundary).

4.1.2 Field Surveys

2007-2014 Surveys

Surveys completed by Waterman Group between 2007 and 2014 confirmed the presence of roosting bats in ten buildings within the wider Fort Halstead site. None of the buildings within the QinetiQ site boundary were found to support a roost.

Over 60 trees across the wider Fort Halstead site were found to have potential to support roosting bats. Within the QinetiQ site, 12 trees were classed as having high potential to support roosting bats, one tree was classed as having moderate potential to support roosting bats, and four trees were classed as having low potential to support roosting bats.

2018 Surveys

During the Preliminary Bat Roost Assessment (Report RT-MME-127947-02) of the wider Fort Halstead site, a total of 31 buildings within the QinetiQ site boundary were identified as having high potential to support roosting bats, and 32 buildings were identified as having low potential to support roosting bats.

During the suite of Dusk Emergence and Dawn Re-Entry Surveys completed in 2018, no bat roosts were identified in any of the buildings within the QinetiQ site.

Nine species of bat (common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, Daubenton's bat, whiskered bat, Natterer's bat, brown long-eared bat and serotine) were recorded utilising the wider Fort Halstead site for foraging and commuting during the 2018 suite of surveys. Common pipistrelle was the most frequently recorded species, whilst low levels of activity by other species were recorded. Activity was concentrated around the site peripheries, particularly around areas of woodland.

2020 Preliminary Bat Roost Assessment of Buildings

A targeted Preliminary Bat Roost Assessment (Report RT-MME-150872-04 Rev A, Appendix 3) of the buildings within the QinetiQ site was completed over two site visits in August 2020. A total of 36 buildings were classed as having high potential to support roosting bats, and 23 buildings were classed as having low potential to support roosting bats.

2020 Dusk Emergence and Dawn Re-Entry Surveys

A suite of Dusk Emergence and Dawn Re-Entry Bat Surveys (Report RT-MME-153340-01 Rev B, Appendix 5) were completed in August and September 2020, focusing on the buildings anticipated at that time to be impacted by the proposals (through refurbishment or demolition), namely Buildings X8-9, X23, X26 and X48. A brown long-eared bat transitional roost was identified in Building X9 during these surveys.

4.2 IMPACT ASSESSMENT

4.2.1 Pre- and Mid-Development / Construction Phase Impacts

Roosting Bats

A bat roost/resting place has been identified in Building X9. As such, the proposed refurbishment of this building could result in the killing or injury of bats and the loss of roosts.

No bat roosts were identified in the remaining buildings surveyed (Buildings X8, X23, X26 and X48). However, survey findings are valid for 12 months from the survey date (August 2020). It is understood that only Building X26 is to be demolished. If works to this building have not commenced by this date, and bats have colonised the buildings in the intervening period, there is the potential for building demolition works to

result in the killing or injury of bats and the loss of roosts. Furthermore if the plans change, and impacts on buildings not included within the 2020 suite of dusk emergence and dawn re-entry surveys are anticipated, if bats are roosting within any of these buildings, the proposed demolition and refurbishment works could result in the killing or injury of bats and the loss of roosts. Furthermore, if bats are roosting within any of the trees on site which are to be impacted by the proposals, in the absence of mitigation, there is the potential for bats to be killed or injured or roosts destroyed. There is also the potential for vibration, noise and illumination during the construction phase of the proposed development to disturb roosting bats in retained buildings or trees. Loss or disturbance of a bat roost would be in breach of the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended).

Foraging and Commuting Bats

Vegetation clearance and construction works could disturb foraging bats and damage suitable terrestrial foraging and commuting habitat, although given that the woodland and other valuable habitats across the site will be retained and enhanced, this effect is not considered to be significant. However, construction phase lighting has the potential to cause fragmentation of dark corridors which may be utilised by foraging and commuting bats, and significant increase in noise or vibration may alter how bats utilise the site during the construction phase. Without mitigation this could have a negative impact on the populations of foraging and commuting bats using the site.

4.2.2 Long-Term Impacts

Disturbance and fragmentation arising from operational phase lighting could have a negative impact on the favourable conservation status of bats utilising habitats within the site for roosting, foraging and commuting purposes.

4.3 AVOIDANCE AND MITIGATION MEASURES

The avoidance and mitigation measures proposed will:

- Prevent killing or injury of bats, or destruction or disturbance of bat roosts;
- Ensure the favourable conservation status of bat populations at the site is maintained; and
- Minimise disturbance to bat foraging and commuting habitat.

4.3.1 Bat Protection Strategy

Building X78

Building X78 is a two-storey brick building with a corrugated metal roof. At the time of the Preliminary Bat Roost Assessment, multiple weep holes were observed in the external walls, some of which were clear of cobwebs, indicating potential use by fauna. These weep holes provide potential access into the wall cavities of the building. It is understood that the roof of Building X78 requires replacing, but the weep holes will remain unaffected. As such, to minimise the risk to roosting bats, the roof replacement works will be undertaken in accordance with a Bat Protection Strategy, as detailed in Report RT-MME-15872-08 Rev A.

4.3.2 Bat Mitigation Strategy and Natural England Bat Licence Application/s

Building X9

Building X9 is a concrete blast bunker building with a flat roof. The suite of survey work undertaken in 2020 confirmed that this building contains a bat roost used by brown long-eared bats. Due to the observation of two brown long-eared bats re-entering the building it is considered that Building X9 is used as a transitional roost. Building X9 is to be refurbished in order to bring it back into operation as an explosives testing chamber after being unused for a number of years. In order to avoid impacts on bats, works will need to be undertaken in line with a Development Licence from Natural England. A Bat Mitigation Strategy (Report RT-MME-153704-01 Rev A) has been prepared to inform the licence application, which can be applied for once planning permission is granted and all conditions relating to wildlife have been discharged.

4.3.3 Further Surveys (if required)

Remaining Buildings with Roost Potential

Buildings X8, X23, X26 and X48, all anticipated to be impacted by the works, were subject to a full suite of surveys in August and September 2020. The remaining buildings within the site classed as having high or low potential to support roosting bats were, at the time of the surveys, not expected to be impacted by the proposals, and were therefore not subject to survey. If works to Buildings X8, X23, X26 and X48 have not commenced within 12 months from the survey date (August 2020), and/or if plans change and impacts on buildings not included within the 2020 suite of dusk emergence and dawn re-entry surveys are anticipated,

then prior to demolition/refurbishment works commencing, a suite of dusk emergence and dawn re-entry surveys will need to be completed. Bat Surveys: Good Practice Guidelines published by the Bat Conservation Trust (Collins, 2016) recommends that for buildings with high bat roosting potential at least three dusk emergence and/or dawn re-entry surveys be undertaken during the bat emergence/re-entry survey season to determine the presence/absence of roosting bats within the buildings. The bat emergence/re-entry survey season extends from May to September. At least two of the surveys should be undertaken during the peak season for emergence/re-entry surveys between May and August and one of the three surveys should be a dawn re-entry survey.

Bat Surveys: Good Practice Guidelines, published by the Bat Conservation Trust (Collins, 2016), recommends for buildings with low bat roosting potential that at least one survey (consisting of either a dusk emergence survey or a dawn re-entry survey) be undertaken during the peak bat activity season (May to August) to determine the presence/absence of roosting bats within the buildings.

If any bat roosts are identified during the surveys, a Natural England Development Licence will be obtained to ensure works commence without breaching the Conservation of Habitats and Species Regulations 2017 or the Wildlife and Countryside Act 1981 (as amended). The licence application process will include the submission of a method statement detailing the current status of bats on site and how the favourable conservation status of the bat populations will be maintained.

Trees with Roost Potential

Any trees within the QinetiQ site which are to be impacted by the proposed works will need to be subject to an updated Preliminary Ground Level Bat Roost Assessment, to determine their suitability to support roosting bats and inform requirements for further surveys. Preliminary Bat Roost Assessments can be undertaken at any time of year.

To confirm whether any trees with roost potential (moderate or high) which are to be impacted by the proposed works support roosting bats, further surveys will need to be completed. There are two possible survey options: the trees can be subject to a Preliminary Roost Feature Inspection Survey using tree climbing equipment to access features that were inaccessible during the Preliminary Ground Level Bat Roost Assessment, or they can be subject to dusk emergence and dawn re-entry surveys.

Option 1: Preliminary Roost Feature Inspection Survey

Where safe to do so, trees will be climbed utilising tree climbing equipment. Any potential roost features will be internally searched using a torch and endoscope. If the feature on further inspection is found to be unsuitable for bats, then the status of the tree will be downgraded to low or negligible bat potential. If a roost is identified, if potential roost features extend beyond the reach of an endoscope, or if potential roost features show any signs of use by fauna, dusk emergence and dawn re-entry surveys will be required, as detailed in Option 2. Dusk emergence and dawn re-entry surveys will also be required for any trees considered unsafe to climb, or those that cannot be fully inspected for safety reasons.

Option 2: Dusk Emergence and Dawn Re-Entry Surveys

Bat Survey: Good Practice Guidelines published by the Bat Conservation Trust (Collins, 2016) recommends that for trees with high bat roosting potential at least three dusk emergence and / or dawn re-entry surveys be undertaken during the bat activity season to determine the presence / absence of roosting bats within the trees. At least one of the surveys should be a dawn re-entry survey, and at least two of the surveys should be undertaken between mid-May and August. For trees with moderate bat roosting potential, one dusk emergence survey and a separate dawn re-entry survey should be undertaken.

If any bat roosts are identified during the surveys, a Natural England Development Licence will be obtained to ensure works commence without breaching the Conservation of Habitats and Species Regulations 2017 or the Wildlife and Countryside Act 1981 (as amended). The licence application process will include the submission of a method statement detailing the current status of bats on site and how the favourable conservation status of the bat populations will be maintained.

Trees assessed as having low potential to support roosting bats should be soft felled under the supervision of a Licensed Bat Worker.

4.3.4 General Construction Phase Measures

To minimise construction impacts on bats, the following measures are proposed:

- Appropriate timing of works – no night working will be carried out, thus minimising any temporary noise, vibration or light disturbance effects on foraging bats or bats using roosts within trees which surround the proposed development area; and,
- Protection of retained habitat – woodland, scrub and scattered trees which are to be retained will be protected in line with the measure in Section 2.3.1 with respect to root protection areas. The installation of protective fencing will ensure that construction works are not carried out immediately beneath retained trees which may have moderate to high bat roost potential.

These measures will be implemented through the use of the CEcMP (Report RT-MME-153844-03 Rev C), which will be submitted in support of the planning application.

4.3.5 Operational Lighting Strategy

Bats are particularly vulnerable to increases or changes in illumination. Operational lighting proposals should take account of ecological best practice, to minimise impacts on ecological features and ensure that dark corridors are maintained and created, particularly around woodland edges. The lighting designs should incorporate the following best practice principles, as outlined in the Bat Conservation Trust's publication 'Landscape and Urban Design for Bats and Biodiversity' (Gunnell *et al.*, 2012) and the Institution of Lighting Professionals and the Bat Conservation Trust's publication '*Bats and artificial lighting in the UK*' (Miles *et al.*, 2018):

- Utilising LED light sources;
- Limiting upward light by specifying lighting units which emit no upward light as standard;
- Providing the lowest possible lighting levels, while maintaining safe levels of illumination; and
- Minimising lighting column heights as far as possible.

An ecological review of the lighting designs will be undertaken.

4.4 COMPENSATION AND ENHANCEMENT MEASURES

The compensation and enhancement measures proposed will:

- Replace bat roosting features lost to development;
- Provide additional roosting features for bats;
- Replace foraging bat habitat lost to development; and
- Improve retained habitat features to benefit foraging bats.

4.4.1 Bat Roosting Boxes

In line with the Bat Mitigation Strategy (Report RT-MME-153704-01 Rev A) for Building X9, one Schwegler 1FW hibernation bat box and one Schwegler 2F bat box will be installed on an appropriate mature tree within the semi-natural broadleaved woodland adjacent to the development area prior to works commencing, as replacement for the loss of the brown long-eared bat transitional roost. In addition, two Schwegler 2F bat boxes, three Schwegler 2F DFP bat boxes and one Miramare woodstone bat box will be installed as enhancement.

A purpose-built bat house is to be provided in the south-western part of the wider Fort Halstead site, adjacent to woodland and the QinetiQ area. In addition, one Schwegler 2F bat box and two Schwegler 2DFDP (or similar specification) bat boxes are to be installed on each of ten retained mature trees around the peripheries of the wider Fort Halstead and 20 integrated Habibat bat boxes are to be installed within buildings across the wider site. The bat boxes will be situated higher than 3 m from the ground to prevent any interference. The exact locations will be determined by a suitably qualified ecologist when the features are installed. These bat boxes will provide suitable roosting opportunities for a range of bat species.

If further surveys (as outlined in Section 4.3.3) are required and additional roosts are identified which will subsequently be required to be destroyed, there is scope within the development to provide suitable replacement features. These features may comprise bat boxes (integrated within buildings or externally installed on trees) or features within built structures such as raised roof tiles. The replacement features will be designed to ensure that they are suitable for the species for which roosts will be lost and provide an adequate level of mitigation for the roost type lost. This will ensure that there is no loss of favourable conservation status of local bat populations. Details of replacement roost features will be provided in the method statements submitted to Natural England as part of a Development Licence application/s.

4.4.2 Habitat Creation and Enhancement

The landscaping scheme has been designed to ensure that strong ecological networks and dark corridors are retained, created and enhanced across the site, providing suitable foraging and commuting habitats for a range of bat species. Further details are provided in Sections 3.3.1 and 3.4.

4.5 POST-DEVELOPMENT MANAGEMENT AND MONITORING

Monitoring of replacement bat roosts, if required, will be carried out in accordance with the Natural England licence. General maintenance checks of bat boxes should be completed annually by a suitably qualified ecologist, to ensure these roosting features remain fit for purpose. The long-term management of retained and created habitats should be carried out in accordance with the LEMP (Report RT-MME-153844-03 Rev B).

5. DORMICE

5.1 BASELINE DATA

5.1.1 Desk Study

Two records of dormouse were provided in the 2018 desk study, with the most recent record dating from 2015 and the nearest located 510 m south of the wider Fort Halstead site.

5.1.2 Field Survey

2012 Survey

During a Dormouse Survey completed by Waterman Group in 2012, a dormouse nest was recorded in a nest tube located within an area of semi-natural ancient woodland in the eastern part of the wider Fort Halstead site. Mammal nests were also found within two other nest tubes at the northern extent of the wider site, although it was not possible to discern whether the nests had been constructed by dormouse or yellow-necked mouse.

2018 Survey

During the 2018 Dormouse Survey (Report RT-MME-127947-10) of the wider Fort Halstead site, a single dormouse was identified in a nest tube located within an area of bramble scrub, located towards the south-western corner of the QinetiQ site, connected to the semi-natural broadleaved woodland which extends around the site.

5.2 IMPACT ASSESSMENT

5.2.1 Pre- and Mid-Development Impacts

It is understood that the habitats suitable for dormouse (woodland and scrub) will largely be retained and therefore impacts on this species are unlikely. However, if any clearance of scrub vegetation within the QinetiQ site is required to accommodate the works, there is the potential for the works to result in the accidental killing, injury or disturbance of dormice, the fragmentation of commuting routes and a reduction in foraging and nesting habitat, which would be in breach of the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended).

5.2.2 Long-Term Impacts

The main long-term risks to dormice will be through the insensitive management of suitable dormice features, such as woodland and scrub, which could reduce the suitability of the site for this species. An increased presence of humans within the site could result in an increased risk of disturbance to dormice following completion of the proposed development. Overall, these impacts could negatively affect breeding success and thus could have a long-term impact on dormice populations within the area.

5.3 AVOIDANCE AND MITIGATION MEASURES

The avoidance and mitigation measures proposed will:

- Prevent killing or injury of dormice, or destruction or disturbance of dormice nests; and
- Ensure the favourable conservation status of dormice populations at the site is maintained.

5.3.1 Licensing Requirements for Vegetation Clearance

As dormice have been recorded within the survey area, no works should be undertaken which would breach the legislation outlined in Appendix 1. This includes clearing any vegetation that is used or could be used by dormice and that could also result in the killing/injury or disturbance of dormice.

Prior to any works being undertaken which are likely to result in a breach of the legislation, a development licence must be obtained from Natural England. The licence application process will include the submission of a method statement detailing the current status of dormice on site and a mitigation strategy to ensure the favourable conservation status of the dormouse population will be maintained. Prior to a licence being issued, planning permission must be granted and relevant conditions relating to protected species and habitat issues must be discharged.

5.3.2 General Construction Phase Measures

To minimise construction impacts on dormice, the following measure is proposed:

- Protection of retained habitat – woodland, scrub and scattered trees which are to be retained will be protected in line with the measure in Section 2.3.1 with respect to root protection areas. The installation of protective fencing will ensure that construction works are not carried out immediately beneath retained trees which may have moderate to high bat roost potential.

These measures will be implemented through the use of the CECMP (Report RT-MME-153844-03 Rev C), which will be submitted in support of the planning application.

5.4 COMPENSATION AND ENHANCEMENT MEASURES

The compensation and enhancement measures proposed will:

- Provide additional nesting locations for dormice; and
- Improve retained habitat features to benefit dormice.

5.4.1 Dormice Nest Boxes

The method statement submitted in support of the licence application to Natural England will inform the requirements for the provision of dormice nest boxes to compensate for nests lost as a result of the works. Any replacement nest boxes will be provided in accordance with the licence.

In addition, a series of dormouse nest boxes will be installed within suitable undisturbed locations around the peripheries of the wider Fort Halstead site, with the exact locations to be determined by a suitably qualified ecologist when the features are installed.

5.4.2 Habitat Creation and Enhancement

The habitat creation and enhancements proposed as part of the landscaping scheme for the proposed development have been designed so as to maximise biodiversity potential, which is likely to provide benefits for dormice. In particular, connectivity within the site and to the surrounding landscape will be maintained and enhanced. Further details are provided in Sections 3.3.1 and 3.4.

New planting should include species that provide suitable food sources to sustain dormice, such as hazel and oak.

5.5 POST-DEVELOPMENT MANAGEMENT AND MONITORING

Monitoring of replacement nest boxes, if required, will be carried out in accordance with the Natural England licence. General maintenance checks of nest boxes should be completed annually by a suitably qualified ecologist, to ensure these features remain fit for purpose. The long-term management of retained and created habitats will be carried out in accordance with the LEMP (Report RT-MME-153844-03 Rev B).

6. TERRESTRIAL MAMMALS: BROWN HARE AND HEDGEHOG

6.1 BASELINE DATA

6.1.1 Desk Study

Five records of hedgehog within a 2 km radius of the wider Fort Halstead site were identified in the 2018 desk study. The most recent record dated from 2014 and the nearest record was located over 1.3 km north of the wider site. No records of brown hare were provided in the desk study.

6.1.2 Field Survey

The mosaic of woodland, grassland and scrub within the southern part of the QinetiQ site provides suitable foraging and refuge opportunities for terrestrial mammals, particularly hedgehog. The open grassland located in the south-eastern part of the QinetiQ site may be utilised by brown hare.

6.2 IMPACT ASSESSMENT

6.2.1 Pre- and Mid-Development Impacts

During the construction phase of the proposed development, there is the potential for individual foraging terrestrial mammals to become trapped and harmed in open excavations, leading to a reduction in foraging success. In addition, vegetation clearance could disturb or damage habitats which may be used by terrestrial mammals. Without mitigation this could have a minor adverse effect on any populations within the local area.

6.2.2 Long-Term Impacts

Suitable habitat for terrestrial mammals will be retained and created around the site peripheries and will remain connected to suitable habitats in the wider landscape. No long-term effects on populations of terrestrial mammals due to habitat loss or fragmentation are anticipated.

An increase in vehicle movements within the site during the nocturnal period has the potential to lead to an increase in hedgehog mortality due to collisions.

6.3 AVOIDANCE AND MITIGATION MEASURES

The avoidance and mitigation measures proposed will:

- Ensure no killing or injury of terrestrial mammals as a result of construction works.
- Reduce the potential for harm to hedgehogs during the operational phase of the development.

6.3.1 Construction Phase Measures

To minimise construction impacts on terrestrial mammals, the following measures are proposed:

- Cover excavations and pipework: any excavations that need to be left overnight should be covered or fitted with mammal ramps to ensure that any animals that enter can safely escape. Any open pipework with an outside diameter of greater than 120 mm must be covered at the end of each work day to prevent animals entering / becoming trapped.
- Sensitive vegetation clearance: clearance of vegetation should be undertaken in a sensitive manner, to ensure any terrestrial mammals that may be present can disperse into suitable habitats off site. In order to avoid the nesting bird season, it is likely that vegetation clearance will be undertaken when hedgehogs may be hibernating. Vegetation clearance should be supervised by a suitably qualified ecologist. Any hedgehogs found they will be moved to a suitable location outside of the works area.

These measures will be implemented through the use of the CEcMP (Report RT-MME-153844-03 Rev C), which will be submitted in support of the planning application.

6.3.2 Operational Phase Measures

Suitable lighting, and a speed limit of 20 mph, will be adopted along the road network within the site, which will minimise the risk of road-related hedgehog mortality.

6.4 POST-DEVELOPMENT MANAGEMENT AND MONITORING

Given the minimal impact of the proposed development on terrestrial mammals, no post-development monitoring is considered necessary.

7. BIRDS

7.1 BASELINE DATA

7.1.1 Desk Study

The 2018 desk study revealed records of a range of bird species protected under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) within a 2 km radius of the wider Fort Halstead site, including barn owl, brambling, fieldfare, goshawk, hen harrier, hobby, honey-buzzard, marsh harrier, merlin, osprey, peregrine, red kite and redwing.

The desk study also provided records of 31 bird species listed as Species of Principal Importance, including 13 Birds of Conservation Concern 4 Red List species (corn bunting, cuckoo, house sparrow, lesser spotted woodpecker, marsh tit, skylark, song thrush, starling, tree sparrow, turtle dove, willow tit, yellow wagtail and yellowhammer) and four Birds of Conservation Concern 4 Amber List species (bullfinch, dunnock, nightjar and reed bunting).

7.1.2 Field Surveys

2012 Breeding Bird Survey

During the Breeding Bird Survey undertaken by Waterman Group in 2012, a total of 45 bird species were identified across the wider site over the course of the four survey visits. Bird species were recorded utilising woodland, scrub, grassland, mature trees and building habitats. Of these species, 27 species were confirmed as breeding or likely to be breeding.

Species of note confirmed as breeding or likely to be breeding within the wider site comprised house sparrow, song thrush and yellowhammer (Species of Principal Importance and Birds of Conservation Concern 4 Red List species), mistle thrush (a Birds of Conservation Concern 4 Red List species) and dunnock (a Species of Principal Importance and Birds of Conservation Concern 4 Amber List species). Song thrush was recorded within the QinetiQ site boundary. The remaining species recorded tended to be widespread generalists.

2018 Breeding Bird Survey

During the Breeding Bird Survey (Report RT-MME-127947-06) of the wider Fort Halstead site, undertaken between May and July 2018, a total of 44 bird species were recorded breeding / probably breeding within the site, comprising:

- Six Species of Principal Importance for Nature Conservation in England and Birds of Conservation Concern 4 Red List species (linnet, marsh tit, skylark, song thrush, spotted flycatcher and yellowhammer);
- Mistle thrush and nightingale, also Birds of Conservation Concern 4 Red List species;
- Two Species of Principal Importance for Nature Conservation in England and Birds of Conservation Concern 4 Amber List species (bullfinch and dunnock); and
- Three Birds of Conservation Concern 4 Amber List species (kestrel, stock dove and tawny owl).

The remaining species recorded were fairly common and widespread generalist species.

The wider Fort Halstead site was considered to be of district value in terms of its breeding bird interest.

The most notable species recorded within the QinetiQ site boundary were song thrush, spotted flycatcher, yellowhammer, bullfinch, dunnock, stock dove and tawny owl.

2018-19 Winter Bird Survey

During the Winter Bird Survey (Report RT-MME-127947-11 Rev A) of the wider Fort Halstead site, completed over four survey visits between December 2018 and February 2019, a total of 43 bird species were recorded using the habitats within the site, comprising:

- Four Species of Principal Importance and Birds of Conservation Concern 4 Red List species (marsh tit, skylark, song thrush and starling);
- Two Birds of Conservation Concern 4 Red List species also listed under Schedule 1 of the Wildlife and Countryside Act, 1981 (fieldfare and redwing);
- One additional Birds of Conservation Concern 4 Red List species (mistle thrush);
- Two Species of Principal Importance and Birds of Conservation Concern 4 Amber List species (bullfinch and dunnock);

- Four additional Birds of Conservation Concern 4 Amber List species (black-headed gull, kestrel, meadow pipit and stock dove); and
- Two additional species listed under Schedule 1 of the Wildlife and Countryside Act, 1981 (brambling and peregrine falcon).

Habitats within the southern part of the QinetiQ site appeared to be of particular value to bullfinch and dunnock.

7.2 IMPACT ASSESSMENT

7.2.1 Pre- and Mid-Development Impacts

The majority of habitats suitable for breeding and wintering birds within the QinetiQ site will be retained, continuing to provide valuable nesting and foraging opportunities throughout the year. However, some of the buildings which provide suitable nesting habitat for common species such as blue tit, great tit and pied wagtail will be demolished or refurbished, resulting in the displacement of these species into the surrounding area. Birds affected by noise and visual disturbance during construction works will likely be displaced into suitable retained habitats around the site peripheries.

Works directly affecting vegetation on site could result in injury or death of nesting birds and any dependent young, which would be in breach of the Wildlife and Countryside Act 1981 (as amended).

7.2.2 Long-Term Impacts

Inappropriate management of retained and created habitats could limit the availability of nesting and food sources within the site. Management activities timed to occur within the nesting bird season could lead to the injury or death of birds which would be in breach of the Wildlife and Countryside Act 1981 (as amended). An increased presence of humans within the site could result in an increased risk of disturbance to breeding birds following completion of the proposed development. Overall, these impacts could negatively affect breeding success and thus could have a long-term impact on bird populations within the area.

7.3 AVOIDANCE AND MITIGATION MEASURES

The avoidance and mitigation measures proposed will:

- Prevent the killing or injury of nesting birds; and,
- Minimise disturbance of nesting birds during construction works.

7.3.1 Construction Phase Measures

To minimise construction impacts on breeding and wintering birds, the following measures are proposed:

- Protection of retained habitat: woodland, scrub and scattered trees which are to be retained will be protected in line with the measure in Section 2.3.1 with respect to root protection areas.
- Appropriate timing of works: building demolition / vegetation clearance should be undertaken outside the bird nesting season. The bird nesting season is weather dependent but generally extends between March and September inclusive (peak period March-August). If this is not possible (for example to ensure vegetation is cleared during the active season for herpetofauna), then any vegetation to be removed or disturbed should be checked by an experienced ecologist for nesting birds immediately prior to works commencing. If birds are found to be nesting any works which may affect them would have to be delayed until the young have fledged and the nest has been abandoned naturally, for example via the implementation of an appropriate buffer zone (species dependent) around the nest in which no disturbance is permitted until the nest is no longer in use.

These measures will be implemented through the use of the CEcMP (Report RT-MME-153844-03 Rev C), which will be submitted in support of the planning application.

7.3.2 Operational Phase Measures

Details regarding the appropriate timing of vegetation management to avoid the nesting bird season have been provided in the LEMP (Report RT-MME-153844-03 Rev B).

7.4 COMPENSATION AND ENHANCEMENT MEASURES

The compensation and enhancement measures proposed aim to:

- Replace foraging and nesting habitat lost to development;
- Ensure the favourable conservation status of bird populations at the site is maintained; and
- Provide additional habitat for nesting and foraging birds.

7.4.1 Replacement Nest Boxes

As part of the wider Fort Halstead development, the following nest boxes are proposed to be installed on retained mature trees within woodland / along woodland edges around the site peripheries to provide additional roosting opportunities for birds:

- 24 Schwegler 1B boxes, with 32 mm hole, suitable for use by small bird species such as great, marsh and coal tits, redstart, house sparrow and tree sparrow;
- 24 Schwegler 1N boxes, suitable for species such as robin, wren and pied wagtail;
- 24 Schwegler 3S Starling Boxes;
- Six Schwegler Owl Box No. 4, suitable for use by stock dove (woodpeckers will sometimes spend the night in this box too) and four Schwegler Owl Box No. 5, suitable for use by tawny owl; and
- Three Barn Owl Nest Boxes and three Kestrel Nest Boxes.

In addition, the following nesting features are proposed to be installed on / within new buildings:

- 12 Habitat integrated Terraced Sparrow Boxes;
- 12 Habitat integrated Swift Boxes;
- 12 Habitat integrated Starling Nest Boxes; and
- 12 House Martin Terrace No 11.

Some of these bird boxes will be installed within the QinetiQ site.

The bird boxes should be installed at a height of at least 3 m to prevent any interference. The best time to install bird boxes is in late winter and early spring, to allow birds time to adjust to them prior to the nesting season. Exact locations will be agreed by a suitably qualified ecologist when the features are installed.

7.4.2 Habitat Creation and Enhancement

The habitats which are to be created and enhanced as part of the proposed development will include those of value to nesting and wintering birds. Further details are provided in Section 3.4.

7.5 POST-DEVELOPMENT MANAGEMENT AND MONITORING

A maintenance check of bird boxes should be completed annually by a suitably experienced ecologist, to ensure these nesting features remain fit for purpose. Further information regarding the long-term management of retained and created habitats has been provided in the LEMP (Report RT-MME-153844-03 Rev B).

8. REPTILES

8.1 BASELINE DATA

8.1.1 Desk Study

The 2018 desk study revealed records of four reptile species within a 2 km radius of the wider Fort Halstead site, comprising common lizard, slow worm, grass snake and adder. The nearest records were attributable to common lizard and slow worm, located on site. The most recent record was attributable to grass snake, dating from 2016.

8.1.2 Field Survey

2012 Survey

During surveys of the wider site completed by Waterman Group in 2012, an 'exceptional' population of slow-worm and a 'good' population of common lizard were recorded. Both slow worms and common lizards were recorded within the area of unimproved calcareous grassland which dominates the southern part of the QinetiQ site.

2018 Survey

During the 2018 Reptile Survey (Report RT-MME-127947-09), the following populations were identified:

- A good population of slow-worm and a good population of common lizard, within the area of unimproved calcareous grassland (Transect C) located within the southern part of the QinetiQ site;
- An exceptional population of slow-worm and a low population of common lizard, supported within an area of semi-improved neutral grassland (Transect E) located within the south-western corner of the wider site (but outside of the QinetiQ site boundary); and
- A low population of slow-worm, supported within an area of grazed unimproved calcareous grassland (Transect F) located within the southern part of the wider site and immediately south of the QinetiQ area.

8.2 IMPACT ASSESSMENT

8.2.1 Pre- and Mid-Development Impacts

Although the grassland areas within the southern part of the site where populations of slow worm and common lizard were identified will be retained, some suitable habitats for reptiles may be temporarily impacted to accommodate the proposed works within the QinetiQ site. Specifically, any works, including the storage of construction materials, within the upper and lower 'Downs Range' parts of the site have the potential to impact reptiles. Whilst the upper 'Downs Range' area was found to be of low value to reptiles during the 2018 survey as a result of frequent mowing, it is directly connected to the lower Downs Range, where good populations of slow-worm and common lizard were recorded (Transect C). As such, during construction, there is the potential for the killing, injury or disturbance to individual slow worms or common lizards utilising habitats at the site. Without mitigation, the works would likely cause a breach of wildlife legislation: these species are protected under the Wildlife and Countryside Act 1981 (as amended) from intentional killing or injuring.

Retained habitats around the site peripheries will remain connected, preventing fragmentation and assisting reptile movement throughout the site and into the wider landscape.

8.2.2 Long-Term Impacts

Insensitive management, such as regular, close mowing of the retained grassland habitats within the site and harsh management of the scrub habitats, are likely to have negative implications on the suitability of habitats for reptiles in the long term.

8.3 AVOIDANCE AND MITIGATION MEASURES

English Nature (2004) identifies two aims that need to be achieved where reptiles are present on proposed development sites:

- (1) To protect reptiles from any harm that might arise during the development work; and
- (2) To ensure that sufficient quality, quantity and connectivity of habitat is provided to accommodate the reptile population, either on-site or at an alternative site, with no net loss of local reptile conservation status.

As such, the avoidance and mitigation measures proposed will:

- Ensure no killing or injury of reptiles (or common amphibians) during construction works.
- Ensure that the favourable conservation status of reptile populations within the site is maintained.

8.3.1 Herpetofauna Mitigation Strategy

Reptile mitigation proposals for the site have been designed based on the best practice outlined in the Herpetofauna Workers Manual (Gent and Gibson, 2003).

The development of the QinetiQ site has been designed to avoid impacts on more valuable habitats, including those where reptiles are known to be present. However, some suitable reptile habitat may need to be removed to accommodate the works. As such, to ensure that no harm to individual reptiles occurs during site clearance works, it is proposed that a programme of habitat manipulation and destructive searches will be implemented. The clearance of terrestrial habitats will be undertaken in a sensitive manner in order to control any potential risk to reptiles (and common amphibians).

Site Clearance Protocol: Initial Habitat Manipulation

Between November and February, outside of the nesting season for birds:

- Initial management of woody vegetation (trees, scrub) and longer grass, consisting of cutting to a height of 0.1 m – 0.2 m, with no impact on the ground or roots, can be completed under supervision of the Ecological Clerk of Works. Grass should be cut in a directional manner, towards retained habitats around the site peripheries.

If this timing is not possible, then any vegetation to be removed or disturbed should be checked by an experienced ecologist for nesting birds immediately prior to works commencing. If birds are found to be nesting any works which may affect them would have to be delayed until the young have fledged and the nest has been abandoned naturally (see Section 7.3.1).

Between March and October inclusive, during the active period for herpetofauna:

- In suitable weather conditions, the site should be subject to a walkover by the Ecological Clerk of Works to determine any sensitive features and their locations with respect to proposed site activities (the survey will focus on the location of any potential refuges for herpetofauna e.g. piles of rubble / rubbish / logs / mammal holes etc). These will be checked and where possible removed from the area.

Any reptiles or common amphibians which are found during the walkover should be translocated by the Ecological Clerk of Works into retained habitats around the site peripheries.

Once the initial management and refugia clearance works have taken place and all arisings removed from the site, the site should be left for a period of one week to allow any reptiles or amphibians present to disperse into the retained habitat.

Site Clearance Protocol: Direct Search and Supervised Topsoil Strip

Between March and October inclusive, during the active period for herpetofauna:

- The proposed construction area will be searched by hand to ensure that no reptiles (or amphibians) are present. Suitably experienced ecologists will undertake all direct search works and all reptiles and common amphibians found will be moved to retained habitat around the peripheries of the plot.
- Following the direct search, a topsoil strip will be undertaken under direct supervision of the Ecological Clerk of Works. The removal of roots of hedges / trees will be undertaken with care by an excavator to allow the careful inspection of the root areas, with vegetation removed from the site so as not to create new refuges.

Receptor Site

Any reptiles (or common amphibians) which are found during the mitigation works will be translocated by suitably experienced ecologists using suitable personal protective equipment to the retained unimproved calcareous and semi-improved neutral habitats in the southern part of the site, outside of the works footprint. These habitats will not be subject to future development and will remain connected to further suitable habitats within the site and the surrounding landscape.

Management of Construction Footprint

Following the supervised vegetation clearance and soil strip works, the construction footprint will be subject to regular management, consisting of the removal of colonising vegetation, at least once every two weeks between April and October, to reduce the suitability of this area for reptiles.

All contractors should be made aware of the potential presence of reptiles on site during the initial site induction and regular tool box talks. In the unlikely event that a reptile is discovered within the development footprint during construction works, a suitably qualified ecologist should be contacted for advice on how to proceed.

8.3.2 General Construction Phase Measures

To minimise construction impacts on herpetofauna, the following measures are proposed:

- Avoiding the creation of potential refuges such as stacked materials and topsoil;
- Cover excavations and pipework: any excavations that need to be left overnight should be covered or fitted with ramps to allow fauna to easily escape.

These measures will be implemented through the use of the CEcMP (Report RT-MME-153844-03 Rev C), which will be submitted in support of the planning application.

8.4 COMPENSATION AND ENHANCEMENT MEASURES

The measures outlined in Section 3.4, including the enhancement of grassland and woodland habitats, will ensure that the site continues to be of value to common reptile and amphibian species.

In addition, it is proposed that hibernacula are created in close proximity to attenuation features within the wider Fort Halstead site, in order to provide additional hibernation and refuge habitat for herpetofauna. It would also be appropriate to install two hibernacula within the grassland/scrub mosaic in the southern part of the QinetiQ site. These hibernacula should be created using suitable logs from vegetation clearance works. Figure 8.1 provides a schematic design for a hibernaculum. The exact locations of hibernacula should be determined by a suitably experienced ecologist when the features are installed.

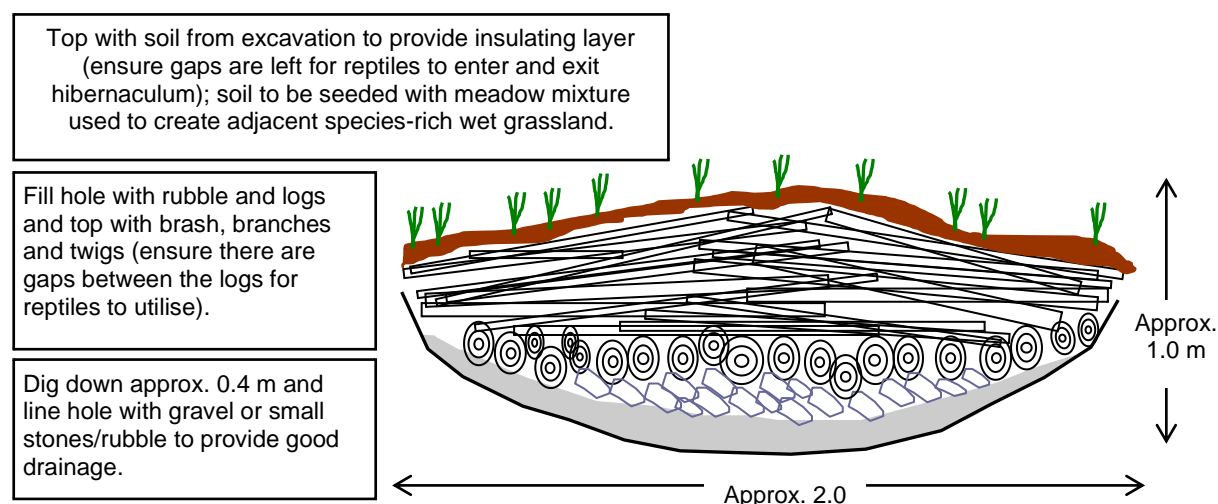


Figure 8.1: Design of Proposed Herpetofauna Hibernacula

8.5 POST-DEVELOPMENT MANAGEMENT AND MONITORING

To ensure that the favourable conservation status of reptile populations is maintained at the site, a scheme of monitoring will be instigated. Given the likely phased nature of the development across the wider Fort Halstead site, it is proposed that reptile monitoring surveys of suitable habitats are undertaken every four years following the completion of the first phase of the development until four years after the completion of the final phase of the development. Subject to the ongoing management of the retained and created habitats

within the site in accordance with the LEMP (Report RT-MME-153844-03 Rev B), it is considered that habitats within the site will remain suitable for reptiles (and common amphibians) in the long-term.

9. SUMMARY

This document details avoidance, mitigation, compensation and enhancement proposals that will be implemented to ensure that the favourable conservation status of key ecological features will be maintained at the site prior to, during and after development. Much of the mitigation has been designed to ensure the long-term retention of existing key habitats and to create linking wildlife corridors through and around the site, allowing species movement into the wider landscape.

The document has identified mitigation proposals to ensure the long-term protection of protected and notable species or species groups which have either been recorded at or near to the site, or for which suitable habitats are present within the site. These species and species groups comprise bats, dormice, brown hare, hedgehog, breeding and wintering birds and reptiles. A separate confidential chapter relating to badgers has been provided (Appendix 1).

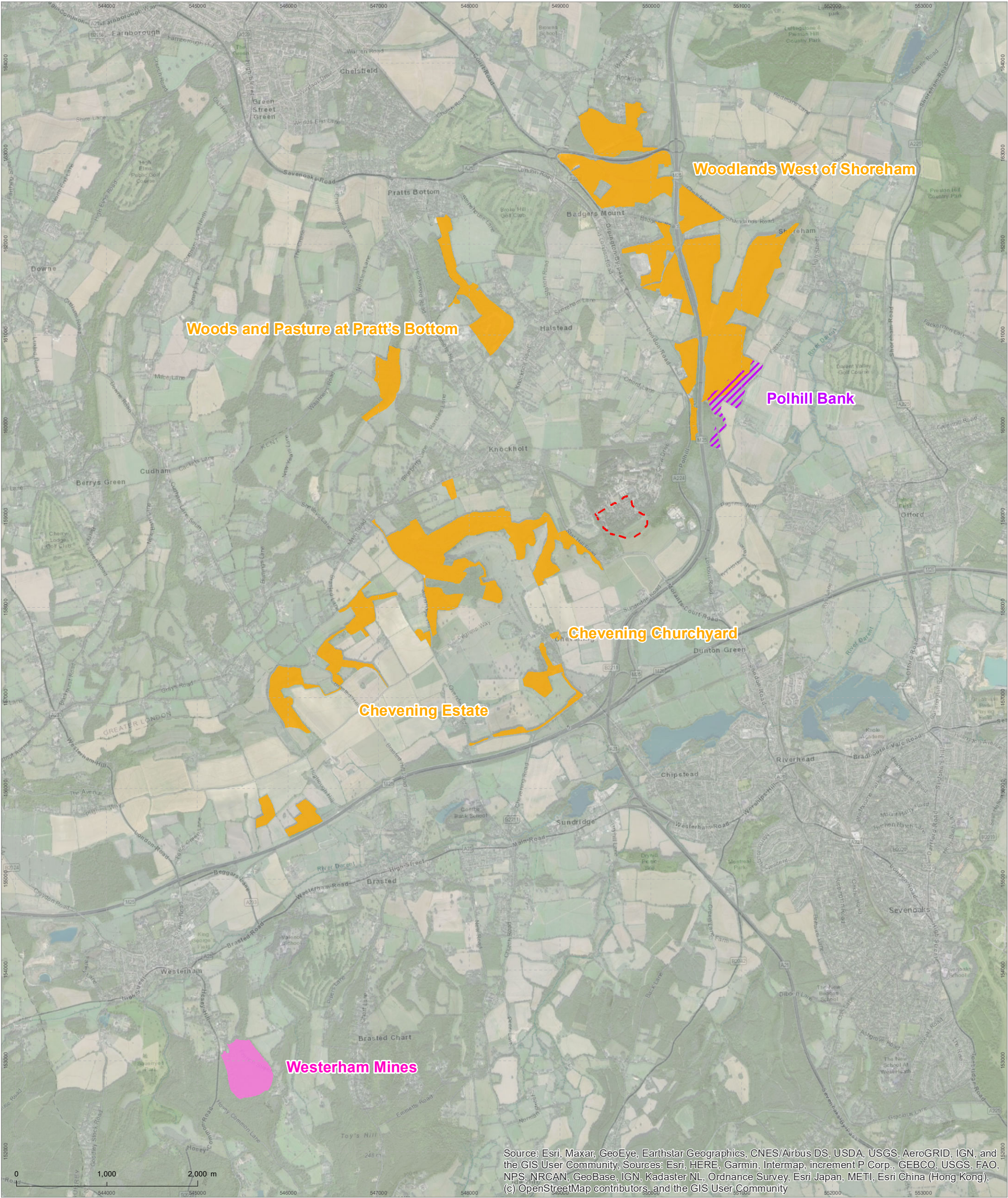
It is recognised that there will be interactions between mitigation proposals required for each of the key ecological features. Where possible, the work schedules for each of the species groups have taken into account the influence of other ecological constraints, however it is anticipated that there may be some minor amendment to proposed timescales in order to ensure a logical phasing and to minimise ecological impact.

It is proposed that the implementation of ecological mitigation will be overseen by a suitably qualified Ecological Clerk of Works who will provide advice to construction and landscaping contractors and manage the interaction between mitigation requirements for each species throughout the development process.

A CEcMP (Report RT-MME-153844-03 Rev C) has been produced, which will be submitted in support of the planning application. Implementation of the measures in this document will control adverse construction impacts. A detailed LEMP (Report RT-MME-153844-03 Rev B), informed by the measures provided in the Outline LEMP for the wider Fort Halstead development, has also been prepared. Implementation of the measures in the detailed LEMP will ensure that the biodiversity values of habitats are maintained in the long-term.

10. DRAWINGS

Drawing Ref	Title
C150872-06-01	Summary of Nature Conservation Sites
C150872-06-02	Summary of Habitats
C150872-06-03	Summary of Species



Legend

Local Wildlife Site

Kent Wildlife Trust Reserve

Site of Special Scientific Interest

Site boundary

Project

QinetiQ Site, Fort Halstead, Kent

Drawing

Summary of Nature Conservation Sites

Client

QinetiQ

Drawing Number

C150872-06-01-RevA

Revision

Rev A

Scale @ A3

1:40,000

Date

May 2021

Approved By

HT

Drawn By

RP

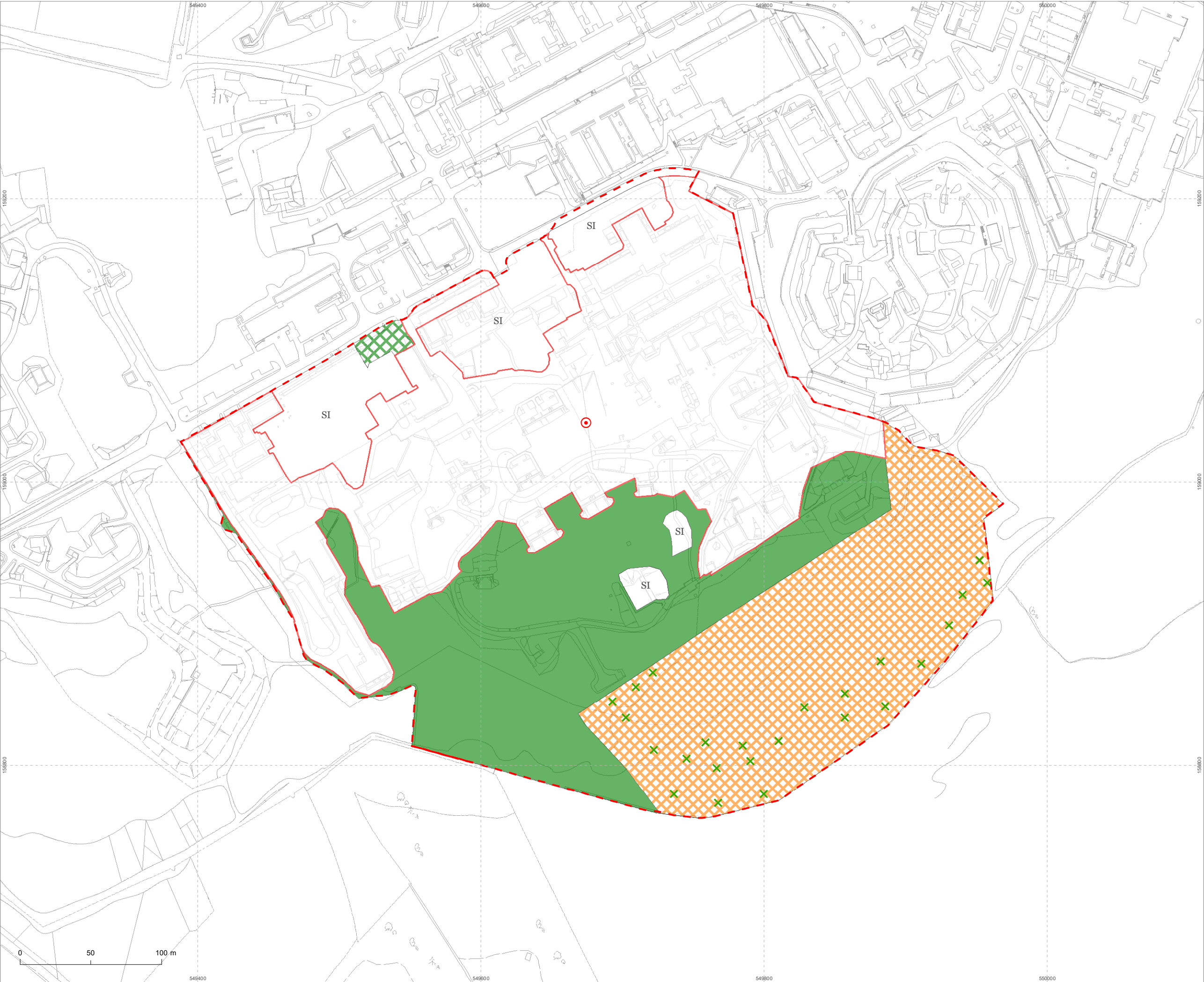
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C150872-06-01-RevA



C150872-06-02-RevA

Legend

Site boundary

Scattered scrub

Dense scrub

Poor semi-improved grassland

Semi-natural broad-leaved woodland

Unimproved calcareous grassland

Other habitat: area supports high number of scattered trees and poor semi-improved grassland around buildings

Note: central section of site includes habitats including buildings, hardstanding, scattered trees, scattered scrub, poor semi-improved grassland, amenity grassland, fence, wall and introduced shrub.

Project

QinetiQ Site, Fort Halstead, Kent

Drawing

Summary of Habitats

Client

QinetiQ

Drawing Number

C150872-06-02-RevA

Revision

Rev A

Scale @ A3

1:2,500

Date

May 2021

Approved By

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Drawn By

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C150872-06-03-RevA

Legend

Site boundary

Bats (2020 results):

High bat roost potential

Low bat roost potential

Reptiles (2018 results):

Exceptional population of slow worm and low population of common lizard identified

Good population of slow worm and good population of common lizard identified

Low population of slow worm identified

Dormice (2018 results):

Dormouse recorded

Note

The following buildings are not included in the map:

Low potential (X10 and X38)

High potential (X37 and X76)

Birds (2018 results):

Red list species

STSong thrush

SFSpotted flycatcher

Y.Yellowhammer

N.Nightingale

MTMarsh tit

Amber list species

TO Tawny owl

SD Stock dove

BF Bullfinch

D. Dunnock

K. Kestrel

Project

QinetiQ Site, Fort Halstead, Kent

Drawing

Summary of Species

Client

QinetiQ

Drawing Number

C150872-06-03-RevA

Revision

Rev A

Scale @ A3

1:2,500

Date

May 2021

Approved By

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Drawn By

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Waterman Group (2015) *Protected Species and Habitats Survey: Fort Halstead, Kent*. Report Number EED12715-102.R.3.3.6.LM

Wildlife and Countryside Act 1981 (as amended).

APPENDICES

- APPENDIX 1** Confidential Badger Appendix
- APPENDIX 2** Preliminary Ecological Appraisal, Report RT-MME-150872-03 Rev B
- APPENDIX 3** Preliminary Bat Roost Assessment, Report RT-MME-150872-04 Rev B
- APPENDIX 4** Badger Survey, Report RT-MME-150872-05 Rev B
- APPENDIX 5** Dusk Emergence and Dawn Re-Entry Bat Surveys, Report RT-MME-153340-01 Rev C
- APPENDIX 6** Species Legislation

APPENDIX 1

CONFIDENTIAL BADGER APPENDIX

(Provided as a separate document)

APPENDIX 2

PRELIMINARY ECOLOGICAL APPRAISAL, REPORT RT-MME-150872-03 REV A

(Provided as a separate document)

APPENDIX 3

PRELIMINARY BAT ROOST ASSESSMENT, REPORT RT-MME-150872-04 REV A

(Provided as a separate document)

APPENDIX 4

BADGER SURVEY, REPORT RT-MME-150872-05 REV A

(Provided as a separate document)

APPENDIX 5

DUSK EMERGENCE AND DAWN RE-ENTRY BAT SURVEYS, REPORT RT-MME-153340-01 REV B

(Provided as a separate document)

APPENDIX 6

SPECIES LEGISLATION

Bats

Bats and the places they use for shelter or protection (i.e. roosts) receive legal protection under the Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2017) and the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2019 (Habitats Regulations 2019). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. This protection means that bats, and the places they use for shelter or protection, are capable of being a material consideration in the planning process.

Regulation 41 of the Habitats Regulations 2017, states that a person commits an offence if they:

- deliberately capture, injure or kill a bat;
- deliberately disturb bats; or
- damage or destroy a bat roost (breeding site or resting place).

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong.

It is an offence under the Habitats Regulations 2017 for any person to have in his possession or control, to transport, to sell or exchange or to offer for sale, any live or dead bats, part of a bat or anything derived from bats, which has been unlawfully taken from the wild.

Changes have been made to parts of the Habitats Regulations 2017 so that they operate effectively from 1st January 2021. The changes are made by the Habitats Regulations 2019, which transfer functions from the European Commission to the appropriate authorities in England and Wales.

All other processes or terms in the 2017 Regulations remain unchanged and existing guidance is still relevant.

The obligations of a competent authority in the 2017 Regulations for the protection of species do not change. A competent authority is a public body, statutory undertaker, minister or department of government, or anyone holding public office.

Whilst broadly similar to the above legislation, the WCA 1981 (as amended) differs in the following ways:

- Section 9(1) of the WCA makes it an offence to *intentionally* kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to *intentionally or recklessly** damage or destroy, or *obstruct access to*, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to *intentionally or recklessly** disturb any protected species *while it is occupying a structure or place which it uses for shelter or protection*.

*Reckless offences were added by the Countryside and Rights of Way (CROW) Act 2000.

As bats re-use the same roosts (breeding site or resting place) after periods of vacancy, legal opinion is that roosts are protected whether or not bats are present.

The reader should refer to the original legislation for the definitive interpretation.

The following bat species are Species of Principal Importance for Nature Conservation in England: barbastelle bat *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *Rhinolophus hipposideros*. Species of Principal Importance for Nature Conservation in England are material considerations in the planning process. The list of species is derived from Section 41 list of the Natural Environmental and Rural Communities (NERC) Act 2006.

Dormouse

Dormice and the places they use for shelter or protection receive European protection under the Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2017) and the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2019 (Habitats Regulations 2019). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. This protection means that dormice, and the places they use for shelter or protection, are capable of being a material consideration in the planning process.

Regulation 41 of the Habitats Regulations 2017, states that a person commits an offence if they:

- deliberately capture, injure or kill a dormouse;
- deliberately disturb dormice; or
- damage or destroy a breeding site or resting place.

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong.

It is an offence under the Habitats Regulations 2017 for any person to have in his possession or control, to transport, to sell or exchange or to offer for sale, any live or dead dormouse, part of a dormouse or anything derived from a dormouse, which has been unlawfully taken from the wild.

Whilst broadly similar to the above legislation, the WCA 1981 (as amended) differs in the following ways:

- Section 9(1) of the WCA makes it an offence to *intentionally* kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to *intentionally or recklessly** damage or destroy, *or obstruct access to*, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to *intentionally or recklessly** disturb any protected species *while it is occupying a structure or place which it uses for shelter or protection*.

*Reckless offences were added by the Countryside and Rights of Way (CRoW) Act 2000.

Dormice are listed as Species of Principal Importance on the UK Post-2010 Biodiversity Framework (2012), and as such are material considerations in the planning process. Dormice are also listed on the Essex Biodiversity Action Plan.

Nesting Birds

The Conservation of Habitats and Species Regulations 2017, (Habitats Regulations 2017) and the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2019 (Habitats Regulations 2019) places a duty on public bodies to take measures to preserve, maintain and re-establish habitat for wild birds.

Nesting and nest building birds are protected under the Wildlife and Countryside Act WCA 1981 (as amended).

Subject to the provisions of the act, if any person intentionally:

- kills, injures or takes any wild bird;
- takes, damages or destroys the nest of any wild bird while that nest is in use or being built; or
- takes or destroys an egg of any wild bird, he shall be guilty of an offence.

Some species (listed in Schedule 1 of the WCA) are protected by special penalties. Subject to the provisions of the act, if any person intentionally or recklessly:

- disturbs any wild bird included in Schedule 1 while it is building a nest or is in, on or near a nest containing eggs or young; or
- disturbs dependent young of such a bird, he shall be guilty of an offence.

Several bird species are Species of Principal Importance for Nature Conservation in England, making them capable of being material considerations in the planning process.

Reptiles

All of the UK's native reptiles are protected by law. The two rarest species – sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca* – benefit from the greatest protection.

Common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, adder *Vipera berus* and grass snake *Natrix natrix* are protected under the Wildlife and Countryside Act 1981 (as amended) from intentional killing or injuring.

Sand lizard and smooth snake are protected under The Conservation of Habitats and Species Regulations 2010 (as amended) and the Wildlife and Countryside Act 1981 (as amended) which together make it illegal to kill, injure, capture, handle or disturb these animals. Places they use for breeding, resting, shelter and protection are protected from being damaged or destroyed. It is also illegal to obstruct these animals from using such areas.

All native reptile species are listed as Species of Principal Importance on the UK Post-2010 Biodiversity Framework (2012), and as such are material considerations in the planning process.

This is a simplified description of the legislation. In particular, the offences mentioned here may be absolute, intentional, deliberate or reckless. Note that where it is predictable that reptiles are likely to be killed or injured by activities such as site clearance, this could legally constitute intentional killing or injuring.

The reader should refer to the original legislation for the definitive interpretation.