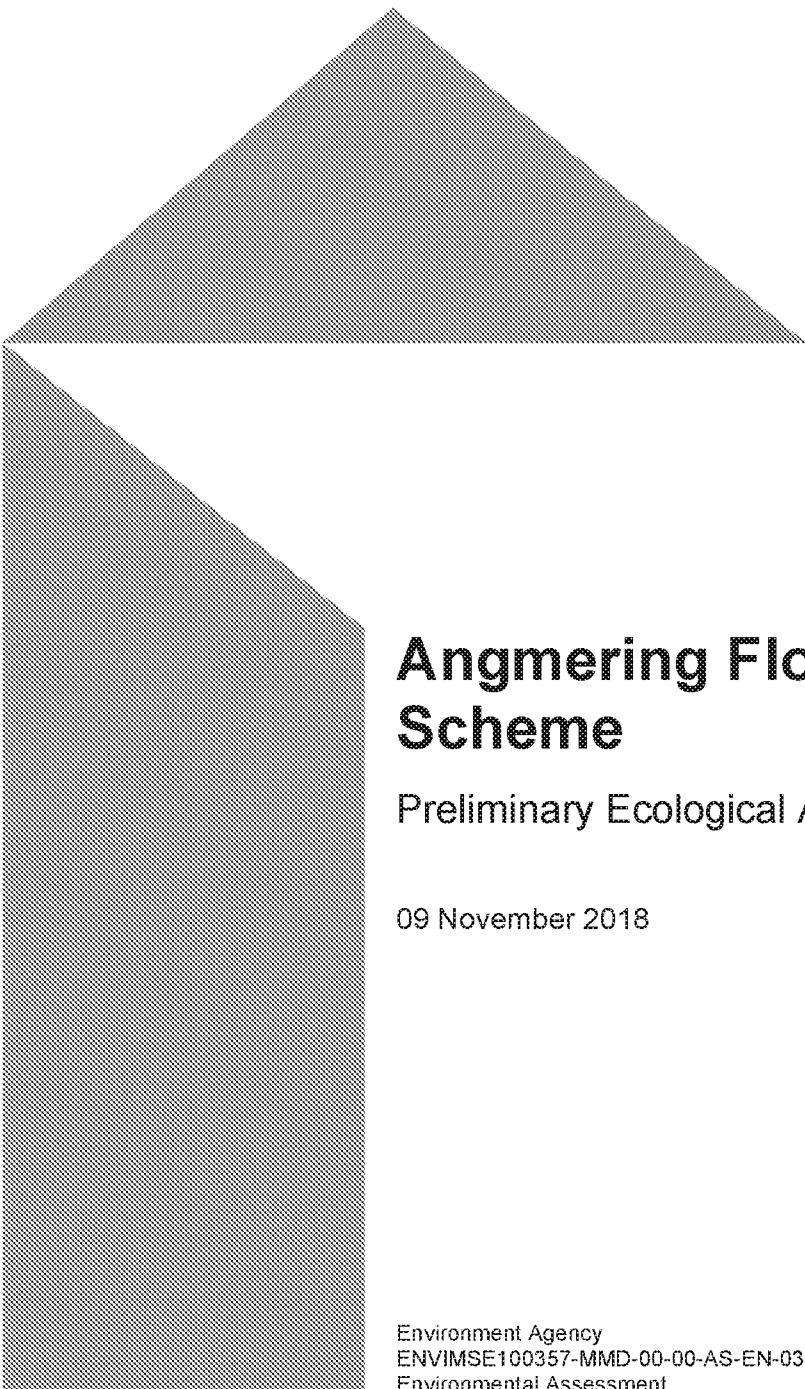




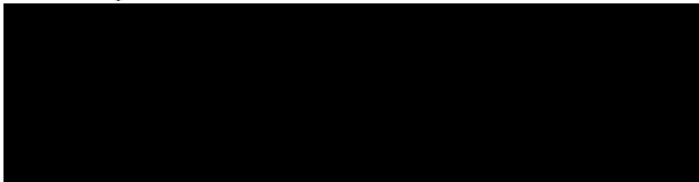
Angmering Flood Alleviation Scheme

Preliminary Ecological Appraisal

09 November 2018

Environment Agency
ENVIMSE100357-MMD-00-00-AS-EN-0303001-S3-P02-C0300-EA3-LOD3-Preliminary
Environmental Assessment

Mott MacDonald
Mott MacDonald House
8-10 Sydenham Road
Croydon CR0 2EE
United Kingdom



Environment Agency

Angmering Flood Alleviation Scheme

Preliminary Ecological Appraisal

09 November 2018

Mott MacDonald Group Limited.
Registered in England and Wales no.
1110949. Registered office: Mott
MacDonald House, 8-10 Sydenham Road,
Croydon CR0 2EE, United Kingdom

Environment Agency
ENVIMSE100357-MMD-00-00-AS-EN-0303001-S3-P02-C0300-EA3-LOD3-Preliminary
Environmental Assessment

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
P01	September 2018	C Wiseman	K Atkinson	C Jenkins	First Draft – for client review
P02	November 2018	C Wiseman	K Atkinson	C Jenkins	Updated following EA comments

EA file naming and file metadata table

BS1192 file name	ENVIMSE100357-MMD-00-00-AS-EN-0303001-S3-P01-C0300-EA3-LOD3-Preliminary Environmental Assessment
BS1192 suitability	S3
Revision	P01
EA deliverable reference	C0300
EA work stage	EA3
Level of Development	LOD3
Title	Preliminary Ecological Appraisal (PEA)

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

Executive summary	1
1 Introduction	2
1.1 Background	2
1.2 Site description	3
1.3 Proposed scheme	3
1.4 Scope of Report	4
1.5 The Zone of Influence	5
2 Legal and Policy Framework	6
2.1 European Legislation and International Conventions	6
2.2 National Legislation	6
2.3 Local Policy	7
3 Methodology	9
3.1 Desk Study	9
3.2 Phase 1 Habitat Survey	9
3.3 Water Vole Survey	9
3.4 Survey Constraints and Limitations	9
4 Baseline	11
4.1 Designated Sites	11
4.1.1 South Downs National Park	11
4.1.2 Long Furlong and Church Hill LWS	11
4.1.3 Clapham Wood LWS	12
4.1.4 Ferring Rife and Meadows LWS	12
4.1.5 Highdown Hill and the Millers Tomb LWS	12
4.1.6 Titnore and Goring Woods Complex LWS	12
4.1.7 Ham Farm Wood LWS	12
4.1.8 Climping Beach SSSI	13
4.1.9 Singleton and Cocking Tunnels SAC	13
4.1.10 The Mens SAC	13
4.1.11 Ebernoe Common SAC	14
4.2 Habitats	14
4.2.1 Arable	14
4.2.2 Species poor semi improved grassland	14
4.2.3 Amenity grassland	14
4.2.4 Improved grassland	15
4.2.5 Scrub	15

4.2.6	Introduced shrub	15
4.2.7	Hedgerows	15
4.2.8	Broadleaved semi natural woodland	15
4.2.9	Scattered trees	15
4.2.10	Tall ruderal	16
4.2.11	Running water and ditches	16
4.2.12	Standing water	16
4.2.13	Structures	16
4.3	Protected Species	16
4.3.1	Water vole	16
4.3.2	Otter	17
4.3.3	Birds	17
4.3.4	Reptiles	18
4.3.5	Great Crested Newts	18
4.3.6	Badgers	18
4.3.7	Hazel Dormouse	18
4.3.8	Bats	19
4.3.9	Other notable species	19
4.3.10	Invasive Species	20
5	Ecological Constraints and Opportunities	21
5.1	Designated Sites	21
5.2	Habitats	21
5.3	Protected Species	22
5.4	Recommendations	22
6	Conclusion	25
7	References	26
	Appendices	27
A.	Location of Scheme	28
B.	Legislation and Policy	29
B.1	International, European and UK Legislation	29
B.2	Protected Species Legislation	30
C.	Biological Records	32
C.1	Summary Report	32
D.	Phase 1 Survey Maps	33

E.	Phase 1 Target Notes	34
F.	Water Vole Survey	50
F.1	Map of Survey Area Extent	50
F.2	Water Vole Habitat Assessment	50
F.3	Water Vole File Sign Survey	50
G.	Citations	51

Executive summary

Mott MacDonald Ltd. has been commissioned by the Environment Agency to undertake a Preliminary Ecological Appraisal for the proposed Angmering Flood Alleviation Scheme, in Angmering, Sussex. This report presents the findings of the Extended Phase 1 Habitat Survey along with an additional water vole survey.

The Extended Phase 1 Habitat survey was carried out by Mott MacDonald during August 2018. The purpose of this survey was to assess the ecological importance of the site and determine the requirement for targeted Phase 2 surveys. As part of this survey, assessments were undertaken of ecologically valuable habitats with the potential to support great crested newts, reptiles, dormice, badgers, bats and water voles.

Several designated sites were identified within a 2km and 5km radius of the Scheme, including nationally and locally important sites.

The desktop study and Extended Phase 1 Habitat Survey identified suitable habitat features for bats, breeding birds, badgers, reptiles, hazel dormouse and great crested newts.

Further ecological surveys for the above protected species are recommended to determine their presence, likely absence and population size class. The number and extent of the surveys required will be determined by the location and type of Options taken forward for the Angmering Flood Alleviation Scheme.

1 Introduction

Mott MacDonald has been commissioned by the Environment Agency to undertake a Preliminary Ecological Appraisal (PEA) for the Angmering Flood Alleviation Scheme, between approximate coordinates TQ 06712 04267 and TQ 08845 05669.

1.1 Background

The Angmering Flood Alleviation Scheme (FAS), forms part of the Solent and South Downs Appraisal Package 107.

Angmering, situated in West Sussex, is split by a culverted watercourse which drains from the South Downs. Situated at the head of the system is Patching Pond which is predominantly ground water fed from the north side of the A27 and discharges into Black Ditch which then meanders along the southern side of the A280, through the West Sussex County Council's (WSCC) highway drainage attenuation feature, through Avenal's Farm, before entering Water Lane culvert at Angmering. The 0.5km long culvert passes through the heart of Angmering under Water Lane, with approximately 200m of the culvert being twinned. The main culvert then drains back into open channel prior to meandering through Ham Manor golf course and joining the River Arun.

Angmering suffers from frequent fluvial and surface water flooding. In 1980, 26 properties flooded and a similar number again in 2012. The majority of these flooding incidents occurred along Water Lane with significant runoff from Dappers Lane.

Four main flow paths have been identified as the main contributors towards flooding of the town. These include:

- ※ Water Lane - Surface water run-off running south west down Water Lane towards the village centre
- ※ Black Ditch - Fluvial flood risk overloading the Water Lane culvert
- ※ Dappers Lane - Surface water run-off running south down Dappers Lane and then south west towards the village centre
- ※ Ancient Woodland (TQ 05370) to East of Weavers Hill - surface water run-off flows north west down fields towards Black Ditch and Water Lane

An Initial Assessment (2015), like a feasibility study, indicated that a FAS in Angmering may be viable but required further data and appraisal work to confirm the economic viability of a Scheme. Following the Initial Assessment, the current stage of the project is to produce an 'Outline Business Case' (OBC) which expands on the work carried out at Initial Assessment stage to determine a viable Scheme and outline design. If viable, this will then progress to the detailed design and delivery stage.

This Preliminary Environmental Assessment will feed into the optioneering stage of the OBC so that all the environmental opportunities and constraints are considered to determine the preferred options for the FAS. Based on the preferred options and locations, the information in this PEA will highlight further surveys and consents required to progress with the preferred scheme.

1.2 Site description

The Scheme stretches from the north at Patching Pond to the South west of Angmering near The Thatchway. A map of the Scheme and area surveyed is located within Appendix A.

Section 1

The river runs from Patching Pond to the start of Black Ditch. Here the survey area encompasses 100m upstream and 50m either side of the pond. The river flows through a culvert under the A27 and A280.

This is the start of Black Ditch which runs down to the culvert inlet at Water Lane covering the fields on both sides of the A280. This includes Ecclesden Farm, Northdown Farm, Miles Copse and Northdown Copse woodlands. This upstream area consists of steep fields at approximately 1/25 gradient across approximately 400m/500m downhill towards the open river channel at the bottom of the valley.

The river then flows through culvert under the A280 through WSCC's highway attenuation feature, and again through culvert under Water Lane into open channel.

Section 2

This section of the Black Ditch flows through Avenals Farm down to the culvert inlet at Water Lane which acts as a restriction causing water to back up during a fluvial flood event.

Section 3

This area includes Dappers Lane ditch and land to the east including a motor racing circuit, agricultural fields and Grooms Copse woodland. Dappers Lane is known for large volumes of surface water to run down the road, contributing to flooding on Water Lane. The road has a gradient of approximate 1/35. Properties are located along both sides of the road, and a ditch runs along the eastern side.

Section 4

This is where the Black Ditch Culvert runs underneath Water Lane. This location contains properties at flood risk either side of the road. In a flood event, the Black Ditch culvert becomes surcharged and water emerges out of the manholes within the road. Some flooding may also be due to surface water unable to drain into the culvert during a rainfall/fluvial flood event. Water Lane slopes west to east at a gradient of approximately 1/100 for 200m then flattens out in village centre.

Section 5

This section covers the village centre, which is at the lowest part of the Scheme and where water ponds during a flooding event. The channel drains through a culvert to open channel to the southeast near St Margaret's church and the village hall.

Section 6

This area covers Ham Manor Golf Course. This area is downstream of the study area and so interventions here won't have an impact to upstream flood risk, however, there is opportunity for habitat creation to improve the economic viability of a FAS.

1.3 Proposed scheme

The Scheme is currently at the optioneering stage to determine a preferred combination of options that will form the overall FAS, with over 50 potential options currently identified to alleviate risk of flooding in Angmering. Further appraisal is yet to be completed to determine the

effectiveness and suitability of options, which this PEA document will feed into the decision-making process of. Below is a summary of the types of options that are currently being considered for each section and is not an exhaustive or definitive list.

Section 1

Options in this area aim to attenuate surface water run off both from the fields either side of the watercourse and within the watercourse itself. The ground is made up of clay, silt, sand and chalk bedrock, so options will also aim improve opportunity for water to infiltrate the ground. Natural Flood Management (NFM) measures could be appropriate as they aim to be low-cost, potential to be installed/managed by landowner, suitable for current land-use and landscape. This includes but not limited to; formalising and adding storage areas, reconnecting the flood plain, land management practices such as crop cover, woodland and hedgerow planting, in channel structures, re-profiling the channel and ditches, small online/offline ponds and sediment traps.

Section 2

Options aim to attenuate within the water course channel taking care not to impact properties that are in closed proximity, also following NFM principals. This includes manipulating the existing channel to meander, formalising and adding storage areas, land management, planting, re-profiling the channel, and property level protection.

Section 3

Options along Dapper Lane should aim to slow the flow of surface water runoff and maximise use of the existing ditch to capture, attenuate and convey water. Potential options include additional gullies and drainage, ditch modifications, overland flow routes, and property level protection.

Section 4

All surface water in Angmering discharges to the culvert under Water Lane but could be unable to either due to lack of drainage or capacity of the culvert. Options include additional drainage, property level protection, raising kerbs, and low level walls.

Section 5

During a flood event water ponds in this area due to this being the lowest point that acts as a 'basin'. Options should aim to discharge back into the open channel to the southwest, and/or provide attenuation where this is not easy/possible without flooding properties. Potential options includes upsizing a short section of the culvert, property level protection, and additional drainage.

Section 6

As this area is downstream of the Scheme, interventions will not have an impact on upstream flood risk. Options during the initial assessment included additional planting at the golf course.

1.4 Scope of Report

The objective of this Preliminary Ecological Appraisal Report is to undertake the following:

- ✦ Identify the habitats and designated sites within the Zone of Influence (Zoi);
- ✦ Assess the likelihood of protected species being present on, near or adjacent to proposed works;

- ✧ Identify the presence of invasive plant species in or adjacent to the proposals; and,
- ✧ Provide recommendations for mitigation and further survey requirements.

1.5 The Zone of Influence

The current guidance on ecological assessments recommends that all ecological features within a Zone of Influence (Zoi) for a project are investigated (IEEM, 2016). The potential Zoi includes:

- ✧ Areas directly within the land take for the proposed development and access;
- ✧ Areas that will be temporarily affected during construction;
- ✧ Areas likely to be impacted by hydrological disruption; and,
- ✧ Areas where there is a risk of pollution and noise disturbance during construction and/or operation.

The Zoi of a project is the area within which features may be subject to significant effects. The Zoi is variable, depending on the ecological features concerned. Regarding the habitats and protected/notable species likely to be affected by the proposed Scheme, the Zoi has been defined as the land within the line of works and immediately adjacent, extending into the wider landscape where hydrological changes will occur. Ponds with potential for great crested newts *Triturus cristatus* were assessed up to 250m from the proposed Scheme. Designated sites and historical biological records were searched for within a 2km radius of the proposed Scheme, extended to 5km for bird and bat species. In addition, all designated sites connected fluvially to the Scheme and Special Areas of Conservation (SAC) designated for bats within 30km of the Scheme were assessed.

2 Legal and Policy Framework

2.1 European Legislation and International Conventions

The construction and operational activities for the Scheme should comply with International and European legislation. The following EC Directives and international conventions are relevant to the ecological assessment:

- ✦ Convention on Biological Diversity (1992);
- ✦ Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979);
- ✦ Bonn Convention on the Conservation of Migratory Species of Wild Animals (1979);
- ✦ Ramsar Convention on Wetlands (1971);
- ✦ EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitat Directive 1992) as amended (92/43/EEC); and,
- ✦ EC Directive on the Conservation of Wild Birds (Birds Directive 1979) as amended (79/409/EEC).

2.2 National Legislation

The construction and operational activities must comply with UK nature conservation legislation, and with national and local biodiversity policies. The key national policies which influence the ecology and nature conservation assessments are:

- ✦ The Conservation of Habitats and Species Regulations (2017);
- ✦ Wildlife and Countryside Act (1981);
- ✦ The Natural Environment and Rural Communities Act (2006);
- ✦ National Planning Policy Framework (NPPF) (March 2012);
- ✦ UK Post-2010 Biodiversity Framework (2012); and,
- ✦ Biodiversity 2020 (2011).

The Natural Environment and Rural Communities Act 2006 requires public bodies, including local authorities, 'to have regard to the conservation of biodiversity in England' when carrying out their normal functions. Also, under this Act a list of species of 'principal importance to biodiversity within England' was drawn up which acts as an aid to guide public bodies in implementing their duty.

The National Planning Policy Framework (NPPF) relates to conserving and enhancing the natural environment. Section 11 requires Local Authorities in England to take measures to:

- ✦ Conserve and enhance biodiversity;
- ✦ Protect the habitats of these species from further decline;
- ✦ Protect the species from the adverse effect of development; and,
- ✦ Refuse planning permission for development, if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts) adequately mitigated, or, as a last resort, compensated for.

The UK Post-2010 Biodiversity Framework covers the period 2011 - 2020 and replaces the UK Biodiversity Action Plan (UKBAP) 1994 – 2010. Its aim is to address the underlying causes of biodiversity loss and improve and enhance biodiversity and ecosystem services. The UKBAP priority habitats and species background information is still widely used at country level.

'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' builds on the Natural Environment White Paper for England and sets out the strategic direction for biodiversity policy for the next decade. The strategy describes what is needed to halt overall biodiversity loss by 2020 and includes goals on the following:

- ✦ Better wildlife habitats;
- ✦ More sites that are larger and less fragmented areas for wildlife, with an increase in priority habitats by at least 200,000ha;
- ✦ The restoration of 15% of degraded ecosystems – as a contribution to climate change mitigation and adaptation; and,
- ✦ An overall improvement in the status of wildlife and the prevention of further human-induced extinctions of known threatened species; Increased engagement of people in biodiversity issues, aware of its value and taking positive action.

The Ancient Woodland Inventory identifies woodlands that have had continuous woodland cover for some centuries.

The Ancient Woodland Inventory has become an important tool for policy makers and planners. Although ancient woodland may be a feature of statutorily designated sites, it is not in itself a statutory designation. However, ancient woodland is given considerable protection through the planning process.

Hedgerows are accorded some protection under the Hedgerows Regulations 1997. These regulations are intended to protect 'important' hedgerows from destruction and damage.

Hedgerows are afforded a level of protection under domestic legislation, Hedgerow Regulations 1997. From June 1st, 1997, it is against the law to remove most countryside hedgerows without permission. To get permission to remove a hedgerow, the local planning department must be contacted.

The Hedgerow Regulations are in favour of protecting and retaining 'important' hedgerows. The regulations set out criteria that must be used by the local planning authority in determining which hedgerows are important. The criteria relate to the value of hedgerows from an archaeological, historical, landscape or wildlife perspective. They exclude hedgerows that are less than 30 years old. If a hedgerow is less than 30 years old and qualifies under any one of the criteria, then it is important.

Legislation and policies specific to individual species likely to be present on site are presented in Appendix B.

2.3 Local Policy

The Arun District Council Local Plan 2011-2031 (proposed for adoption) includes policies of relevance to ecology and nature conservation; Policy GI SP1 Green Infrastructure and development; and Policy ENV SP1 Natural Environment.

Policy GI SP1: All major development must be designed to protect and enhance existing Green

Infrastructure assets, and the connections between them, in order to ensure a joined up Green Infrastructure Network.

Policy ENV SP1: Arun District Council will encourage and promote the preservation, restoration and enhancement of biodiversity and the natural environment through the development process and particularly through policies for the protection of both designated and non-designated sites. Where possible it shall also promote the creation of new areas for habitats and species.

In addition, in April 2018, the South Downs National Park submitted their first Local Plan. The plan is still to be finalised, but when it is adopted, the new South Downs Local Plan will replace the existing planning policies operating across the South Downs National Park.

Despite the changes to national level biodiversity policy described above, county and district level Biodiversity Action Plans (BAPs) still apply. The Sussex Biodiversity Action Plan (2007) includes County-wide plans for relevant habitats including arable field margins, hedgerows, woodland, ponds, and species including water voles and pipistrelle bats.

The local BAP for this area was produced by Arun District Council 2000. Through this plan, Arun District Council sets to:

- ※ neither to cause nor to contribute to, through action or inaction, the extinction of any native living species in their district;
- ※ nor to make the populations of common species decline so that they become rare;
- ※ nor to unduly restrict variation within species;
- ※ nor to destroy nor cause a net loss of area of any irreplaceable natural habitat.

3 Methodology

3.1 Desk Study

A detailed ecological desk study was undertaken during August 2018 utilising online databases including Multi-Agency Geographic Information for the Countryside (MAGIC), local council websites and the Joint Nature Conservation Committee (JNCC) were consulted to identify the location of statutory and non-statutory designated sites up to 2km radius of the Scheme and 30km to identify sites designated for bats.

In addition, a data search from the Sussex Biodiversity Record Centre (SBRC) was undertaken in August 2018, with records requested within a 2km radius of the proposed Scheme for all species and protected habitats, excluding birds and bats, where a 5km radius was used. A summary report of the results is within Appendix C. Records prior to 2008 were deemed too historical to be relevant to this appraisal and are therefore not considered further.

3.2 Phase 1 Habitat Survey

The site was visited by a Mott MacDonald Ecologist in August 2018. An extended Phase 1 habitat survey was carried out within 50m either side of the watercourse. The broad habitat types were identified and mapped in accordance with the Handbook for Phase 1 Habitat Survey (JNCC, 2010) and notes were taken of habitat which may support, or evidence of activity of protected or notable species.

A rapid phase one assessment was undertaken for areas within 50m + of the Scheme up to 100m where there are proposals for NFM type measures in the upstream fields either side of the A280. Habitats within the ZOI were classified according to JNCC habitat types. Where possible, plant species were identified to species level. The species lists were compiled and incorporated into the Phase 1 Habitat Survey Target Notes. The Phase 1 Habitat maps are shown in Appendix D, together with the accompanying target notes in Appendix E.

3.3 Water Vole Survey

Watercourses and adjacent habitats were assessed for evidence of water vole activity by a Mott MacDonald Ecologist during August 2018.

Watercourses were formally inspected for evidence of water vole activity, involving a careful visual inspection of the channel, banks and riparian zone to look for signs of water vole presence including droppings/latrine sites, feeding remains, burrow entrances and prints.

Where possible, the water vole survey work was carried out both from top of bank and from within the channel looking directly in to the bank. The water vole survey extent is shown on the maps detailing the survey area in Appendix F.

3.4 Survey Constraints and Limitations

It should be noted that the absence of certain protected or rare species does not preclude their presence on a site. There is always the risk of protected or rare species being over-looked, either owing to the timing of the survey or the scarcity of the species at the site.

The survey cannot, therefore, be considered to provide a wholly comprehensive account of the ecological interest of the site and it should be noted that this report does not constitute an

Ecological Impact Assessment. However, the site does provide a “snapshot” of the ecological interest present on the day of the survey visit that when combined with the desk study can inform the design and site option selection.

Field surveys were confined to locations where landowner permission had been obtained or to public rights of way (PRoW). Therefore, aerial photography was used to supplement surveys where access was not available.

Finally, during the water vole survey some sections of the bank and Patching Pond were not possible to survey, due to dense bankside vegetation and restricted land access. In addition, there was heavy rainfall during the second day of survey. This may have resulted in evidence of activity, such as latrines being washed away.

4 Baseline

4.1 Designated Sites

A number of nationally and locally designated sites occur within 2km of the proposed Scheme, one SSSI is connected to the Scheme fluviially and three Special Areas of Conservation (SAC) designated for bats are located within 30km of the Scheme. No internationally designated sites were identified within 2km. The location of the designated sites can be found within Ecological data search for land at Angmering, Sussex Biodiversity Records Centre, 2018. Citations detailing the characteristics of these features can found in Appendix G of this report.

Table 1: Designated sites within 2km of the proposed Scheme

Site name	Designation	Level of importance	Distance from Scheme
South Down	National Park	National	Within
Long Furlong and Church Hill	Local Wildlife Site	Local	1,400m north
Clapham Wood	Local Wildlife Site	Local	540m north
Ferring Rife and Meadows	Local Wildlife Site	Local	1,550m south
Highdown Hill and the Millers Tomb	Local Wildlife Site	Local	Adjacent
Tilnore and Goring Woods Complex	Local Wildlife Site	Local	370m east
Ham Farm Wood	Local Wildlife Site	Local	1,700m east

Source: SBRC 2018

4.1.1 South Downs National Park

A large proportion of the Scheme, is within the South Downs National Park. This includes the northern and southern sections, excluding Angmering Village and part of Water Lane.

The South Downs National Park covers over 1600 square kilometres of England's most valued lowland landscapes including rolling hills, heathland, river valleys, ancient woodland, Heritage Coast and market towns and villages.

As the proposed Scheme is within the National Park, further landscape assessment will be required. This may include a Landscape Visual Impact Assessment. However, this will be confirmed once further details is provided at the next stage of the Scheme when there will be a shortlist of Options.

4.1.2 Long Furlong and Church Hill LWS

Long Furlong and Church Hill Local Wildlife Site (LWS) is located approximately 1,400m north of the Scheme.

Long Furlong is a steep north and west facing slope between the A280 and Clapham Woods, supporting rich chalk grassland and scrub. Church Hill is a complex mosaic of chalk grassland, species rich scrub and woodland.

No impact is anticipated to the site due to its distance from the Scheme.

4.1.3 Clapham Wood LWS

Clapham woods is located approximately 540m north of the Scheme.

Clapham Wood is an extensive, ancient semi natural woodland on the undulating dip slope of the South Downs. The ground flora is rich and includes several interesting species. The wood was moderately affected by the storm of October 1987 and unfortunately several large blocks of woodland were subsequently cleared for pasture. Much of the wood is not managed but some areas are still coppiced.

No impact is anticipated to the site due to its distance from the Scheme.

4.1.4 Ferring Rife and Meadows LWS

Ferring Rife and Meadows LWS is located approximately 1,550m south of the Scheme.

This site consists of 1.3km of rife, plus several hectares of rough grassland. Situated adjacent to the urban area of Ferring it is of great local importance. It supports a nationally rare snail, *Monacha cartusiana* and a large proportion of a locally uncommon plant, Parsley Water dropwort *Oenanthe lachenalii*. A good diversity of birds, butterflies and dragonflies have also been recorded.

No impact is anticipated to the site due to its distance from the Scheme.

4.1.5 Highdown Hill and the Millers Tomb LWS

Highdown Hill and the Millers Tomb is located adjacent to the Scheme south of the agricultural fields of Ecclesden Farm and Northdown Farm.

The Millers Tomb was identified in 1992 and it comprises a small area of species rich chalk grassland. The site was extended in 1997 to include Highdown Hill. The whole site comprises relatively unimproved chalk grassland and scrub on the south facing scarp of a small outlier of the South Downs near Worthing. Although heavily used for informal recreation, the site supports several uncommon plants and animals.

The LWS could be subject to pollution during the construction of the Scheme and or disturbance, however an Environmental Action Plan (EAP) will be produced and strictly adhered to ensure there are no negative impacts upon the site, for which it is designated.

4.1.6 Titnore and Goring Woods Complex LWS

Titnore and Goring Woods Complex is located approximately 370m east of the Scheme.

This woodland complex is the largest in Worthing Borough. Much of it is ancient in origin, although its structure and species composition vary considerably, due to management. The site is of outstanding importance as a large area of semi-natural habitat close to a heavily built-up area.

No impact is anticipated to the site due to its distance from the Scheme.

4.1.7 Ham Farm Wood LWS

Ham Farm Wood LWS is located approximately 1,700m east of the Scheme.

The site represents the only area of ancient woodland within the built-up area of Worthing. Despite its proximity to housing it is remarkably undisturbed and is a valuable urban wildlife site.

No impact is anticipated to the site due to its distance from the Scheme.

4.1.8 Climping Beach SSSI

Climping Beach SSSI is located approximately 6km south west of the Scheme at the mouth of the River Arun. It is connected to the Scheme via Black Ditch, which drains into the River.

The site is a stretch of coast with a vegetated shingle beach, behind which is a sand dune system. The intertidal zone supports important populations of wintering birds and the numbers of wintering sanderling, in particular, are of European significance.

The SSSI could be subject to pollution during the construction of the Scheme, however an EAP will be produced and strictly adhered to to avoid airborne pollution or contamination of the water course.

Table 2: Special Areas of Conservation (SAC) designated for bats within 30km of the Scheme.

Site Name	Bat Species site is designed for	Level of importance	Approximate distance from the Scheme
Singleton and Cocking Tunnels SAC	Barbastelle <i>Barbastella barbastellus</i> and Bechstein's bat <i>Myotis bechsteinii</i>	International	23 km North West
The Mens SAC	Barbastelle <i>Barbastella barbastellus</i>	International	17 km North West
Ebernoe Common SAC	Barbastelle <i>Barbastella barbastellus</i> and Bechstein's bat <i>Myotis bechsteinii</i>	International	23 km North West

Source: Magic 2018

4.1.9 Singleton and Cocking Tunnels SAC

The Singleton and Cocking Tunnels SAC is located approximately 23km north west of the Scheme. The site is 1.88Ha comprised of two disused brick-built railway tunnels in West Sussex running between Midhurst and Chichester. The tunnels provide ideal microclimates and protection for hibernating bats. The site is one of the best hibernacula in the UK and features hundreds of bats and a diversity of species including Bechstein's and Barbastelles.

New best practice guidance has published Core Sustenance Zones (CSZs) for individual bat species, defined as "the area surrounding a bat roost within which habitat availability and quality will have a significant influence of the resilience and conservation status of the colony" (BCT, 2016). For CSZ for Barbastelle is a 6km radius from the roost; therefore, as the Scheme lies outside of this radius it is anticipated that the works will not impact Singleton and Cocking Tunnels SAC.

4.1.10 The Mens SAC

The Mens SAC is located approximately 17km north west of the Scheme. The Mens is an extensive area of mature beech *Fagus sylvatica* woodland rich in lichens, bryophytes, fungi and saproxylic (dead wood) invertebrates. It is developing a near-natural high forest structure, in response to only limited silvicultural intervention over the 20th century, combined with the effects of natural events such as the 1987 great storm. The site also supports an important population of barbastelle bat.

As above in section 4.1.9, due to the distance of the SAC from the Scheme (over 6km), it is anticipated that the Scheme will not impact the Mens SAC.

4.1.11 Ebernoe Common SAC

Ebernoe Common SAC is located approximately 23km north west of the Scheme.

Ebernoe Common has an extensive block of beech high forest and former wood-pasture over dense holly *Ilex aquifolium* with a very rich epiphytic lichen flora, including *Agonimia octospora* and *Catillaria atropurpurea*. The beech woodland is associated with other woodland types, open glades and pools, which contribute to a high overall diversity. A maternity colony of Barbastelle bats utilises a range of tree roosts in the site, usually in dead tree stumps, but the species appears to be present throughout the year, with individuals utilising a range of roost sites in tree holes and under bark. The site also holds a maternity colony of Bechstein's bats, mainly roosting in old woodpecker holes in the stems of live mature sessile oak *Quercus petraea* trees.

As above in section 4.1.9, due to the distance of the SAC from the Scheme (over 6km), it is anticipated that the Scheme will not impact the Ebernoe Common.

4.2 Habitats

The habitat types recorded within the ZOI are presented in this section. The Phase 1 Habitat map can be found in Appendix D, together with accompanying target notes (TN) in Appendix E which provides a detailed list of the dominant plant species and notes on any ecologically valuable habitats with the potential to support protected and notable species.

The landscape is predominantly agricultural with the dominant habitat types being grassland with associated hedgerows, streams and ditches. There are also areas of broadleaved woodland both within and adjacent to the ZOI. Finally, Angmering, a small village, made up of hardstanding, buildings and amenity grassland is to the west of the Scheme.

4.2.1 Arable

A variety of arable fields are located within the northern and southern section of the Scheme. The majority were recently harvested or ploughed. Many of these fields had margins comprising species poor semi improved grassland (TN37 & 38).

4.2.2 Species poor semi improved grassland

This habitat type is scattered across the Scheme forming pasture fields for cattle as part of Ecclesden Farm, Avenals Farm, Northdown Farm and Ecclesden Common (TN19, 26, 29, 48 and 52).

Common species identified include dominant cock's-foot, *Dactylis glomerata*, Yorkshire fog *Holcus lanatus* and fescues *Festuca spp.*, with white clover *Trifolium repens*, dandelion *Taraxacum officinale* agg, perennial rye-grass *Lolium perenne*, common knapweed *Centaurea nigra*; common nettle *Urtica dioica*; creeping thistle *Cirsium arvense*, greater plantain *Plantago major* and creeping buttercup *Ranunculus repens* in areas.

4.2.3 Amenity grassland

There are patches of amenity grassland across the Scheme, forming the gardens of residential properties and some small areas of the motor racing circuit where the grassland is heavily managed (TN11 and 18). Species present include dominant perennial rye-grass with rare dandelion and common daisy *Bellis perennis*.

4.2.4 Improved grassland

Improved grassland is found in some of the grazing pastures to the north and south of Black Ditch (TN24). These areas have been subject to improvement by application of fertilisers or modification by herbicides and often sown or used as set aside. They are species-poor and offer little opportunity for biodiversity. The sward in these areas is even and is comprised of dominant perennial rye grass and Yorkshire fog, whilst the forbs composition is species-poor and is comprised of occasional broad-leaved dock *Rumex obtusifolius* and creeping thistle *Cirsium arvense*.

4.2.5 Scrub

Scrub is located throughout the Scheme, including the verge of the A280 and Dappers Lane, along the banks of Black Ditch, surrounding farmyards and the motor race circuit (TN8, 9, 12, 14, 20, 25, 32, 34, 42, 51 and 61). Species identified included bramble, *Rubus fruticosus* agg, elder *Sambucus nigra*, buddleia *Buddleja davidii* and common nettle.

4.2.6 Introduced shrub

Introduced shrub in the form of ornamental planting scatters many gardens. This includes areas at Ecclesden Farm and the graveyard at Angmering. Species noted include box *Buxus sp*, laurel *Laurus sp* and leylandii *Leyland cypress*.

4.2.7 Hedgerows

There are a variety of hedgerows across the Scheme, with the majority associated with the farmland to the north and south. This included intact hedgerows (TN57), defunct hedgerows (TN58) and hedgerows with trees (TN16, 44). Some hedgerows had evidence of being managed, whilst others had become sparse and defunct, with barbed wire fences in places.

Hedgerows species included common hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, elder *Sambucus nigra*, hedge bindweed *Calystegia sepium*, common beech *Fagus sylvatica* and English oak *Quercus robur*. There were also scattered mature trees within some hedgerows, with the majority being English oak or ash *Fraxinus excelsior*.

4.2.8 Broadleaved semi natural woodland

Two areas of ancient semi natural woodland are located within or adjacent to the Scheme. They are Grooms Copse (TN29), and Highdown Copse.

Five large areas of broadleaved woodland are also located within the Scheme. These are Poling Furzefields (TN15), Miles Copse (TN43), Rough Piece (TN60), Northdown Copse (TN53) and woodland at Patching pond (TN30 & 31). Other small linear strips include at Ecclesven Manor (TN32), the motor racing circuit, Ham Spinny and along Black Ditch (TN40). The majority of the woodland within the Scheme is well connected to the wider landscape by hedgerows, creating important wildlife corridors.

Species identified include, sycamore *Acer pseudoplatanus*, field maple *Acer campestre* ash, spindle *Euonymus europaeus*, lime *Tilia spp.*, hazel *Corylus avellane*, oak, beech and blackthorn. The understory was predominately ivy *Hedera helix*, bramble and common nettle.

4.2.9 Scattered trees

A variety of trees scatter the scheme ranging in age and condition. This includes semi mature black polar *Populus nigra* in Angmering village triangle (TN3), cypress trees in Angmering grave

yard *Cupressus x leylandii* (TN1) and mature oaks within the pasture fields to the South (TN48 and 59).

Due to the size and maturity of the trees they may be subject to a Tree Preservation Order.

4.2.10 Tall ruderal

Small areas of tall ruderal vegetation are located across the south of the scheme, and along Dappers Lane forming a mosaic with other habitats (TN7, 12, 19, 24, 47). Common species include ragwort *Jacobaea vulgaris*, broadleaved dock and common nettle.

4.2.11 Running water and ditches

Black Ditch runs through the centre of the Scheme with a network of dry and wet ditches joining it from the agricultural landscape to the north and south as well as from the run off and drains from Dapper and Water Lane (TN2, 6, 8, 13, 17, 201, 21, 23, 26, 36, 42, 45, 46, 48, 49, 50, 52, 55 and 62).

4.2.12 Standing water

There are ten ponds within the Schemes footprint and eleven within 250m of the scheme. Due to access, only six of the ponds were observed during the survey (TN 18, 22, 25, 30, 31 and 61).

4.2.13 Structures

Angmering is located to the west of the scheme as well as scattered farms and outbuildings. These settlements are joined by a network of roads including the A280, Dappers Lane and Water Lane (TN4, TN12).

4.3 Protected Species

The information presented in this section has been compiled through the identification of suitable habitat with the potential to support protected or notable species, in conjunction with a search of local biological records from SBRC.

4.3.1 Water vole

There are multiple records for the European Water Vole *Arvicola amphibius* within the Scheme. This includes near Patching Pond, along Black Ditch near Northdown Farm and at properties near The Thatchway, Angmering. The most recent record is from 2016 at The Thatchway where an adult was observed on multiple occasions swimming within Black Ditch. Other Records include individuals (adults and juvenile), latrines, burrows and feeding stations.

A water vole survey was undertaken by Mott MacDonald of Black Ditch during August 2018. A survey was not possible at Patching Pond, due to restricted access. During these surveys no individuals or evidence of activity (latrines, feeding station and or borrows) was identified. However suitable habitat on site was identified to support these species which is detailed below.

Black Ditch

The western section of Black Ditch runs from Angmering Village Triangle to The Thatchway, where the watercourse flows through to the golf course. Here the banks are made of earth and the water is shallow and shaded. The vegetation is predominately ivy and bramble, with overhanging leylandii trees with small areas of rushes and sedges. There are multiple outfall pipes from the neighbouring land into the ditch, and from the steep banks it is evident that the

water levels here change regularly (TN2). This area of the ditch is of low to moderate quality for water vole and it is anticipated this area may be used by water voles for dispersal.

The eastern section of Black Ditch runs adjacent to the A280 from Patching Pond through to Avenals Farm where it goes under culvert through Angmering at Water Lane. Most of the habitat here is of high quality for water voles. With marginal vegetation in most areas. Some areas were very overgrown and fenced off with limited access, whilst others had narrow marginal vegetation due to grazing pressure. However, a diversity of feeding and shelter opportunities were observed for the species (TN17, 20, 22, 23, 36, 40, 46 and 49).

Patching Pond

The pond is located to the north of the Scheme. The pond is fenced off as it is part of a private fishing syndicate, it was however observed from the lay by at Arundel Road (TN31). Broadleaved woodland surrounds the pond.

The full survey results and map is detailed within Appendix F. A second water vole field signs survey during 2019 will need to be undertaken. This should include Patching Pond, if an Option is taken forward within or adjacent to the pond.

4.3.2 Otter

No records are available for the otter *Lutra lutra* due to confidentiality from SBRC.

No evidence of otter activity was identified during the survey. Black Ditch offers low habitat suitability for the otter, due to its low water levels and small width and it is therefore presumed that otters are likely absent.

4.3.3 Birds

SBRC returned records of multiple bird species within 2km of the Scheme. This includes but is not limited to Red Kite *Milvus milvus*, Kestrel *Falco tinnunculus*, Cuckoo *Cuculus canorus*, Barn Owl *Tyto alba*, Tawny Owl *Strix aluco*, Green Woodpecker *Picus viridis*, Linnet *Linaria cannabina*, Cetti's Warbler *Cettia cetti* and Yellowhammer *Emberiza citrinella*.

There have been multiple records for the Cuckoo and Yellowhammer within Angmering. In addition, the Barn Owl, has been recorded at Grooms Copse, and the Red Kite at Patching Pond. The Red Kite was also observed during the survey (TN43).

Multiple habitats are located within the Scheme that have potential to support birds. This includes woodland, scrub, trees, hedgerows and buildings (TN1, 3, 4, 6, 7, 10, 14, 15, 20, 25, 32, 34, 42, 44, 59, 60). These habitats offer a variety of shelter, foraging and dispersal opportunities.

The proposed Scheme has the potential to disturb Schedule 1 breeding birds as the Barn Owl and Red Kite are known to occupy the area. If suitable habitat for these species is located within 50m of the works footprint then further surveys and mitigation will be required.

Hydrological changes have the potential to impact the resources available for overwintering bird species, particularly within Climping Beach SSSI. Therefore, further information regarding the modelled changes in flood levels post-completion of the Scheme is required to allow for impact assessment to be undertaken.

4.3.4 Reptiles

Multiple records exist for reptiles within 2km of the Scheme, this includes slow worm *Anguis fragilis*, grass snake *Natrix helvetica* and adder *Vipera berus*. No recent records were returned for reptiles within the Scheme.

A variety of habitats within the Scheme were identified to have potential to support reptiles. This includes a mosaic of scrub, tall ruderal, running water, woodland, hedgerows and grassland which provide commuting and foraging opportunities. Suitable hibernacula and shelter opportunities were also present including refuge heaps, rubble and wood piles (TN 6, 7, 9, 10, 12, 14, 15, 16, 19, 22, 24, 25, 27, 28, 30, 31, 32, 34, 38, 45, 46, 47, 51, 52, 53, 60, and 62).

Further surveys are recommended to ascertain baseline information on the potential reptile populations to inform a detailed assessment and any mitigation requirements.

4.3.5 Great Crested Newts

SBRC returned no records for great crested newts (GCN) *Triturus cristatus* within the 2km of the Scheme.

Suitable terrestrial habitats exist within the Scheme for GCN, including commuting habitat along hedgerows and ditches, foraging habitat within grassland meadows and tall ruderal vegetation as well as suitable shelter and hibernacula features including woodland and rubble piles.

Eleven ponds are located within the Scheme, and a further ten ponds are within 250m of the Scheme, however due to limited access only six ponds were observed during the survey. The highways pond south of the racing circuit was dry (TN25), and Avenals Farm pond was heavily used by waterfowl and likely stocked with fish (TN18). Four ponds were noted as having moderate to high potential to support GCN (TN 22, 30, 31 and 61), however due to the rapid nature of the assessment no habitat suitability assessments (HSIs) were undertaken. If works are planned within 250m of these ponds, it is recommended that a HSI is undertaken. Subject to the HSI score, ponds may require further surveys to establish presence or likely absence of GCN, to allow for a detailed assessment to be completed.

4.3.6 Badgers

No data is available for the badger *Meles meles* from SBRC due to confidentiality.

No setts or latrines were identified during the survey, however large mammal tracks of an unknown species were noted within the southern section of the site (TN21).

The study area offers a variety of habitats for badgers including woodland, hedgerows and scrub which provides suitable cover for sett construction and high value areas to forage. These areas will require further survey before this species can be discounted, as not all areas with the potential to support badgers were accessed during the preliminary surveys.

4.3.7 Hazel Dormouse

Multiple records for hazel dormouse *Muscardinus avellanarius* were returned within 2km of the Scheme. This includes a record of two adults taken from a nest tube survey within the ancient woodland and hedgerows at Grooms Copse which is within the Scheme.

Woodland is present within the Scheme which has high potential to support this species. This includes Grooms Copse (TN29) (where records of presence exist), Highdown Copse, Poling Furze-fields (TN15), Miles Copse (TN43), Rough Piece (TN60), Northdown Copse (TN53) and

woodland at Patching pond (TN30 & 31). Other small linear strips of woodland are at Ecclesven Manor (TN32), the motor racing circuit, Ham Spinny and along Black Ditch (TN40).

There is also a variety of hedgerows within the Scheme which connect the woodland together. In addition, dense scrub in areas offers moderate potential to support these species.

Due to the potential for habitats within the Zol and footprint of the Scheme to support dormice, further surveys are required to allow for a detailed assessment to be completed.

4.3.8 Bats

Multiple records exist for bats within 5km of the Scheme. This includes Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Brown Long-eared Bat *Plecotus auritus*, Serotine *Eptesicus serotinus*, *Myotis*, Daubenton's Bat *Myotis daubentonii*, Noctule Bat *Nyctalus noctule* and Nathusius's Pipistrelle *Pipistrellus nathusii*. This includes records within Angmering for common pipistrelle and brown long eared bat, however specific locations are not available.

A variety of habitats and structures were identified within the Scheme to have potential to support roosting bats. This includes the residential and commercial buildings within Angmering Village, agricultural buildings to the north and south, mature scattered trees across the Scheme and woodland (TN1, 3, 4, 10, 15, 18, 30, 31, 32, 41, 43, 48, 53, 59 and 61). Further detailed surveys would be required to determine the exact potential of these features. There is also suitable commuting and foraging habitat including hedgerows, woodland, water and grassland meadows. Further surveys, in the form of tree assessments and emergence/re-entry and/or activity surveys are recommended to provide a baseline of bat usage of the habitats within the Zol before bats can be discounted. These surveys will inform any necessary mitigation required.

4.3.9 Other notable species

Suitable habitats across the Scheme including running water, tall ruderal vegetation, mature trees and ancient woodland have been identified to have the potential to support terrestrial and aquatic invertebrates. Records exist for these species within 2km of the Scheme, including records within Angmering and Highdown Hill for the red listed and county notable brown hairstreak *Thecla betulae* and grizzled skipper *Pyrgus malvae* and naturally scarce Stag Beetle *Lucanus cervus*. No aquatic invertebrate records were returned.

Across the Scheme, the arable and pasture fields have potential to support the brown hare *Lepus europaeus* whilst the woodland and hedgerows have potential to support hedgehogs *Erinaceus europaeus*.

Potential impacts to Black Ditch will be avoided via implementation of an EAP, thus avoiding impacts upon aquatic invertebrates.

There is the potential for impacts to terrestrial invertebrates during construction of the Scheme. However, habitat loss will be minimal and the EAP will include measures to control activities which could give rise to biophysical changes, such as the extent of the works footprint and correct storage of materials.

Patching Pond has historically been used as a fishery. If the Scheme was to impact this pond, further surveys will be required to establish the baseline fish population to inform appropriate mitigation.

4.3.10 Invasive Species

There are multiple records of Japanese knotweed *Fallopia japonica* and Indian Balsam *Impatiens glandulifera* within 2km of the Scheme.

Japanese knotweed was identified along Black Ditch at Ecclesden Farm (TN39). This will need to be removed safely and in accordance with the EAP to minimise the spread of the species.

5 Ecological Constraints and Opportunities

Potential construction impacts would be managed under an EAP. The EAP is a practical tool for managing the effects of a project during the construction phase. The EAP would outline the mitigation, monitoring and measures to be taken during the implementation by the appointed contractor to avoid or control adverse environmental effects and the actions needed to implement these measures.

5.1 Designated Sites

No significant effect on the integrity of Long Furlong and Church Hill LWS, Clapham Wood LWS, Ferring Rife and Meadows LWS, Titnore and Goring Woods Complex LWS and Ham Farm Wood LWS is anticipated. This is due to their distance from the Scheme and no pathways for pollution being identified.

Highdown Hill and the Millers Tomb LWS is located adjacent to the Scheme, however any environmental impacts to this site will be mitigated for within an EAP and therefore no significant impacts are anticipated.

Climping Beach SSSI is located downstream of the Scheme. Although no works are proposed within the SSSI boundary, Black Ditch, is connected to the site via the River Arun. However, no significant effects on the integrity of this site is anticipated from pollution, subject to observance of the EAP. However, hydrological changes have the potential to impact the resources available for overwintering bird species. Therefore, further information regarding the modelled changes in flood levels post-completion of the Scheme is required to allow for impact assessment to be undertaken.

No significant impact is anticipated to Singleton and Cocking Tunnels SAC, The Mens SAC and Ebernoe Common SAC, designated for bat conservation due to their distance from the Scheme.

5.2 Habitats

Natural flood management, including habitat creation such as woodland and hedgerow planting is proposed as part of the Scheme. However, for some Options, including the reprofiling of Black Ditch, the clearance of ponds and or the creation of holding areas will result in the loss of habitats, including lowland meadows, ponds, wood pasture and parkland which are listed on the Sussex Biodiversity Action Plan. The Scheme also has the potential to cause habitat fragmentation, which will reduce the extent of habitats available for foraging and dispersing wildlife.

During construction, there is also likely to be temporary impacts of habitat loss and damage due to access, general working areas and compound locations. Works in close proximity to trees have the potential to adversely affect them through ground compaction and root damage. Whilst works in close proximity to watercourses have the potential to adversely affect the surrounding environment through oil and chemical spills which may pollute the watercourse.

After the Scheme commission and reinstatement of habitats the impacts would be minimal during operation. No further land take would be required as a result of the Scheme. Habitat creation and compensation to replace those damaged or permanently lost would be required in order to ensure there are no long-term impacts as a result of the Scheme.

5.3 Protected Species

The Scheme has the potential to affect water voles, bats, hazel dormouse, reptiles, badgers, great crested newts and breeding birds through the loss of habitats and disturbance during construction. The favourable conservation status of many of these species depends on maintaining the extent and continuity of these habitats and the networks they provide as wildlife corridors. The habitat loss and resulting fragmentation of wildlife corridors would reduce connectivity to foraging areas. As such, the availability of resources would decrease resulting in individuals having to forage for longer periods and potentially use sub-optimal habitat. In the absence of mitigation, the Scheme may directly impact upon roosting or resting place of the above species, which could potentially kill or injure individuals.

There would be an increase in noise levels and visual intrusion during construction which could temporarily disturb protected species utilising habitats adjacent to the Scheme. Any lighting used during construction must avoid adversely affecting badgers and bat species, if present. This could be minimised with hoods, cowls and directed luminaires to reduce spill onto ecological features.

5.4 Recommendations

In accordance with the NPPF, works should not only avoid or mitigate ecological impacts, but also seek to compensate and enhance biodiversity within the area. Therefore, compensation and enhancement measures for the Scheme must be implemented.

It is recommended that all Options avoid the severance of habitat, including existing hedgerows and woodland. Replanting is included as an Option for compensation and enhancement for a variety of sections of the Scheme. This should include replanting of native species-rich hedgerows and trees, creation of species-rich grassland, creation of woodland and the provision of nesting and roosting opportunities for bats and birds. New planting should be connected to existing habitat within the landscape to compensate for the loss of wildlife corridors. The species composition should take account of the habitats lost and those within the surrounding area.

The creation of wildlife ponds, to be used as holding areas for water could be incorporated into the Scheme. The edges of the ponds should be planted with a variety of flora, offering shelter, foraging and commuting opportunities for wildlife. In addition, if Black Brook culvert is updated, the inclusion of mammal ledges could be incorporated into the design, to add further connectivity along the Scheme for water vole and other wildlife.

A Natural England European Protected Species Mitigation Licence may be required for works in areas where water voles, GCN, bats and dormice have been recorded. Licences are likely to require the implementation of mitigation measures to compensate for the loss of habitat, sensitive timing of works and supervision by a licensed ecologist.

Works that directly affect active badger setts will require a development licence which will only be granted outside the breeding season (November – June). Any open trenches should be covered overnight during the works to prevent badgers from becoming trapped. If this is not possible than mammal ladders should be installed to allow any trapped mammals to escape safely.

It is recommended that a buffer zone of 50m is implemented around barn owl and red kite nesting habitat during construction, if noise disturbance will be above 50db (or baseline levels if likely to be considerably lower). This will be maintained until all young have fledged and no longer dependent on parent birds.

The removal of scrub, hedgerows and trees to allow for the construction of the Scheme should be avoided where possible. If the removal of trees is unavoidable, bird boxes and bat boxes should be put in place to mitigate for the loss of shelter for these species. To mitigate against adverse impacts on nesting birds, it is recommended that all clearance activities are undertaken outside of the breeding season (March – September inclusive). If works need to be undertaken during this period supervision would be required by a suitably experienced Ecologist. Where nests are identified, works would stop, and a no work zone erected to ensure all legal obligations are met. This would remain in place until all young have fledged.

Ecological tool box talks should be given to contractors prior to the works commencing to make them aware of the legalisation afforded to protected species, and the working practices implemented to minimise impacts on the sensitive habitats within the designated sites.

Due to the presence of ecological features which have the potential to support species of conservation concern, it is recommended that the following surveys in Table 3 are undertaken. All surveys will be carried out in accordance with best practice guidance.

Table 3: Recommended Phase 2 Surveys

<i>Ecological Feature</i>	<i>Biodiversity Value / Legal Protection</i>	<i>Survey Method</i>	<i>Optimal Survey Period</i>
Hedgerow	Protected under the Hedgerow Regulations (1997). UK BAP and local priority habitat.	Survey of species within Hedgerow. Only required in areas where removal of hedgerow is planned.	May - September
Hazel Dormouse	Protected under the EC Habitats Directive and the W&CA 1981 (as amended). UK BAP and local priority species	Nest tube survey: Only required in areas where removal of woodland or hedgerow is planned.	April to November
Bats	Protected under the EC Habitats Directive and the W&CA 1981 (as amended). UK BAP and local priority species.	Preliminary Roost Assessment (Trees and Buildings). Only required for where a potential roost may be removed or disturbed. Determines if further survey required. Emergence Re – Entry Surveys	Anytime May to September (key months June to August)
GCN	Protected under the EC Habitats Directive and the W&CA 1981 (as amended). UK BAP and local priority species	Activity Surveys	May to September (key months June to August)
		Transect surveys to identify commuting and foraging routes	
		Habitat suitability index (HSI) assessment to determine further surveys.	November to April
		Environmental DNA	Mid-April to late June
		Presence / absence surveys: Bottle trapping, torchlight counts and egg searches of all water bodies within study area.	April to mid-June
Badgers	Badgers are protected under the Protected of Badgers Act (1992)	Further survey to identify and class all (where possible) badger setts on site.	February to March
Water Vole Surveys	Protected under the EC Habitats Directive and the W&CA 1981 (as amended). UK BAP and local priority species	Second field sign survey.	April to May
Breeding Bird Surveys (including Barn Owls and Red Kite)	Protected under the W&CA 1981 (as amended) and some species are listed under Schedule 1 (W&CA).	Walkover to identify potential nesting sites. Recording of bird calls using BTO standard survey guidelines. Only required where habitat that supports these species is being removed or disturbed.	3 visits per suitable area, between March and June.
Reptiles	Protected under the W&CA 1981 (as amended).	10 visual surveys to determine populations using artificial refuge. Only required in areas where suitable habitat has been identified.	During suitable weather conditions between Mid-March to Mid-June and Mid-July to mid-October.

6 Conclusion

This Preliminary Ecological Appraisal was undertaken to identify the habitats within the ZoI and to assess the likelihood of notable and protected species being present within and directly adjacent to the Scheme. A variety of habitats occur across the Scheme extent, including grasslands, broadleaved woodland, scrub, trees and watercourses. The survey work together with the desktop studies have identified that there are suitable habitats to support water voles, badgers, bats, breeding birds, dormice, GCN and reptiles.

In the absence of mitigation, the Scheme has the potential to affect habitats of differing conservation value which have the potential to support protected species. Habitats that will be directly affected include areas of semi-improved grassland, hedgerows, running water, standing water and broad-leaved woodland.

These impacts should be considered during the decision-making process and mitigation measures should be reviewed for the chosen preferred options for the Scheme.

With the implementation of mitigation measures, such as the reinstatement of habitat following construction, the planting of replacement hedgerows and trees to compensate for the loss of wildlife corridors, sensitive timing of works and ecological enhancements to mitigate for changes in flood levels, the impact from construction and operation would be reduced.

7 References

Bat Conservation Trust. 2016. Bat Surveys for Professional Ecologists

IEEM (2006) Guidelines for Ecological Impact Assessment. Institute of Ecology and Environmental Management (IEEM)

Joint Nature Conservation Council (1993) Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit, JNCC Publications, Peterborough

Joint Nature Conservation Council (2003) Herpetofauna Worker's Manual, JNCC Publications

Joint Nature Conservation Council (www.jncc.gov.uk)

Multi-Agency Geographic Information Centre (MAGIC)

Sussex Biodiversity Partnership (<https://www.biodiversitysussex.org.uk/species/>)

Sussex Biodiversity Records Centre, 2018. Ecological data search for land at Angmering

UK Biodiversity Action Plan (www.ukbap.org.uk)

Appendices

A.	Location of Scheme	28
B.	Legislation and Policy	29
C.	Biological Records	32
D.	Phase 1 Survey Maps	33
E.	Phase 1 Target Notes	34
F.	Water Vole Survey	50
G.	Citations	51

A. Location of Scheme



Sources: Esri HERE, Garmin,
USGS, Intermap, INCREMENT P,
NRCan, Esri Japan, METI, Esri
China (Hong Kong), Esri Korea,

Key to Symbols

Watercourse

Waterbody

Survey extent

Notes

© Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2018.
Contains: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, © OpenStreetMap contributors, and the GIS User Community Contains OS data © Crown Copyright and database right 2018

P01	20/09/18	TJ	For Information	CW	KA
Rev	Date	Drawn	Description	Ch'k'd	App'd

MOTT MACDONALD
Stoneham Place
Stoneham Lane
Southampton
SO50 9NW
United Kingdom
T 02380 628800
W www.mottmac.com

Client



Title

Location of the scheme

Sheet 1 of 1

Designed	CW	Checked	CW
Drawn	TJ	Approved	KA
Scale at A3		Status	Rev
1:10,231		S2	P01

Drawing No. ENVIMSE100357-MMD-00-00-MP-EN-0301001

Mr. MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We do not accept any responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.



B. Legislation and Policy

B.1 International, European and UK Legislation

Table B.1: International, European and UK Legislation and Policy

Legislation/Policy	Summary
UK Policy	
National Planning Policy Framework (NPPF) 2012:	The purpose of the NPPF is to help achieve sustainable development. Section 11 of the NPPF (Conserving and enhancing the natural environment) sets out the responsibilities of the planning system to minimise impacts on biodiversity and provide net gains in biodiversity where possible. This requires Local Authorities in England to take measures to: ... Conserve and enhance biodiversity; ... Protect the habitats of these species from further decline; ... Protect the species from the adverse effect of development; and ... Refuse planning permission for development, if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts) adequately mitigated, or, as a last resort, compensated for.
UK Post-2010 Biodiversity Framework	This covers the period 2011 - 2020 and replaces the UK Biodiversity Action Plan (UKBAP) 1994 – 2010. Its aim is to address the underlying causes of biodiversity loss and improve and enhance biodiversity and ecosystem services. However, the UKBAP priority habitats and species background information is still widely used at country level.
Biodiversity 2020: A strategy for England's wildlife and ecosystem services	This strategy builds on the Natural Environment White Paper for England and sets out the strategic direction for biodiversity policy for the next decade. The strategy describes what is needed to halt overall biodiversity loss by 2020 and includes goals on the following: ... Better wildlife habitats; ... More sites that are larger and less fragmented areas for wildlife, with an increase in priority habitats by at least 200,000ha; ... The restoration of 15% of degraded ecosystems – as a contribution to climate change mitigation and adaptation; ... An overall improvement in the status of wildlife and the prevention of further human-induced extinctions of known threatened species; Increased engagement of people in biodiversity issues, aware of its value and taking positive action.

B.2 Protected Species Legislation

Table B.2: Protected species Legislation

Species	Legislation
Bats <i>Chiroptera</i>	All bat species are protected under the Conservation of Habitat and Species Regulations 2017 and Wildlife and Countryside Act (WCA) 1981. This means it is illegal to: ... Deliberately capture, injure or kill a bat; ... Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats; ... Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time); ... Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat; and ... Intentionally or recklessly obstruct access to a bat roost.
Badgers <i>Meles meles</i>	Badgers and their setts are afforded protection under the Protection of Badgers Act 1992. This Act is in regards to welfare legislation for badgers, due to history persecution, rather than their distribution which is widespread and abundant throughout the countryside. Under this act it is an offence to: ... Capture, kill, injure and cruelly or ill-treat a badger; ... Damage, obstruct or destroy a sett; and, ... Disturb a badger when within a sett.
Dormice <i>Muscardinus avellanarius</i>	Dormice are protected under the Conservation of Habitat and Species Regulations 2017 and by the Wildlife and Countryside Act 1981. This makes it illegal to: ... Intentionally or deliberately injure, kill or take any wild dormouse; ... Intentionally or deliberately damage, destroy or obstruct any access to any structure or place used for shelter, breeding, or protection by a dormouse; ... Or to intentionally or recklessly disturb a dormouse whilst it is using such a structure or place; or ... Possess or advertise/sell/exchange a dormouse (dead or alive) or any part of a dormouse.
Great crested newts (GCN) <i>Triturus cristatus</i>	GCN are fully protected by the Conservation of Habitats and Species Regulations 2017 and under the WCA 1981. This makes it illegal to: ... Intentionally or deliberately kill, injure or take any GCN; ... Possess or control any live or dead specimen, or anything derived from a GCN; ... Intentionally or deliberately damage, destroy or obstruct any access to any structure or place used for shelter, breeding, or protection by a GCN; ... Or to intentionally or recklessly disturb a great crested newt whilst it is using such a structure or place.
Widespread reptile species ~ Slow worm <i>Anguis fragilis</i> ~ Grass snake <i>Natrix natrix</i> ~ Common lizard <i>Zootoca vivipara</i> ~ Adder <i>Vipera berus</i>	All UK reptile species are protected under the WCA 1981 making it illegal to: ... Intentionally or deliberately injure, kill or take any wild reptile; ... Possess or advertise/sell/exchange a reptile (dead or alive) or any part of a reptile.
Breeding Birds	All wild birds in the UK are protected under the WCA 1981 making it illegal to: Kill, injure or take any wild bird;

Species	Legislation
	~ Take, damage or destroy the nest of any wild bird while it is being built or in use; ~ Take or destroy the eggs of any wild bird; and ~ Possess or control (e.g. for exhibition or sale any wild bird or egg unless obtained legally). In addition to the above, Schedule 1 birds species are also protected from disturbance, both to their nesting areas and wintering habitats.
Water voles <i>Arvicola amphibius</i>	Water voles are protected under the WCA 1981 (as amended by the Countryside and Rights of Way Act 2000). This legislation makes it an offence to: ~ Intentionally kill, injure, disturb or take a wild water vole; and ~ Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by this species; ~ Sell, offer for sale or advertise for live or dead water voles; and ~ Possess or control a live or dead water vole, or any part of a water vole.
Otters <i>Lutra lutra</i>	Otters are afforded protection under Schedule 5 and 6 of the WCA and the Conservation Habitats and Species Regulations 2017. This makes it illegal to: ~ Intentionally kill, injure, disturb or take an otter; ~ Intentionally or recklessly damage, destroy or obstruct access to any place that an otter uses for shelter or protection.

C. Biological Records

C.1 Summary Report

Ecological Data Search SxBRC/18/386 - Summary Report

An ecological data search was carried out for land at Angmering on behalf of Catherine Wiseman (Mott MacDonald) on 28/08/2018.

The following datasets were consulted for this report:

	Requested	Radius/buffer size
Designated sites, habitats & ownership maps	Yes	2km
Protected, designated and invasive species	Yes	2km
Bats at different search size		5km

Summary of results

Sites and habitats

Statutory sites	1 National Park
Non-statutory sites	6 LWS
Section 41 habitats	4 habitats
Ancient and/or ghyll woodland	Present

Protected and designated species

International designations	50 species	834 records
National designations	146 species	3,769 records
Other designations	291 species	5,946 records
Total	317 species	6,443 records
Invasive non-native	28 species	227 records

The report is compiled using data held by Sussex Biodiversity Record Centre (SxBRC) at the time of the request. SxBRC does not hold comprehensive species data for all areas. Even where data are held, a lack of records for a species in a defined geographical area does not necessarily mean that the species does not occur there – the area may simply not have been surveyed.

**This summary page may be published.
The full report and maps may not be published or otherwise shared.**

The data search report is valid until 28/08/2019 for the site named above.

D. Phase 1 Survey Maps

[illegible]

Client

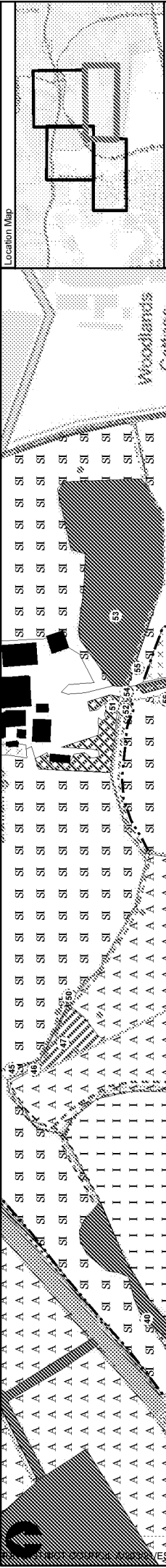
Title	Angmering Phase 1 Habitat Map
-------	----------------------------------

Designated	NA			Eng Check		NA
Drawn	AMR Dorey			Coordination		C Wiseman
ASIS Check	C Wiseman			Approved		K Atkinson
Scale at A3	1:4,300	Status	S2	Rev	P01	Security STD

Drawing Number

ENV\IMSE100357-MMD-00-00-MP-EN-0301002





Key to Symbols	
	Target Notes
	Broadleaved woodland - semi-natural
	Scrub - dense/continuous
	Scrub - scattered
	Broadleaved parkland/scattered trees
	Improved grassland parkland/scattered trees
	Poor semi-improved grassland
	Mixed parkland/scattered trees
	Other tall herb and fern - ruderal
	Standing water
	Defunct hedge
	Hedge with trees - species-poor
	Fence
	Dry ditch
	Boundary removed
	Survey Boundary
	Buildings
	Bare ground

Notes

© Natural England copyright. Contains Ordnance Survey data © Crown copyright and database right 2018.

Sources Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO USGS, FAO, NPS, NRCAN, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, © OpenStreetMap contributors, and the GIS User Community

Contains OS data © Crown Copyright and database right 2018

P01	19/09/18	AMND	For Information	CW	KA
Rev	Date	Drawn	Description	Chkd	App'd
M M					
MOTT MACDONALD					
Victory House Trafalgar Place Brighton BN1 4FY United Kingdom T +44 (0)1223 463500 F +44 (0)1223 461007 W mottmac.com					



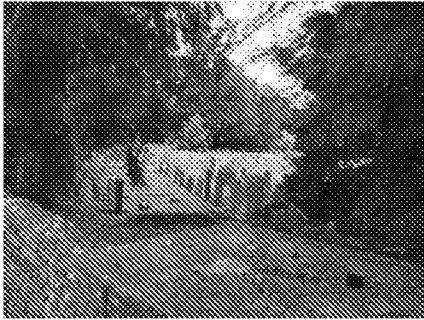
Client

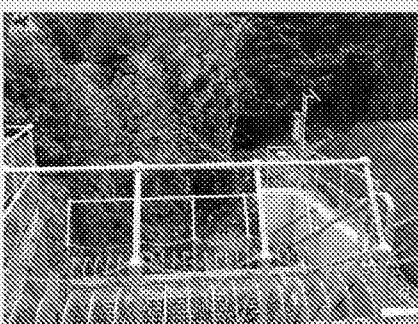
Title

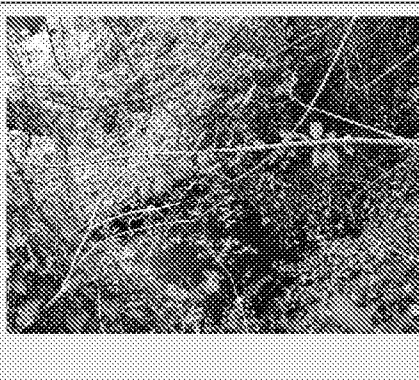
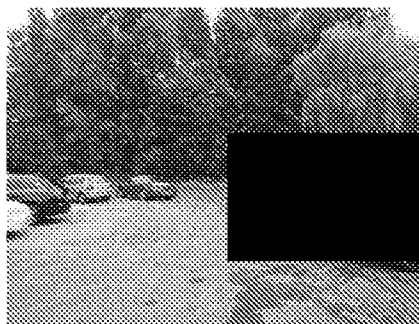
Angmering
Phase 1 Habitat Map

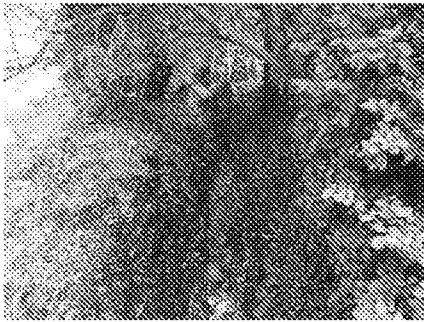
Designed	NA	Eng Check	NA
Drawn	AMK Dorey	Coordination	C Wismann
GIS Check	C Wismann	Approved	K Atkinson
Scale at A3	Status	Rev	Security
1:4,400	S2	P01	STD
Drawing Number			
ENV/MSCE/100357/AMND-06-06-NP-EN-00971002			

E. Phase 1 Target Notes

Target Note	Description	Species potential	Photo
1	Angmering grave yard with scattered mature trees Leyland Cypress and amenity grassland.	Nesting birds and bats.	
2	The watercourse is very shaded before going under culvert at The Thatchway. The banks are steep and covered with ivy Hedera helix and overhanging Leyland Cypress. The substrate is predominately silt and pebbles and flow is smooth with ripples in areas. Inflows from the village hall car park and health centre scatter the SE bank.	Water vole, bats and nesting birds.	
3	Three black poplar trees Populus nigra within the village triangle surrounding the war memorial which often floods.	Bats and nesting birds.	

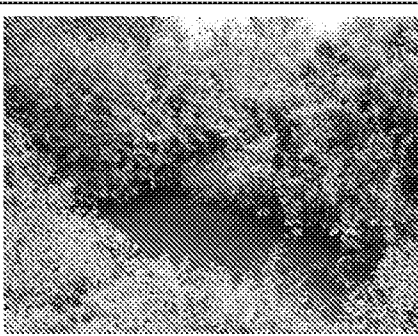
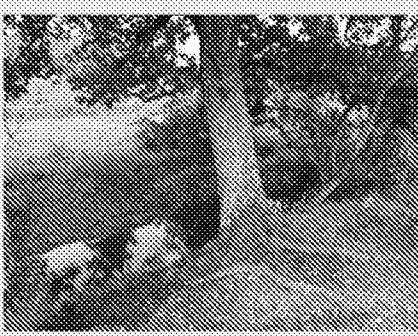
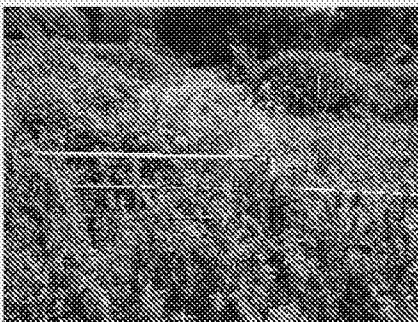
4	The village triangle of Angmering is surrounded by many old buildings and brick walls which all have potential to support roosting bats. This area was discussed as being used as a holding pool for the water.	Nesting bird and bats.	
5	A green triangle with memorial between water lane and the high street. It is made up of amenity grassland with a young poplar tree. This area was discussed as being used as a holding pool for the water.	Nesting birds.	
6	The EA inlet with trash screen for Black Ditch before it goes under culvert through Angmering. An option is to move the earth bund to the road side and have neighbouring field (TN7) as a water hold.	Nesting birds and reptiles.	
7	Tall ruderal vegetation and scrub scatter the field. This is an area proposed for holding flood water. Species identified include great willow herb, common nettle Buddleia and spear thistle.	Reptiles and nesting birds.	

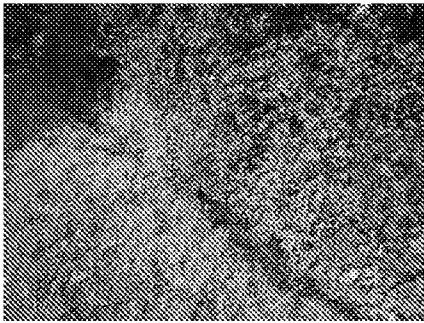
8	The watercourse is very overgrown, and access was limited. The banks are steep and dominated by bramble and ivy. The watercourse is 2m wide, with an outflow of 3m. The flow was smooth with ripples in areas. A dam, made of an old plank crosses the channel.	Nesting birds and water voles.	
9	The Angmering fishing centre shop borders the ware course. The car par and the back of the building is bordered by scrub. Species include nettle, bramble and dock.	Reptiles and nesting birds.	 
10	Broadleaved woodland which borders Dappers Lane. Species identified includes common ash Fraxinus excelsior, and sycamore with n understorey of blackthorn, ivy and bramble.	Nesting birds, bats, reptiles and dormice.	

11	Proposed holding area for water within verge (amenity grassland) along Dappers Lane. An English oak and ash tree are within the verge which is bordered by a species poor hedgerow dominated by blackthorn, oak and ash.	Nesting birds and bats.	
12	The verge along Dappers Lane has areas of tall ruderal and scattered scrub. Species identified including frequent tall fescue, common nettle and dock with occasional elder.	Reptiles and nesting birds.	
13	The wet ditch which runs along dappers lane. Before it enters an underground drain. The water level was very low with a substrate of earth and pebbles. The banks were steep with dominant ivy.	Nesting birds.	
14	The verge on the eastern side of Dappers Lane is dominated by scrub. Species identified include nettle, dock and dandelion with occasional ash and elder and rare spear thistle <i>Cirsium vulgare</i> .	Nesting birds, reptiles and badgers.	

15	Poling Furzefields woodland which is used as a scout training ground. There was not access to the woodland. Species observed from Dappers Lane include dominant oak, beech and ash with occasional hazel. The understorey was predominately bramble. The canopy of the woodland overhangs the neighbouring defunct hedgerow with trees.	Nesting birds, bats, dormice, badgers, reptiles and amphibians.	
16	A proposed ditch management area adjacent to a hedgerow with trees. Tree root protection zones will need to be considered. Species identified include dominant ash, and elder with occasional ash and rare sycamore. The understorey included dominant nettle, bramble and ivy, with occasional holly and rare broadleaved willow herb and red campion.	Nesting birds, reptiles and dormice.	
17	Black Ditch as it flows through Avenals Farm. The flow is smooth with occasional ripples. The bank is made up of earth and the substrate is silt with pebbles and the occasional cobble. The water depth is low (approx. 30cm). Natural dams from fallen trees brake the flow. Species identified include beech, elder, bramble, ash and leylandi. The understorey is predominately ivy with occasional ferns including lady fern.	Water vole, nesting birds and bats.	
18	A large ornamental pond which Black Ditch flows through at Avenals Farm. The channel here has been manipulated using a small dam to create the pond. The pond is surrounded by amenity grassland and scattered mature ornamental trees. Species include oak, ash and crack willow <i>Salix fragilis</i>. The pond was stocked heavily with waterfowl. It is unknown if fish are present, but it is likely.	Nesting birds and bats.	

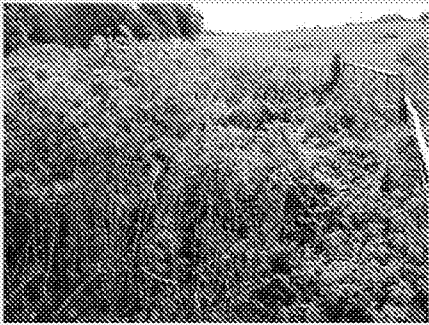
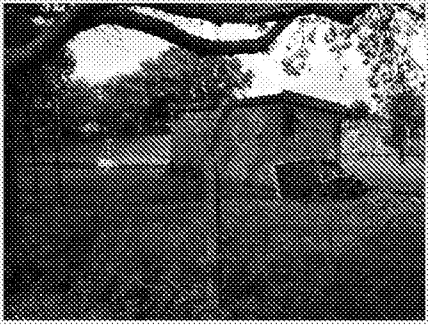
19	A pasture field where the stream goes under the driveway of Avenals Farm. Habitat here includes semi improved grassland with areas of tall ruderal grassland. The A280 (left of the photo) is bordered by scrub.	Reptiles and nesting birds.	
20	Black Ditch is bordered by dense scrub in areas (top). The dominant species are juncus, nettle and bramble with scattered crack willow. The flow was smooth and the substrate as earth. The depth of the water was approximately 50cm. The areas of the ditch that were accessible had a variety of flora(bottom). This includes foals water cress and water mint and rare water plantain.	Nesting birds, water vole and amphibians.	
21	Large mammal tracks were identified in the field, however no badger setts or fox dens were identified.	Badger.	

22	A large pond on the edge of Black Ditch surrounded by a diverse flora of water mint, common fleabane <i>Pulicaria dysenterica</i> , broadleaved willow herb and nettle. Larger shrubs include bramble, willow and ash.	Amphibians, water vole, reptiles and nesting birds.	
23	Here Black Ditch is wider (approximately 2.5m), with a smooth flow. The bank is earth and the substrate is silt with occasional gravel. The bankside has become poached by cattle. This area is scattered by mature trees including oak, willow and ash.	Nesting birds and water voles.	
24	Improved grassland with a border of tall ruderal vegetation. Species include Ragwort, common bent grass, dock and thistle.	Reptiles and nesting birds.	
25	An overgrown dry highways pond with no access. Potential option is to clear the vegetation and silt and to use the pond for storage. The habitat here is predominately scrub including dominant nettle and bramble.	Nesting birds, badgers and reptiles.	

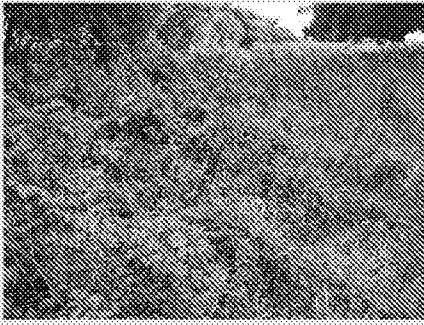
26	A wet ditch with running water along the hedgerow in a field of semi improved grassland.	Nesting birds – hedgerow.	
27	A large refugee heap covered by scrub in areas near the motor racing circuit.	Nesting Birds, amphibians and reptiles.	
28	The motor racing circuit. No access to survey. The track is surrounded by scrub, dominated by bramble, buddleia and nettle.	Nesting birds, reptiles and amphibians.	
29	A photo of Grooms Copse woodland, taken from Ecclesden Farm. A potential option is to extend the woodland south into the neighbouring arable field.	n/a	

30	Patching Pond South -- no access during the survey. The pond is surrounded by broadleaved woodland with little understory. Species include oak, beech, hazel and ash with occasional willow.	Amphibians, badgers, nesting birds, reptiles, bats.	
31	Patching pond north -- no access at time of survey. Photo taken from layby. The pond is surrounded by broadleaved woodland which looks wet in areas. Species identified include willow, oak and ash. The pond is used as a fishery.	Amphibians, nesting birds, reptiles and bats.	
32	The remnants of an old track which is a strip of broadleaved woodland. Species identified include dominant oak, ash and beech with occasional sycamore. The understory is predominately bramble with nettle and rare field bindweed.	Bats, nesting birds, reptiles, badgers and amphibians.	
33	The pond at Ecclesven Manor.	Amphibians	No photo -- no access
34	A large area of disposed material where scrub, dominated by bramble and nettle has established at Ecclesden Farm.	Reptiles, amphibians and nesting birds.	

35	A potential option is to plant this area of the farmland where the land is not being used to increase the areas water holding capacity.	n/a	
36	Black Ditch before it goes under the A260. Here the banksides are made of earth and densely vegetated (bramble, and nettle with scattered ash, oak and hazel). The culvert under the road is made of brick. The water is deep (approx. 1 m), the substrate is silt and the flow is smooth.	Water vole and nesting birds.	
37	An area of pooling at the bottom of the field. A potential option is to sow a holding crop after harvest to increase water holding capacity in the area.	n/a	
38	The watercourse here is very densely vegetated by bramble. Therefore a detailed water vole survey was not possible. A potential option would be to re profile and dig out the ditch..	Water voles, reptiles and nesting birds.	

39	Japanese knotweed is present on this part of Black Ditch before it goes under the tac to the farm. This area of the watercourse is very overgrown.	Invasive species – Japanese Knotweed.	
40	This area of Black Ditch is fenced with barbed wire to stop the cattle accessing it. The area is also densely vegetated with patches of thick bramble. Other less dominant species included nettle, scatter ash, willow, dock and lady fern.	Water vole and nesting birds.	
41	The sewage treatment works are fence off. Mature trees surround the site, including ash and oak.	Nesting birds and bats.	
42	A dry ditch which is very overgrown with nettle, bramble and bind weed which runs down to Black Ditch.	Nesting birds and reptiles.	

43	Miles Copse, a broadleaved woodland is used for rearing pheasants. Species identified included dominant ash and beech with occasional oak and hazel. The woodland has little to none understory with nettle and bramble in areas. Two red kites were observed flying over the woodland.	Nesting birds, bats, badgers, reptiles, dormice and amphibians.	
44	Two mature oaks trees within the hedge. Species identified within the hedge include dominant blackthorn, elder, ash and oak with occasional hazel and beech. The ground flora was dominated by bramble and nettle.	Bats and nesting birds.	
45	This area of Black Ditch was very overgrown, therefore not all areas of the bank were surveyed.	Nesting birds, reptiles and water vole.	
46	Photo taken from bridge that crossed the water. This area of the ditch is very overgrown with bramble, blackthorn, elder and nettle, with rare spindle. The banks are made of earth and the substrate is silt. The flow is smooth with ripples in areas. The depth is approximately 50cm.	Water vole, reptiles and nesting birds.	

47	An area of set aside which is predominately tall ruderal. Dominant species identified include common nettle, broad leaved dock, creeping thistle, ragwort, Perennial Rye-grass and cocks foot. There was also scattered mature oak trees.	Nesting birds, reptiles, bats and amphibians.	
48	Here the channel becomes less overgrown and narrower (approximately 1m). The substrate is earth and the flow is smooth with clear water. Ground flora includes frequent common fleabane, foals water cress and water mint with occasional creeping thistle, cocks foot, juncas, broadleaved willow herb and broadleaved dock and rare buddleia. The surrounding habitat is semi improved grassland and four large mature oaks are present in the neighbouring pasture field.	Water vole, bats and nesting birds.	
49	This is where the water joins Black Ditch from under culvert from Patching Pond. Species include bramble, nettle, broadleaved dock, spindle and common fleabane.	Nesting birds and water vole.	
50	The water course is 2m wide and approx. 1m deep. The banks are earth and the substrate is silt. The water is brown and the flow is smooth. The bankside is overgrown with scrub with scatter trees. Species include blackthorn, elder, bramble, nettle, ash and spindle.	Nesting birds and water vole.	

51	A earth mound covered in dense scrub (nettle and bramble).	Reptiles and nesting birds.	
52	This area of the wet ditch was difficult to survey due to cows (farmer requested we did not enter the field). Here the watercourse is fenced off from the cattle and looks to be surrounded by dense vegetation including bramble. The neighbouring habitat is semi improved grassland.	Nesting birds, reptiles and water voles.	
53	An unmanaged broadleaved woodland. Species identified includes dominant oak, field maple and ash with occasional beech and elder. There is an understorey of ivy nettle, bramble, broadleaved dock and thistle.	Nesting birds, bats, reptiles, badgers, amphibians, dormice.	No photo
54	Very wet agricultural track from Northdown Farm wher water pools from the farmyard and surrounding fields.	n/a	
55	A dry ditch which is not mapped on the OS map wich runs through the woodland.	n/a	

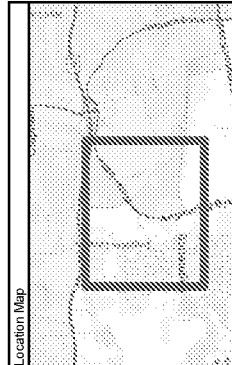
56	A steep banked wet ditch which is not on the OS map. The water level is low and the substrate is earth. The ditch is shaded by bramble, hawthorn and nettle.	Nesting birds.	
57	An area at the bottom of the set aside field where water pools. Potential for this area to become a holding pond. A hedgerow borders this field dominated by blackthorn and bramble.	n/a	
58	Potential for defunct hedge to be replanted.	n/a	
59	A large mature oak tree on the edge of the field.	Nesting birds and bats.	

60	An area of broadleaved woodland with an edge of scrub. Species identified within the woodland include dominat hazel, elder and ash with occasional beech, blackthorn and hawthorn. The understorey included bramble nettle, beech and broadleaved dock.	Badgers, nesting birds, bats, reptiles and amphibians.	
61	A pond that looks to be very deep surrounded by broadleaved woodland and fenced off from the field Access was not possible to its edge. It will need a HSI for GCN as the surrounding terrestrial habitat is good.	Amphibians.	
62	A dry ditch located along the field edge which is not OS mapped. The ditc is overgrown with nettles.	Nesting birds, amphibians and reptiles.	

Source: Catherine Wiseman 2018

F. Water Vole Survey

- F.1 Map of Survey Area Extent
- F.2 Water Vole Habitat Assessment
- F.3 Water Vole File Sign Survey



Key to Symbols

Survey Extent

Notes

© Natural England copyright. Contains Ordnance Survey data. Crown copyright and database right 2018.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, © OpenStreetMap contributors, and the GIS User Community
Contains OS data. © Crown Copyright and database right 2018.

201	19/09/18	AMXD	For information	CW	KA
Rev	Date	Drawn	Description	Chk'd	App'd

M
MOTT
MACDONALD

Client



Title

Angerming Water Vole Survey Extends

Designed	NA	Eng Check	NA
Drawn	AMX Dorey	Coordination	C Wiseman
ISIS Check	C Wiseman	Approved	K Atkinson
Grade at A3	Status	Rev	Security
1:6,000	S2	P01	STD

Drawing Number

200 Meters

This document is the property of Mott MacDonald Ltd. It should not be relied upon by any other party or used for any other purpose. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

WV1 WATER VOLE HABITAT ASSESSMENT									
Ecology Code ¹					Surveyor	Catherine Wiseman			
Land Parcel Reference	Angmering - Black Ditch				Date	28/08/2018			
Wind	2	Air Temperature (°C)	20	Rain	3	Cloud Cover	6		
Easting (X) at start of survey	506714				Northing (Y) at start of survey		104265		
Easting (X) at end of survey	506643				Northing (Y) at end of survey		105389		
Water body type	Ditch	Transect ID	F001		Water body depth		1m - 2m		
Weather Conditions (Description)	The survey was conducted over two days. On the Tuesday (28th) the weather was warm and cloudy, on the Wednesday it had rained over night there was moderate rain in the morning.								
HABITAT ASSESSMENT									
Bank Profile	Steep >45°								
Estimated average depth (m)	0.5				Estimated width (m)		1 - 2m		
Estimated flow	Low								
Predominant shore/bank substrate ²	Earth								
Bordering land use	Western section - Angmering Village - residential gardens and a golf course. Eastern section - agricultural pasture fields. The water course goes under culvert between the two areas.								
State vegetation cover for each of the following vegetation types using DAFORN ³	Bankside Trees	F			Reeds/sedges	F			
	Bushes	D			Tall grasses	F			
	Herbs	F			Short grass	F			
	Submerged weed	O							
Habitat Description	Western section - The Thatchway to Angmering Village Triangle - This section is very shaded with overhanging trees and limited bankside herbs and sedges. The neighbouring land use is Angmering grave yard and the village hall car park, with some residential property gardens. Eastern section - A280 at water lane to Patching Pond - This area is predominately agricultural.								

WV'1 - Water vole habitat assessment proforma

Vegetation structure and availability of food sources		Western - The vegetation was dominated by mature trees and scrub. The banks were earth with a lot of ivy, with limited herbs and sedges. Eastern - The bankside vegetation is more diverse offering greater feeding potential. This includes water mint and food water cress.	
Level of shading (%)		60	
Connectivity with other areas of suitable habitat		Medium	
Disturbance		Slight	
CONCLUSION			
Survey Result		Watercourse potentially suitable for water vole - no or limited access for survey	
If YES note any requirements for non standard further survey			
A water vole field sign survey is required. In areas where it is difficult to access the banks, floats could be used.			
Photo Reference Codes ⁴		TN2 and TN20	
		Are further surveys needed?	Yes

WV2 WATER VOLE FIELD SIGNS											
WV1 Ecology ID 1		Surveyor			Catherine Wiseman						
Land Parcel Reference		Angmering - Black Ditch			28/08/2018						
Wind	2	Air Temperature (°C)	20	Rain	3	Cloud Cover	5	Weather Conditions (Description)	Tuesday - Warm and cloudy. Wednesday - Wet and warm.		
Water level		Low			Estimated flow			Low			
Any significant changes since habitat assessment?		None			Field signs observed?			No			
Observation No. 3 Digit Ref.	WV2 Ecology ID	Easting (X)	Northing (Y)	Species	Nature of record (e.g. latrine, burrow, run, footprint etc)	Notes		Photo Reference?	Sample collected for DNA analysis		
F001	Angmering - Black Ditch										
F002	Angmering - Black Ditch										
F003	Angmering - Black Ditch										
F004	Angmering - Black Ditch										
F005	Angmering - Black Ditch										
F006	Angmering - Black Ditch										
F007	Angmering - Black Ditch										
F008	Angmering - Black Ditch										
F009	Angmering - Black Ditch										
F010	Angmering - Black Ditch										

Observation No. 3 Digit Ref.	WV2 Ecology ID	Easting (X)	Northing (Y)	Species	Nature of record (e.g. latrine, burrow, run, footprint etc)	Notes	Photo Reference	Sample collected for DNA analysis
F011	Angmering - Black Ditch							
F012	Angmering - Black Ditch							
F013	Angmering - Black Ditch							
F014	Angmering - Black Ditch							
F015	Angmering - Black Ditch							
F016	Angmering - Black Ditch							
F017	Angmering - Black Ditch							
F018	Angmering - Black Ditch							
F019	Angmering - Black Ditch							
F020	Angmering - Black Ditch							
F021	Angmering - Black Ditch							
								Are further surveys needed?
								Yes

G. Citations

COUNTY: WEST SUSSEX

SITE NAME: CLIMPING BEACH

DISTRICT: ARUN

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981.

Local Planning Authority: ARUN DISTRICT COUNCIL

National Grid Ref: TQ 020010

Area: 65.8 (ha.) 162.6 (ac.)

Ordnance Survey Sheet 1:50,000: 197

1:10,000: TQ 00 SW

Date Notified (under 1949 Act): 1980

Date of Last Revision: --

Date Notified (under 1981 Act): 1985

Date of Last Revision: --

Other Information:

Description and Reasons for Notification:

The site is a stretch of coast with a vegetated shingle beach, behind which is a sand dune system. The intertidal zone supports important populations of wintering birds and the numbers of wintering sanderling, in particular, are of European significance.

Vegetated shingle beaches are a nationally uncommon habitat. The beach at Climping is broad in the west but narrows to the east. Plant communities are mainly restricted to sheltered areas behind the main shingle bank and include yellow horned poppy *Gaucium flavum*, sea dale *Crambe maritima*, sea beet *Beta vulgaris*, curled dock *Rumex crispus* and sea holly *Eryngium maritimum*. Scrub of tamarisk *Tamarix gallica* and hawthorn *Crataegus monogyna* has developed in a few places behind the shingle.

Sand dunes are fragile systems, susceptible to erosion and often unstable. Stabilised parts of these dunes are dominated by marram-grass *Ammophila arenaria*. Other plants which are present include dune fescue grass *Vulpia membranacea*, red fescue grass *Festuca rubra*, sand catchfly *Silene conica*, sand sedge *Carex arenaria*, viper's bugloss *Echium vulgare* and a locally uncommon plant, Nottingham catchfly *Silene nutans*.

The intertidal zone consists of soft muds and sands which support large populations of marine invertebrates. The invertebrates are an important food source for wintering birds. In particular up to 300 sanderling have been recorded from this site in winter; a figure which represents 1% of the West European population of this bird which breeds in the high Arctic but flies south to winter on sandy coasts and estuaries. Other wintering birds include grey plover and oystercatcher.

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name: Ebernoe Common

Unitary Authority/County: West Sussex

SAC status: 1) Ebernoe Common was designated as a SAC on 1 April 2005.
2) Extensions to the Ebernoe Common SAC were designated on 10 December 2009

Grid reference: SU977273

SAC EU code: UK0012715

Area (ha): 234.05

Component SSSI: Ebernoe Common SSSI

Site description:

Ebernoe Common has an extensive block of beech *Fagus sylvatica* high forest and former wood-pasture over dense holly *Ilex aquifolium* with a very rich epiphytic lichen flora, including *Agonimia octospora* and *Catillaria atropurpurea*. The beech woodland is associated with other woodland types, open glades and pools, which contribute to a high overall diversity. A maternity colony of **Barbastelle bats** *Barbastella barbastellus* utilises a range of tree roosts in the site, usually in dead tree stumps, but the species appears to be present throughout the year, with individuals utilising a range of roost sites in tree holes and under bark. The site also holds a maternity colony of **Bechstein's bats** *Myotis bechsteinii*, mainly roosting in old woodpecker holes in the stems of live mature sessile oak *Quercus petraea* trees.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robur-petraeae* or *Ilici-Fagenion*). (Beech forests on acid soils)

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Barbastelle bat *Barbastella barbastellus*
- Bechstein's bat *Myotis bechsteinii*

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0012715
Date of registration: 10 December 2009

Signed: 

On behalf of the Secretary of State for Environment,
Food and Rural Affairs



LOCAL WILDLIFE SITE (LWS)

West Sussex

Site Name:	Long Furlong & Church Hill		
Site Ref:	Ar03 / W11	Owner:	Private
District:	Arun & Worthing	Size (ha):	68.6
Parish:	Findon & Clapham	Date:	Identified May 1992
National Grid Ref:	TQ109081	Author:	Marion Finch
Habitat:	Chalk grassland, scrub and semi-natural woodland		

Summary

Long Furlong is a steep north and west-facing slope between the A280 and Clapham Woods, supporting rich chalk grassland and scrub. Church Hill is a complex mosaic of chalk grassland, species-rich scrub and woodland.

Long Furlong and Church Hill form a large piece of contiguous habitat, so have been included as one site. Clapham Woods is an ancient woodland of County-wide importance.

Site description

The upper slopes of Long Furlong have modified chalk grassland, with grasses and herbs normally associated with enriched soils. The lower slopes are extremely diverse, with typical species such as Quaking Grass *Briza media*, Cowslip *Primula veris*, Stemless Thistle *Cirsium acaule*, Round-headed Rampion *Phyteuma tenerum*, Salad Burnet *Sanguisorba minor*, Devil's-bit Scabious *Succisa pratensis* and Wild Thyme *Thymus praecox* well represented. Ant-hills are scattered. Clumps of Burnet Rose *Rosa pimpinellifolia* and areas of scrub occur, and a small area of Oak and Ash woodland over dense shrubs borders Clapham Wood.

Church Hill's chalk grassland varies more in terms of species and structure. Short, species-rich turf occurs on steep slopes and banks; longer more grass-dominated sward is generally associated with enriched or ungrazed areas. The presence of ant-hills indicates a lack of recent disturbance. There are large areas of scrub with a good diversity of shrubs present, and secondary woodland, which is mostly Ash with Beech and Oak locally dominant, and Sycamore frequent, especially in areas of storm damage. Chalk grassland occurs in clearings and along tracks.

The diversity of habitats and vegetation structure makes the site important for a variety of birds and invertebrates.

Management recommendations

The grassland should not be 'improved' by fertilising or reseeding. Scattered scrub should be cleared where encroaching on the grassland, but the established scrub is a source of food for invertebrates and birds. Clearings and rides should be kept open. Sycamore invasion of the woodland should be checked. The coarser grassland needs grazing.

LOCAL WILDLIFE SITE (LWS)

West Sussex

Site Name:	Clapham Wood		
Site Ref:	Ar08 / W09	Owner:	Private
District:	Arun & Worthing	Size (ha):	155.8
Parish:	Clapham	Date:	Identified May 1992
National Grid Ref:	TQ105070	Author:	Graham Roberts
Habitat:	Semi-natural woodland		

Summary

Clapham Wood is an extensive, ancient semi-natural woodland on the undulating dip slope of the South Downs. The ground flora is rich and includes a number of interesting species. The wood was moderately affected by the storm of October 1987 and unfortunately several large blocks of woodland were subsequently cleared for pasture. Much of the wood is not managed but some areas are still coppiced.

Site description

Clapham Wood occupies a variety of soil types. On the hill top soils are mostly heavy clays with a fairly low lime content. This supports a woodland community consisting mostly of Oak standards over Hazel or Sweet Chestnut coppice. The ground flora is characterised by a carpet of Bluebells *Hyacinthoides non-scripta*, with patches of Wood Anemone *Anemone nemorosa*. Bramble *Rubus fruticosus* and Bracken *Pteridium aquilinum* are also present.

The chalky soils of the hill slopes carry a very different flora. Oak, Ash, Field Maple and Hazel are most frequent, with patches of Dogwood, Spindle, Wild Privet and Wayfaring Tree. The ground flora is particularly rich. Bluebell and Wood Anemone are still common but with swathes of Dog's Mercury *Mercurialis perennis* and patches of Sanicle *Sanicula europaea*, Primrose *Primula vulgaris*, Common Dog-violet *Viola riviniana*, Lesser Celandine *Ranunculus ficaria*, Wild Strawberry *Fragaria vesca*, Pignut *Conopodium majus*, Stinking Iris *Iris foetidissima*, Nettle-leaved Bellflower *Campanula trachelium* and Early-purple Orchid *Orchis mascula*.

The wood has many tracks and paths, some of which support interesting floras. Tuberous Comfrey *Symphytum tuberosum*, a very rare plant in West Sussex occurs along a track.

Clapham Wood has a moderately diverse range of breeding birds, including Goldcrest, Chiffchaff, Blackcap, Treecreeper, Marsh Tit, Nuthatch, Cuckoo, Great Spotted Woodpecker and Green Woodpecker.

Management recommendations

Much of the woodland would benefit from active management, particularly in the form of coppicing and selective thinning. Ride management, notably coppicing of the adjacent shrub layer, would enhance the site for both wildlife and Pheasants. Any tree planting should be with native broadleaved species such as Oak, Ash and Cherry.

LOCAL WILDLIFE SITE (LWS)

West Sussex

Site Name:	Ferring Rife and Meadows		
Site Ref:	Ar12	Owner:	Private
District:	Arun	Size (ha):	9.5
Parish:	Kingston & Ferring	Date:	Identified May 1994
National Grid Ref:	TQ090022	Author:	Graham Roberts
Habitat:	Stream and neutral grassland		

Summary

This site consists of 1.3km of rife, plus several hectares of rough grassland. Situated adjacent to the urban area of Ferring it is of great local importance. It supports a nationally rare snail, *Monacha cartusiana* and a large proportion of a locally uncommon plant, Parsley Water-dropwort *Oenanthe lachenalii*. A good diversity of birds, butterflies and dragonflies have also been recorded.

Site description

Ferring Rife consists of a wide channel between two high grassy banks. The clear, shallow flowing water supports a fairly sparse aquatic flora. This includes submerged species such as Curled Pondweed *Potamogeton crispus*, Fringed Water-lily *Nymphoides peltata* and Canadian Waterweed *Elodea canadensis*. The marginal flora is more diverse and includes Water-plantain *Alisma plantago-aquatica*, Branched Bur-reed *Sparganium erectum*, Grey Club-rush *Schoenoplectus tabernaemontani*, Water Figwort *Scrophularia auriculata* and Water Cress *Nasturtium officinale*.

There is an interesting area of moderately species-rich rough grassland to the west of the rife. The presence of Parsley Water-dropwort is particularly notable. Other interesting plants include Pepper-saxifrage *Silene silaus*, Strawberry Clover *Trifolium fragiferum*, Yellow Loosestrife *Lysimachia vulgaris*, Marsh Woundwort *Stachys palustris*, Meadow Vetchling *Lathyrus pratensis*, Common Spike-rush *Eleocharis palustris*, Meadowsweet *Filipendula ulmaria*, Wild Carrot *Daucus carota* and Carnation Sedge *Carex panicea*.

There are several small, shallow ponds within the area of rough grassland. Some of the marginal flora, such as Common Reedmace *Typha latifolia* and Yellow Iris *Iris pseudacorus*, has presumably been introduced.

The grassland supports a good colony of the nationally rare snail, *Monacha cartusiana*. Grey Wagtail and Kingfisher have been seen by the rife, and Meadow Pipit, Skylark and Snipe are known to frequent the rough grassland. Butterflies recorded include Small Copper, Common Blue, Orange-tip, Green-veined White, Ringlet and Wall Brown. The Common Darter dragonfly has been observed in large numbers along the rife.

Management recommendations

The rife vegetation is likely to require periodic clearance. A careful balance is required in order to maintain water flow without denuding it of vegetation.

LOCAL WILDLIFE SITE (LWS)

West Sussex

Site Name:	Highdown Hill & the Miller's Tomb		
Site Ref:	Ar16 / W02	Owner:	National Trust & Worthing Borough Council
District:	Arun & Worthing	Size (ha):	22.9
Parish:	Ferring & Worthing	Date:	Identified May 1992. Revised May 1997
National Grid Ref:	TQ095042	Author:	Simon Curson
Habitat:	Chalk grassland, scrub and chalk pits		

Summary

The Miller's Tomb SNCI, identified in 1992, comprises a small area of species-rich chalk grassland. The SNCI was extended in 1997 to include Highdown Hill. The whole site comprises relatively unimproved chalk grassland and scrub on the south facing scarp of a small outlier of the South Downs near Worthing. Although heavily used for informal recreation, the site supports several uncommon plants and animals.

Site description

The grassland has received fertiliser in the past when a hay crop was taken and is now mostly grass dominated with species such as Upright Brome *Bromus erectus*, Red Fescue *Festuca rubra* and Tall Fescue *Festuca arundinacea* prominent. Despite this some typical chalk grassland herbs are present including Hairy Violet *Viola hirta*, Fairy Flax *Linum catharticum*, Glaucous Sedge *Carex flacca*, the rare Round-headed Rampion *Phyteuma tenerum* and large quantities of Sainfoin *Onobrychis viciifolia*, especially on the reservoir. On the areas of deeper soil Bulbous Buttercup *Ranunculus bulbosa*, Salad Burnet *Sanguisorba minor*, Ribwort Plantain *Plantago lanceolata* and Rough Hawk's-beard *Crepis biennis* occur.

Chalk scrub is found around the old chalk pits and site boundaries, typically comprising Hawthorn, Ash, Dogwood, Elder, Privet, Buckthorn and Traveller's Joy *Clematis vitalba*. Associated with the scrub are patches of taller grassland containing False Oat-grass *Arrhenatherum elatius*, Hoary Ragwort *Senecio erucifolius*, Wild Parsnip *Pastinaca sativa*, Common Knapweed *Centaurea nigra* and Hemp Agrimony *Eupatorium cannabinum*. A clump of trees including Beech, Holm Oak, Ash and Scots Pine is present on the hill fort.

The mosaic of short turf, taller herbs and scrub makes the site a valuable habitat for birds and invertebrates. Fauna recorded here include Carthusian snail, a Red Data Book species, Long-winged Cone-head, Common Lizard, Glow-worm, the scarce Chalkhill Blue and 17 commoner butterfly species and a range of birds including Long-tailed Tit, Whitethroat, Chiffchaff, Linnet, Bullfinch and occasional Nightingales.

Management recommendations

Grazing the site would be the most beneficial management for the site, however this may not be practical due to the high recreational pressure. Cutting the grassland areas annually and removing the cuttings may be the most practical method of maintaining the grassland. The areas of tall herb and scrub would benefit most if left to develop naturally. However it would be best to control any further spread of the scrub.

SITE OF NATURE CONSERVATION IMPORTANCE (SNCI)

West Sussex

Site Name:	Titnore & Goring Woods Complex		
Site Ref:	W04	Owner:	Private
District:	Worthing	Size (ha):	78.6
Parish:	N/A	Date:	Identified May 1992. Revised May 1994.
National Grid Ref:	TQ100050	Author:	Jill Barton
Habitat:	Semi-natural woodland and pond		

Summary

This woodland complex is the largest in Worthing Borough. Much of it is ancient in origin, although its structure and species composition vary considerably, due to management. The site is of outstanding importance as a large area of semi-natural habitat close to a heavily built-up area.

Site description

The majority of the woodland is dominated by Oak with Ash, Elm, Birch and Beech. The shrub layer is very variable, with area of Hazel or Sweet Chestnut coppice or a mixture of Holly, Hawthorn, Blackthorn, Willow and Elder. The ground flora is predominantly Bramble *Rubus fruticosus*, Bluebell *Hyacinthoides non-scripta* and Bracken *Pteridium aquilinum*, with Wood Sage *Teucrium scorodonia*, Male Fern *Dryopteris filix-mas* and Honeysuckle *Lonicera periclymenum* also typical. It tends to be sparse in dense shade. Ash occurs where the ground is damp and base-enriched, with Hazel and some Field Maple and Wild Privet under, and a ground flora of sedges *Carex* spp, ferns, Yellow Flag *Iris pseudacorus* and Dog's Mercury *Mercurialis perennis*.

Old boundary banks support a rich flora, including ancient woodland indicators such as Primrose *Primula vulgaris* and Hart's-tongue Fern *Phyllitis scolopendrium*. Parts of the woodland have been thinned to occasional Oak standards over sown Rye-grass *Lolium perenne*. Scots Pine is very occasional in parts of the wood.

Management recommendations

Much of the site is well-managed coppice with standards. Re-coppicing should be encouraged to maintain the diversity of the ground flora and wildlife value of the woodland. The conversion of woodland to occasional trees over improved pasture destroys the character and value of the site and should be discouraged.

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the SAC home page on the JNCC website. This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.

<http://jncc.defra.gov.uk/>



NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE **UK0030337**
SITENAME **Singleton and Cocking Tunnels**

TABLE OF CONTENTS

- [1. SITE IDENTIFICATION](#)
- [2. SITE LOCATION](#)
- [3. ECOLOGICAL INFORMATION](#)
- [4. SITE DESCRIPTION](#)
- [5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES](#)
- [6. SITE MANAGEMENT](#)

1. SITE IDENTIFICATION

1.1 Type B	1.2 Site code UK0030337	Back to top
----------------------	-----------------------------------	-----------------------------

1.3 Site name

Singleton and Cocking Tunnels

1.4 First Compilation date 2003-05	1.5 Update date 2015-12
--	-----------------------------------

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough
PE1 1JY

Email:

Date site proposed as SCI: 2003-05

Date site confirmed as SCI: 2004-12

Date site designated as SAC: 2005-04

National legal reference of SAC designation:

Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010
(<http://www.legislation.gov.uk/ukxi/2010/490/contents/made>).

2. SITE LOCATION

[Back to top](#)

2.1 Site-centre location [decimal degrees]:

Longitude

-0.758611111

Latitude

50.92166667

2.2 Area [ha]:

1.88

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code

Region Name

UKJ2	Surrey, East and West Sussex
------	------------------------------

2.6 Biogeographical Region(s)

Atlantic (100.0 %)

3. ECOLOGICAL INFORMATION

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

[Back to top](#)

Species			Population in the site							Site assessment				
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A B C D	A B C		
						Min	Max				Pop.	Con.	Iso.	Glo.
P	1308	<u>Barbastella barbastellus</u>			p				P	DD	C	B	B	C
M	1323	<u>Myotis bechsteini</u>			p				P	DD	C	B	B	C

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see [reference portal](#))
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

[Back to top](#)

4.1 General site character

Habitat class	% Cover
N23	100.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: nutrient-poor, sedimentary, basic 2 Terrestrial: Geomorphology and landscape: lowland, valley

4.2 Quality and importance

Barbastella barbastellus - for which the area is considered to support a significant presence. Myotis bechsteini - for which the area is considered to support a significant presence.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i o b]
H	A02		I
H	M02		B
H	G01		I
H	J03		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i o b]

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification, T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

<http://publications.naturalengland.org.uk/category/64900688940889216>

<http://publications.naturalengland.org.uk/category/3212324>

5. SITE PROTECTION STATUS (optional)

[Back to top](#)

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK04	100.0				

6. SITE MANAGEMENT

[Back to top](#)

6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☐	Yes
☐	No, but in preparation
☒	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the [official European Union guidelines for the Standard Data Form](#). The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippophaila rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietalia rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion roburi-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic resources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

**EC Directive 92/43 on the Conservation of Natural Habitats and of Wild
Fauna and Flora**

Citation for Special Area of Conservation (SAC)

Name: The Mens
Unitary Authority/County: West Sussex
SAC status: Designated on 1 April 2005
Grid reference: TQ023234
SAC EU code: UK0012716
Area (ha): 203.28
Component SSSI: The Mens SSSI

Site description:

The Mens is an extensive area of mature beech *Fagus sylvatica* woodland rich in lichens, bryophytes, fungi and saproxylic (dead wood) invertebrates. It is developing a near-natural high forest structure, in response to only limited silvicultural intervention over the 20th century, combined with the effects of natural events such as the 1987 great storm. The site also supports an important population of barbastelle bat *Barbastella barbastellus*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Illici-Fagenion*). (Beech forests on acid soils)

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Barbastelle bat *Barbastella barbastellus*

This citation relates to a site entered in the Register of European Sites for Great Britain.

Register reference number: UK0012716

Date of registration: 14 June 2005

Signed: [REDACTED]

On behalf of the Secretary of State for Environment,
Food and Rural Affairs

