Norwich Western Link

Environmental Statement

Chapter 10: Biodiversity

Appendix 10.1: Phase 1 Habitat Survey Report 2018 Part 1 of 3

Author: WSP

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Contents

1 Introduction

1.1.1 WSP was commissioned by Norfolk County Council to provide baseline data on the types and distribution of habitats, of an area to the West of Norwich, to inform options for a road known as the Norwich Western Link.

1.1.2 The following term has been used with regards to the desk study and field survey work:

- Field Survey Data – An area defined to the west of Norwich

1.1.3 WSP was commissioned to provide current baseline data on the types and distribution of habitats on the Field Survey Area. The aim was to provide information on the types and distribution of habitats within the Field Survey Data, and their potential or otherwise to support protected species and, or species of conservation concern.

1.1.4 It is recommended that measures to avoid adverse ecological impacts (for example, the re-sitting of construction compounds, or adjustments in road alignment, etc.) should be considered in the first instance. Where adverse impacts cannot be avoided, options to reduce adverse impacts should be implemented. This includes measures such as carrying out works outside of breeding seasons for protected species, such as great crested newts and birds.

1.1.5 We have included a summary of key information shown in this document in an accessible format. However, some users may not be able to access all technical details. If you require this document in a more accessible format please contact norwichwesternlink@norfolk.gov.uk

Norfolk County Council

PHASE 1 HABITAT SURVEY

V1
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PHASE 1 HABITAT SURVEY

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WSP
4th Floor
6 Devonshire Square
London
EC2M 4YE
Phone: +44 113 395 6201
Fax: +44 20 7337 1701
WSP.com

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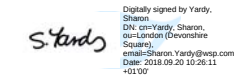
Signature	 Digitally signed by Yardy, Sharon DN: cn=Yardy, Sharon, ou=London (Devonshire Square), email=Sharon.Yardy@wsp.com Date: 2018.09.20 10:26:11 +01'00'			
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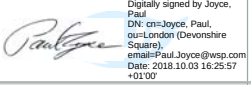
Signature	 Digitally signed by Joyce, Paul DN: cn=Joyce, Paul, ou=London (Devonshire Square), email=Paul.Joyce@wsp.com Date: 2018.10.03 16:25:57 +01'00'			
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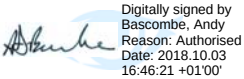
Signature	 Digitally signed by Bascombe, Andy Reason: Authorised Date: 2018.10.03 16:46:21 +01'00'			
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EXECUTIVE SUMMARY

WSP was commissioned by Norfolk County Council to complete a Phase 1 habitat survey of an area to the west of Norwich, to inform options for a road known as the Norwich Western Link.

The aim of this was to provide baseline information on the types and distribution of habitats to inform the options for the Norwich Western Link. To act as an appraisal in combination with an ecological desk study (WSP, 2018) to form an ecological baseline to identify potential constraints.

A pre-classified map of the Field Survey Area was purchased from Norfolk Biodiversity Information Service (NBIS), which was updated using aerial imagery and field notes. The field survey covered the central area of the Field Survey Area, in between the A1067 and A47, where routes are being considered for the Norwich Western Link.

The Field Survey Area largely consisted of arable fields to the west, with large areas of connected woodland to the east, with urban areas further east. Veteran trees and trees with bat roost potential were recorded.

Habitat suitability for protected species are detailed.

It is recommended that measures to avoid adverse ecological impacts (for example, the re-siting of construction compounds, or adjustments in road alignment, etc.) should be considered in the first instance. Where adverse impacts cannot be avoided, options to reduce adverse impacts should be implemented. This includes measures such as carrying out works outside of breeding seasons for protected species, such as great crested newts and birds.

As a last resort, measures that compensate for the loss of the particular ecological resource that is affected should be considered. For example, like-for-like replacement of lost habitats and enhancement of existing habitats.

1

INTRODUCTION

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1. WSP was commissioned by Norfolk County Council to provide baseline data on the types and distribution of habitats, of an area to the west of Norwich, to inform options for a road known as the Norwich Western Link.

1.1.2. The following term has been used with regards to the desk study and field survey work:

- Field Survey Area – An area defined to the west of Norwich as shown in Figure 1, Appendix A.

1.2 BRIEF AND OBJECTIVES

1.2.1. WSP was commissioned to provide current baseline data on the types and distribution of habitats on the Field Survey Area. The aim was to provide information on the types and distribution of habitats within the Field Survey Area, and their potential or otherwise to support protected species and, or species of conservation concern.

1.2.2. The results of the Phase 1 survey and associated digitised plan are detailed in this report.

2

METHODS

2 METHODS

2.1 NORFOLK HABITAT MAPPING

2.1.1. A pre-classified map of the Field Survey Area was purchased from Norfolk Biodiversity Information Service (NBIS), which was created using remote sensing imagery. This was created using Image layers such as Landsat 5 and Vector layers using Ordnance Survey Mastermap, Ordnance Survey Vectormap Settlements and Cloud masks.

2.2 REPORTS

2.2.1. The following reports have been consulted:

- The Landscape Partnership (2018a) Western Link Road Route Options, Ecological Appraisal Report Summary for The Easton and Ringland Estates.
- The Landscape Partnership (2018b) Western Link Road Route Options Ecological Appraisal Report for The Easton and Ringland Estates.

2.3 PHASE 1 HABITAT SURVEY

A Phase 1 Habitat Survey of the Site was carried out on 23rd, 24th, 30th, 31st July and 1st August 2018 in warm and dry weather conditions. The field survey covered the central area of the Field Survey Area, in between the A1067 and A47, where routes are being considered for the Norwich Western Link.

2.3.1. Habitats were described and mapped following the standard Phase 1 habitat survey methodology (JNCC, 2010). Phase 1 habitat survey is a standard technique for classifying and mapping British habitats. The dominant plant species are recorded and habitats are classified according to their vegetation types. Where appropriate consideration was given to whether habitats qualify, or could qualify, as a Habitat of Principal Importance following habitat descriptions published by the Joint Nature Conservation Committee (JNCC, 2008).

2.3.2. Pre-classified habitats were checked using aerial photography and ground-truthed during the survey and subsequently digitised using a Geographical Information System (GIS). Target notes were made to provide information on specific features of ecological interest or habitat features too small to be mapped and correspond with Photograph numbering in Appendix B.

2.3.3. A list of plant species was compiled in each habitat type with the scientific names for plant species following those in the New Flora of the British Isles (Stace, 2010).

2.3.4. Any invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act (WCA) 1981 (as amended) were searched for.

2.4 VETERAN TREES

2.4.1. Veteran trees refer to ancient and significantly aged trees. They have cultural, historical, landscape and nature conservation value because of their age, size, or condition (Natural England, 2018). Trees considered to meet this description were recorded during survey.

2.5 TREES WITH BAT POTENTIAL

2.5.1. Trees with the potential to support bat roosts that were encountered during surveys were categorised in line with the descriptions in Table 1, this is based on information for preliminary roost assessment as detailed in Collins (2016).

Table 1 - Categorisation of bat roost types in trees (Collins, 2016)

Roost Potential Category	Description of Roosting Behaviour	Commuting and Foraging Habitats
High	A tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer	Continuous, high quality habitat that is well connected to the wider landscape that it is likely to be used regularly by commuting bats such as river valleys,

Roost Potential Category	Description of Roosting Behaviour	Commuting and Foraging Habitats
	periods of time due to their size, shelter, protection, conditions and surrounding habitat.	streams, hedgerows, lines or trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined water courses and grazed parkland. Site is close to and connected to known roosts.
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only- the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
Low	A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerows or a vegetated stream, but isolated, e.g. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.

2.6 DATES OF SURVEY AND PERSONNEL

2.6.1. The site visits were led by an experienced WSP surveyor who is an Associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM). They hold FISC Level 4, a Natural England Level 2 bat licence 2017-28708-CLS-CLS and Natural England Level 1 great crested newt licence 2017-30337-CLS-CLS.

2.7 NOTES AND LIMITATIONS

2.7.1. The Phase 1 Habitat map (Appendix A) has been produced from pre-classification, information collected in field notes and from aerial photography. Whilst this map provides an overview, it should not be assumed that this is a fully accurate or detailed map of habitat types in the Field Survey Area. This is due to the large survey area and the survey being restricted to public roads and pavements and public rights of way, for example footpaths and bridleways. The survey area visited focused on the central area in between the A1067 and A47 where routes are being considered for the Norwich Western Link.

2.7.2. The Phase 1 Habitat Survey was carried out over a period of five days, as such seasonal variations could not be observed and it is likely that only a selection of all species was recorded. However, through the use of desk study information to supplement site survey data, it is considered that an accurate indication of the potential ecological value was obtained during the survey.

2.7.3. Areas of grassland that were accessed from public footpaths had recently been cut, limiting the number of species that could be recorded and the habitat classification. Grasslands have largely been classified using a precautionary approach as semi-improved neutral, although it is probable that a proportion of them are improved or poor semi-improved grassland.

3

RESULTS AND INTERPRETATION

3 RESULTS AND INTERPRETATION

3.1 PHASE 1 HABITAT SURVEY

OVERVIEW

3.1.1. A pre-classified map of the Field Survey Area was purchased from NBIS, which included the following habitat types: arable, bracken, coniferous plantation, felled woodland, fen marsh swamp, gardens, hedgerows, improved grassland, lowland heathland, deciduous woodland, lowland mixed deciduous woodland, scrub, semi-improved grassland and water bodies.

3.1.2. The Landscape Partnership (2018b) surveys of the Ringland and Easton Estates with the Field Survey Area identified 20 Phase 1 habitat categories or broad-leaved semi-natural woodland, broad-leaved plantation woodland, coniferous plantation, mixed semi-natural woodland, dense continuous scrub, scattered trees/lines of trees, semi-improved acid grassland, semi-improved neutral grassland, improved grassland, marshy grassland, bracken, swamp, standing water, running water, arable, amenity grassland, intact hedge (species-poor), defunct hedge (species-poor) and species poor hedge with trees.

3.1.3. The Field Survey Area largely consisted of arable fields to the west, with large areas of connected woodland to the east, with urban areas further east. Species recorded during survey are detailed in Tables 2 and 3. Target notes and photographs are included in Appendix B.

3.2 HABITAT DESCRIPTIONS

SEMI-NATURAL BROADLEAVED WOODLAND

3.2.1. Semi-natural broadleaved woodland is present across the Field Survey Area. Species recorded in the canopy included oak *Quercus robur*, birch *Betula* sp., sycamore *Acer pseudoplatanus*, beech *Fagus sylvatica*, rowan *Sorbus acuparia*. The understorey species included bramble *Rubus fruticosus* agg., stinging nettle *Urtica dioica*, bracken *Pteridium aquilinum* and honeysuckle.

CONIFEROUS PLANTATION WOODLAND

3.2.2. Coniferous plantation is present within Hockering Wood and adjacent to other areas of broadleaved woodland around Ringland. The dominant species includes pine *Pinus* sp., ground flora includes dominant bracken *Pteridium aquilinum*.

SCATTERED BROADLEAVED TREES, VETERAN TREES AND TREES WITH BAT ROOST POTENTIAL

3.2.3. Scattered broadleaved trees were present across the Field Survey Area, predominantly ash and oak. Veteran trees and trees with the potential to support a bat roost are detailed in Appendix B.

DENSE / CONTINUOUS SCRUB (A2.1) & SCATTERED SCRUB

3.2.4. Small areas of scrub are present across the Field Survey Area, with species including bramble, hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*.

GRASSLAND

3.2.5. Grassland were largely mapped as semi-improved neutral as a precautionary approach, as most fields could not be accessed and the fields which were accessed adjacent to the River Wensum had recently been cut. Species recorded included Yorkshire fog *Holcus lanatus*, perennial ryegrass *Lolium perennis*, soft brome *Bromus hordaceus* and dock *Rumex* sp.

3.2.6. Ditches adjacent to grazing marshes adjacent to the River Wensum are likely to hold more botanical interest rather the grasslands themselves, with species adjacent to the ditches including common reed *Phragmites australis*, greater willowherb *Epilobium hirsutum*, purple loosestrife *Lythrum salicaria*.

ARABLE LAND

3.2.7. Arable is the main habitat type within the Field Survey Area and is particularly dominant to the west. Fields consisted largely of cereal crops.

HEDGEROWS

3.2.8. Hedgerows were present across the Field Survey Area, predominantly forming boundaries of the fields. Hedgerow species included hawthorn, blackthorn, spindle *Euonymus europaeus*, bramble and elder *Sambucus nigra*.

RUNNING WATER

3.2.9. The River Wensum and River Tud run across the Field Survey Area. The River Wensum was accessed at various locations within the Field Survey Area.

3.2.10. The River Tud was viewed from one location, with water depth less than 20cm depth with bank vegetation consisting of meadowsweet *Filipendula ulmaria*, greater willowherb, bindweed *Calystegia* sp., speedwell *Veronica* sp., and sycamore and ash.

STANDING WATER

3.2.11. Multiple water bodies were identified throughout the Field Survey Area.

BUILDINGS AND HARDSTANDING

3.2.12. Buildings and hardstanding were present throughout the Field Survey Area, including residential, commercial developments and roads.

BRACKEN

3.2.13. Areas dominated by bracken were predominantly roadside verges and the understorey of woodlands.

3.3 OTHER

3.3.1. Lowland heathland was identified in the NBIS dataset, however lowland heath was not identified within HPI information and was not identified during survey. Other land uses included solar farms and wind turbines.

3.4 SPECIES RECORDED

Table 2 – Incidental Amphibian, Bird and Invertebrate Species Recorded

Common name	Scientific name
Blackbird	*Turdus merula*
Buzzard	*Buteo buteo*
Comma	*Polygonia c-album*
Common Toad	*Bufo bufo*
Gatekeeper	*Pyronia tithonus*
Green-veined white	*Pieris napi*
Grey wagtail	*Motacilla cinerea*
Heron	*Ardea cinerea*
Holly blue	*Celastrina argiolus*
Large white	*Pieris brassicae*
Meadow brown	*Maniola jurtina*
Red admiral	*Vanessa Atalanta*
Silver-washed fritillary	*Argynnis paphia*
Small white	*Pieris rapae*
Speckled wood	*Pararge aegeria*
Swallow	*Hirundo rustica*

Table 3 - Plant and Bryophyte Species Recorded

Common name	Scientific name
Alder	*Alnus glutinosa*
Arrowhead	*Sagittaria latifolia*
Ash	*Fraxinus excelsior*
Bank Haircap	*Polytrichastrum formosum*
Beech	*Fagus sylvatica*
Beech	*Fagus sylvatica*
Bindweed sp.	*Calystegia sp.*
Birch sp.	*Betula sp.*
Bracken	*Pteridium aquilinum*
Bramble	*Rubus fruticosus agg.*
Broom	*Cytisus scoparius*
Broom Fork-moss	*Dicranum scoparium*
Burdock sp.	*Actium sp.*
Bur-reed sp.	*Sparganium sp.*
Cock's-foot	*Dactylis glomerate*
Common Feather-moss	*Kindbergia praelonga*
Common knapweed	*Centaurea nigra*
Common mallow	*Malva neglecta*
Common nettle	*Urtica dioica*
Common ragwort	*Senecio jacobaea*
Common reed	*Phragmites australis*
Creeping buttercup	*Ranunculus repens*
Creeping cinquefoil	*Potentilla reptans*
Creeping thistle	*Cirsium arvense*
Curled pondweed	*Potamogeton cripsus*
Dandelion	*Taraxacum agg.*
Dock sp.	*Rumex sp.*
Dog's mercury	*Mercurialis perennis*
Elder	*Sambucus nigra*
False oat grass	*Arrhenatherum elatius*
Field bindweed	*Convolvulus arvensis*
Field maple	*Acer campestre*
Field scabious	*Knautia arvensis*
Gorse	*Ulex europaeus*

Common name	Scientific name
Great willowherb	*Epilobium hirsutum*
Greater knapweed	*Centaurea scabiosa*
Guelder rose	*Virburnum opulus*
Hard rush	*Juncus inflexus*
Hawthorn	*Crataegus monogyna*
Hazel	*Corylus avellane*
Hedge woundwort	*Stachys sylvatica*
Hemp agrimony	*Eupatorium cannabinum*
Herb-Robert	*Geranium robertianum*
Himalayan balsam	*Impatiens glandulifera*
Hogweed	*Heracleum sphondylium*
Holly	*Ilex aquifolium*
Honeysuckle	*Lonicera periclymenum*
Hornbeam	*Carpinus betulus*
Horse chestnut	*Aesculus hippocastanum*
Ivy	*Hedera helix*
Lady's bedstraw	*Galium verum*
Lords and Ladies	*Arum maculatum*
Lucerne	*Medicago sativa*
Meadowsweet	*Filipendula ulmaria*
Mugwort	*Artemisia vulgaris*
Mullein sp.	*Verbascum sp.*
Neat Feather-moss	*Pseudoscleropodium purum*
Nipplewort	*Lapsana communis*
Pedunculate oak	*Quercus robur*
Perennial ryegrass	*Lolium perenne*
Pine sp.	*Pinus sp.*
Purple loosestrife	*Lythrum salicaria*
Reed canary grass	*Phalaris arundinacea*
Reed sweet-grass	*Glyceria maxima*
Restharrow	*Oonis arvensis*
Rowan	*Sorbus acuparia*
Soft brome	*Bromus hordeaceus*
Spear thistle	*Cirsium vulgare*
Speedwell sp.	*Veronica sp.*
Swan's-neck Thyme-moss	*Mnium hornum*

Common name	Scientific name
Sweet chestnut	*Castanea sativa*
Sweet-grass sp.	*Glyceria sp.*
Sycamore	*Acer pseudoplatanus*
Tufted vetch	*Vicia cracca*
Water starwort sp.	*Callitriche sp.*
Wavy hair grass	*Deschampsia flexuosa*
White campion	*Silene latifolia*
Willow sp.	*Salix sp.*
Yarrow	*Achillea millefolium*
Yellow archangel	*Lamium galebdolon*
Yellow water-lily	*Nuphar lutea*
Yorkshire fog	*Holcus lanatus*

3.5 MAMMAL RECORDS

3.5.1. Other than the bird species recorded in Table 2, no other mammals or signs of mammals were recorded during the survey.

3.6 PLANT SPECIES

3.6.1. One Schedule 9 species, Himalayan balsam *Impatiens glandulifera* was recorded along the River Wensum and within the Field Survey Area.

3.7 HABITATS OF PRINCIPAL IMPORTANCE (HPI)

3.7.1. Habitats of Principal Importance that were identified in WSP (2018) were consistent on the ground, for as much as could be identified from survey. No new areas that were considered as potentially HPI were identified.

3.8 SUITABILITY FOR PROTECTED SPECIES / SPECIES OF CONSERVATION CONCERN

3.8.1. The results of the NBIS species records are detailed in the Ecological Desk Study report (WSP, 2018) along with recommendations for further surveys. The requirement for these surveys is confirmed in the summary of habitat suitability in Table 4.

Table 4 - Assessment of Habitats to Support Protected Species / Species of Conservation Concern

Species	Description of Habitat Suitability
Badgers	The habitats present within the Field Survey Area including woodland, scrub, hedgerows and grassland were considered to provide suitable foraging opportunities for badgers. The woodland habitats provide suitable sett building opportunities.
Bats	The woodland, hedgerows, mature trees and grassland present within the Field Survey Area provide suitable habitat for foraging and commuting bats. Overall the Field Survey Area is considered to provide high suitability for foraging and commuting bats. Buildings, trees and other structures present within the Field Survey Area are assumed to have potential to support bats.
Great crested newts	Numerous water bodies are present within the Field Survey Area, which could provide suitable habitat, with terrestrial habitat also present.

Species	Description of Habitat Suitability
Invertebrates	The less intensively managed grassland areas within the Field Survey Area are likely to provide potential habitat for a range of invertebrates. Records of Desmoulin's whorl snail and Norfolk Hawker dragonfly are known from the Field Survey Area and surveys and targeted surveys will be necessary.
Breeding birds	A range of habitats are present with the Field Survey Area which provide suitable nesting opportunities for birds.
Wintering birds	The arable fields and grassland provide some potential foraging and habitat for passage/over-wintering species such as mixed thrush flocks, skylarks and pipits. Arable fields and areas of grassland could also be used by flocks of migrant/over-wintering bird species such as geese.
Water vole	Running and standing water habitats within the Field Survey Area were considered to provide suitable foraging and burrowing opportunities for water vole.
Otter	Running and standing water habitats within the Field Survey Area were considered to provide suitable foraging and commuting opportunities for otters. Where the River Wensum was accessed there was ample vegetation cover along the river corridor to offer sheltering opportunities.
Fish	Water bodies within the Field Survey Area were considered to provide suitable habitat for fish species. Numerous fish were seen from vantage points along the River Wensum, but were not identified.
White-clawed crayfish	Water bodies within the Field Survey Area were considered to provide suitable foraging opportunities and breeding conditions for white-clawed crayfish.
Reptiles	Areas of grassland, field margins, scrub, hedgerows and woodland provide suitable habitat for common reptile species (adder, grass snake, slow worm, common lizard) for foraging, basking, shelter and hibernating opportunities.

3.9 GENERAL RECOMMENDATIONS

3.9.1. At this stage of the assessment process and without information from detailed surveys or design, only broad recommendations of likely mitigation requirements are possible. Further surveys would be necessary to confirm the exact mitigation requirements necessary to address specific impacts. In broad terms the following hierarchical approach to mitigation should be adopted – this approach is strongly supported by guidance in the DMRB and national planning policy:

- Firstly, measures to avoid adverse ecological impacts (for example, the re-siting of construction compounds, or adjustments in road alignment, etc.) should be exhausted;
- Where an adverse impact cannot be avoided, options to ameliorate or reduce an adverse impact should be implemented (e.g. erection of barriers or bunds to reduce noise and vibration; use of Sustainable Drainage Systems to regulate water flows);
- As a last resort, measures that compensate for the loss of the particular ecological resource that is affected should be considered. For example, like-for-like replacement of lost habitats;
- Compensation approaches may include enhancement of existing habitats by improved management and long-term monitoring.

3.9.2. General mitigation measures, falling into one or more of the above categories, which would help to reduce the magnitude and significance of potential construction and operational impacts are[1]:

[1] The following measures only constitute the proposed generic mitigation. At this stage it is not possible to determine detailed mitigation methods.

- Correct timing of works to avoid key periods for particular species, such as avoidance of the bird breeding season for habitat clearance;
- Habitat creation: either through the translocation of existing habitats or seed banks; the enhancement of existing habitat; and / or the planting of new habitat;
- Translocation and / or exclusion of species (under appropriate licences / agreements) where required from the Scheme Option footprint to pre-prepared receptor sites to minimise impacts of habitat loss and species mortality;
- Appropriate design and use of lighting to minimise impacts on bats and other light sensitive species;
- Re-establishing connectivity between habitats affected by road construction and incorporation of features within the detailed design which would restore connectivity for protected species whose habitat has been fragmented by the road;
- The use of screening during construction to minimise the spread of noise, dust, lighting, etc. and the use of fencing to temporarily exclude species by restricting access into particular areas (such as reptile exclusion fencing);
- Appropriate landscaping and re-landscaping of all new roadside verges and disturbed habitat specifically for species known to be present in the area (where suitable for network and safety priorities). All landscaping should use species of local provenance;
- Installation of surface water run-off attenuation and treatment features to ensure water discharged to watercourses would not compromise the conservation value of the watercourse or the species that live within it; and
- Implementation of general construction environmental best practice. This could include, but is not limited to, providing tool box talks for construction staff informing them of key ecological constraints within the area, the damping of haul routes to minimise the spread of dust, the use of drip trays and spill kits when refuelling vehicles and ensuring that open trenches are not left over night without safe means of egress for animals that may fall into them.

4

BIBLIOGRAPHY

4 BIBLIOGRAPHY

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Appendix A

PHASE 1 MAP