HIF Banwell Bypass and Highways Improvements Project

ES Appendix 8.C Habitats Regulations Assessment

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Contents

1 Abbreviations and Definitions

Abbreviation	Meaning	Definition
AA	Appropriate Assessment	The second stage of a Habitats Regulations Assessment (HRA)
AGC	Alun Griffiths (Contractors) Ltd	
AQ	Air Quality	
ARN	Affected Road Network	Parts of the road network which are identified as likely to be affected by changes in air quality as a result of a project.
CEMP	Construction Environmental Management Plan	A working document identifying how a development site will be managed to mitigate its potential impacts, on the environment and local community, during the construction phase.
Compensation		Measures taken to make up for the loss of, or permanent damage to, biological resources through the provision of replacement areas
Competent Authority		The competent authority is an individual or organisation as listed under 7(1) of the Habitat Regulations that is legally obligated to consider the impacts of any likely adverse effect on any European designated site within the Zone of Influence of a plan or project
Derogation		Provision within the Habitat Regulations to allow a development under IROPI
DMRB	Design Manual for Roads and Bridges	The Design Manual for Roads and Bridges contains information about current standards relating to the design, assessment and operation of motorway and all-purpose trunk roads in the United Kingdom
ECoW	Environmental/Ecological Clerk of Works	Supports compliance with legislation and planning conditions but also provides advice and guidance throughout construction
EIA	Environmental Impact Assessment	A method and process by which information about environmental effects is collected, assessed and used to inform decision-making.
ES	Environmental Statement	Prepared by an applicant as part of an Environmental Impact Assessment (EIA) in support of a planning application.

European site		Designated areas (SACs, SPAs, certain SCIs/candidate SACs, potential SPAs, proposed SACs, and Ramsar sites) forming part of a wider network of protected sites across Europe. Previously referred to as “Natura 2000 sites” under EU legislation.
FCS	Favourable Conservation Status	The concept of Favourable Conservation Status (FCS) has a foundation in international wildlife conservation, notably the 1979 Bonn Convention on Migratory species (CMS). Achievement of FCS for a wider range of species and natural habitat types was subsequently incorporated as the explicit aim of the EU Habitats Directive. Natural England defines Favourable Conservation Status as the minimum threshold at which habitats and species in England can be considered to be thriving
GWDTE	Groundwater Dependent Terrestrial Ecosystem	Wetlands which critically depend on groundwater flows or chemistries and which are sensitive to hydrological and ecological changes caused by development
HIF	Housing Infrastructure Fund	A government programme providing grant funding (under application) for new infrastructure and housing development.
HRA	Habitats Regulations Assessment	The process by which a plan or a project is assessed as to whether it may affect a protected site, in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended)
IROPI	Imperative Reasons of Overriding Public Interest	Reasons that a proposed development can be allowed as long as compensatory measures are taken to ensure the overall coherence of the SAC network is protected (Article 6(4) of the Habitats Directive).
JNCC	Joint Nature Conservation Committee	The statutory adviser to the government and devolved administrations on UK and international nature conservation. Its work contributes to maintaining and enriching biological diversity, conserving geological features and sustaining natural systems

LSE	Likely Significant Effect	A significant effect on a European site that could affect its conservation objectives that is likely to occur (or cannot be excluded) as a result of the Scheme alone or in combination with other plans or projects
Mitigation		Measures taken to avoid or reduce the negative impacts.
NE	Natural England	The Statutory conservation body for England, acting as the government's advisor for the natural environment in that region of the UK.
NSC	North Somerset Council	
NVC	National Vegetation Classification	A system of classifying habitat types in Great Britain according to the vegetation they contain. It covers all natural, semi-natural and major artificial habitats.
Ramsar		A Wetland site designated under the 1971 “Ramsar Convention on Wetlands of International Importance Especially as Waterfowl”
SAC	Special Area of Conservation	A European protected site, designated under the EU Habitats Directive and implemented in the UK through the Conservation of Habitats and Species Regulations 2017 plus amendments, (commonly known as the Habitats Regulations).
SCI	Site of Community Importance	A site which, in the biogeographical region or regions to which it belongs, contributes significantly to the maintenance or restoration at a favourable conservation status of a natural habitat type or of a species
SPD	Supplementary Planning Document	A non-statutory document that forms part of the local development framework and provides detailed guidance on how policies or proposals in development plan documents will be implemented
SIP	Site Improvement Plans	Documents developed and produced by Natural England as part of the improvement programme for England’s SACs and SPAs.
SPA	Special Protection Area	A European protected site, designated under the EU Birds Directive and implemented in the

		UK through the Wildlife and Countryside Act 1981 (plus amendments) and the Habitats Regulations.
SSSI	Site of Special Scientific Interest	A protected site, of national importance, designated under the Wildlife and Countryside Act 1981 (plus amendments) for geological or biological (habitat/species) reasons
WSP	WSP (UK) Ltd	
ZoI	Zone of Influence	Within the context of a Habitats Regulations Assessment, the ZoI is the area over which the proposed plan or project may have an impact on ecological features of a European designated site. This can extend beyond the project boundary where there are ecological or hydrological links.

2 Introduction

2.1 Background

2.1.1 North Somerset Council's (NSC) Housing Infrastructure Fund (HIF) proposal supports potential housing sites (subject to the emerging Local Plan 2038).

2.1.2 A business case was submitted to Homes England to secure funding for a package of infrastructure improvements, including a new Bypass around the village of Banwell, in February 2019 and a successful funding announcement was made at the end of October 2019.

2.1.3 The Bypass would provide a highway connection to enable potential housing sites that may be allocated in the emerging Local Plan and alleviate the anticipated impact of further traffic growth upon the already congested Banwell village.

2.1.4 NSC appointed Alun Griffiths (Contractors) Ltd, with Arup, TACP and Wallingford Hydro Solutions (the 'AGC Team') as their technical and environmental advisors, to develop a solution including optioneering, design and planning support of the HIF Banwell Bypass and Highways Improvements Project Stage 1. Stage 1 of the project includes: optioneering; preliminary design; Environmental Impact Assessment (EIA); planning permission; Statutory Processes. Stage 2 of the project is the detailed design and construction phase, following planning determination and land acquisition.

2.2 Scheme objectives

2.2.1 NSC's overall objectives for the Scheme are to deliver, within cost, quality, and programme targets:

a) Improve the local road network to deal with existing congestion issues.

b) Improve and enhance Banwell's public spaces by reducing traffic severance and improving the public realm.

c) Provide the opportunity to increase active and sustainable travel between local villages and Weston-super-Mare.

d) Deliver infrastructure that enables housing development (subject to Local Plan).

e) Ensure the development respects the local area and minimises visual impact upon the surrounding countryside and Mendip Hills Area of Outstanding Natural Beauty (AONB).

f) Innovative and efficient in reducing and offsetting carbon from the design and construction of the infrastructure.

g) Ensure the development provides the opportunity to increase Biodiversity Net Gain by at least 10%.

h) Proactively engage with stakeholders in a way that is both clear and transparent.

2.3 Purpose of this Report

2.3.1 Prior to the route of the proposed Bypass being decided[1], WSP UK Ltd (WSP) was initially commissioned by NSC to produce a series of scoping documents including a Habitat Regulations Assessment (HRA) screening report ("Banwell Bypass: Information to Inform Habitats Regulations Assessment – Screening" March 2021) which formed part of the appendices of an "Environmental Impact Assessment – Combined Screening and Scoping Report". This took account of the three potential route options under consideration at that time.

2.3.2 Available data presented within the original HRA Screening indicated that the Scheme would have a likely significant effect on one or more European Sites and therefore recommendations for the preparation of an Appropriate Assessment (AA), were made.

2.3.3 With Stage 1 of the project now progressing, an updated HRA Screening was requested by NSC, to form part of the ES Biodiversity Chapter.

2.3.4 The updated screening is required to identify, or otherwise, the continuing need for an AA under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) on the following sites, following confirmation of the Preferred Route:

[1] Three routes were initially under consideration

a) North Somerset and Mendip Bats SAC
b) Mendip Limestone Grasslands SAC
c) Mells Valley SAC
d) Bath and Bradford Upon Avon Bats SAC
e) Exmoor and Quantock Oakwoods SAC
f) Severn Estuary SAC
g) Severn Estuary SPA
h) Severn Estuary Ramsar
i) Chew Valley Lake SPA
j) Somerset Levels and Moors SPA
k) Somerset Levels and Moors Ramsar

2.3.5 The means by which the above sites were identified are presented in Section 5.

2.3.6 The purpose of this Report is therefore to present the findings of the HRA screening for the Scheme. Furthermore, where the need for an Appropriate Assessment is identified, this report presents a Statement to inform an Appropriate Assessment (a 'Shadow Assessment') which NSC, as the competent authority under the Habitat Regulations, can use to inform their Appropriate Assessment.

2.3.7 As per the Habitats Regulations NSC shall agree to the Scheme only after it has been confirmed that it will not affect the integrity of any European site or sites (Regulation 63(5)). Regulation 63(3) also requires that the Competent Authority consult with the Statutory Nature Conservation Body (Natural England) and have due regard to any responses from that body.

2.3.8 Further information regarding the relevant legislation and the HRA process is presented in Section 3.

2.3.9 Guidance for the completion of this report has been taken from the Design Manual for Roads and Bridges (DMRB) LA 115 "Habitats Regulations Assessment" Revision 1, January 2020 (formerly HD 44/09).

2.3.10 During the planning determination process, several meetings and a site visit were held with Natural England (NE) and NSC's

County Ecologist to review the proposals. Both NE and the NSC's County Ecologist considered that further mitigation was necessary within the Scheme to ensure impacts on the SAC were avoided. In addition, amendments have been made to the HEP calculations and associated mitigation provision to reflect changes linked to:

- Interpretation of the horseshoe bat use across the NSC North Somerset and Mendip Bats SAC Supplementary Planning Document Consultation Bands;
- Provision of a 20m habitat buffer along the Scheme alignment removed from the Habitat Evaluation Procedures (HEP) calculations;
- Greater clarity regarding Additionality in terms of BNG requirements and horseshoe bat mitigation provision.

2.3.11 At the request of the LPA, this Shadow Assessment has now been updated to incorporate the additional material submitted in December and to clarify the approach to and timings of delivering the mitigation for bats.

2.4 Experience of the Author of this Report

2.4.1 This report has been produced by Victoria Nicholls BSc (Hons), MSc, MRSB, a bat licenced professional ecologist with more than 15 years' experience in both the private and public sectors.

3 Legislation, Policy and Guidance

3.1 Relevant Legislation

3.1.1 The need for a Habitat Regulations Assessment is driven by the requirements of the Conservation of Habitats and Species Regulations 2017 (as amended) (henceforth called the Habitat Regulations).

3.1.2 The Habitat Regulations originally transposed the land and marine aspects of the Habitats Directive (Council Directive 92/43/EEC) and certain elements of the Wild Birds Directive (Directive 2009/147/EC) (known as the Nature Directives) into UK law. The Regulations were amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 to allow them to remain operable from 1st January 2021 (after the UK left the EU).

3.1.3 Under the Habitat Regulations it is a requirement to create and maintain a national site network within the UK territory comprising those protected sites already designated under the Nature Directives (Special Areas of Conservation – SACs – and Special Protection Areas – SPAs), and any further sites designated under the Regulations. SACs and SPAs are high-quality conservation sites that make a significant contribution to conserving the habitats and species identified in Annexes I and II of the Habitats Directive. The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds).

3.1.4 Where a development proposal (plan or project) has the potential to have an impact on any of the qualifying features of an SAC or SPA, it is required to carry out an assessment to identify the risk of a significant effect on the site (Habitat Regulations Assessment or HRA). Such a proposal is required to be assessed both alone and in combination with other plans and projects. (Potential SPAs and possible SACs should be treated as equal to fully designated SPAs and SACs under the Habitat Regulations.)

3.1.5 In addition to SACs and SPAs, Ramsar sites (both listed and

proposed) are required to be considered in the Habitat Regulation Assessment process. Ramsar sites are wetlands of international importance that have been designated under the criteria of the Ramsar Convention on Wetlands[2]. Within the UK, the boundaries of Ramsar sites typically overlap those of SACs and/or SPAs.

3.1.6 Under the Habitat Regulations, specific Conservation Objectives are applied to SACs and SPAs (refer to 3.3). No such objectives apply to Ramsar sites. The Ramsar Convention predominantly covered wetland conservation and 'wise use', with three main 'pillars' of activity:

a) the designation of wetlands of international importance as Ramsar Sites;
b) the promotion of the wise use of all wetlands in the territory of each country; and
c) international co-operation with other countries to further the wise use of wetlands and their resources.

3.1.7 The Environment Act 2021 legislated for the potential to amend Part 6 (Assessment of Plans and Projects) of the Habitats Regulations. The Secretary of State may make regulations to amend the Habitat Regulations only If satisfied that the regulations do not reduce the level of environmental protection provided by them.

3.2 Stages of a Habitat Regulations Assessment

3.2.1 Under the Conservation of Habitats Regulations, Regulation 63 states:

a) A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which—
   - is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and
   - is not directly connected with or necessary to the management of that site,

[2] The Convention on Wetlands of International Importance especially as Waterfowl Habitat, adopted in Ramsar, Iran in February 1971

- must make an appropriate assessment of the implications of the plan or project for that site in view of that site's Conservation Objectives.

3.2.2 The HRA process can be broadly broken down into four stages with the requirement for any one stage determined by the findings of the previous stage. The four stages can be summarised as follows:

a) **Stage 1 – Screening**: This stage collates evidence regarding which sites (SACs, SPAs and Ramsar sites) have the potential to be impacted by the proposed plan or project (either alone or in combination with other projects or plans). Where a potential significant effect is considered likely further assessment is then required during Stage 2 Appropriate Assessment, set out below (conversely, where no significant effects are identified, sites may be screened out of the need for further assessment).

b) **Stage 2 - Appropriate Assessment**: Where a likely significant effect has been identified during Stage 1, a detailed assessment of impact likelihood and severity on the sites is undertaken. This incorporates a detailed review of the proposal in relation to the structure and function of the European Sites along with their Conservation Objectives. This can also include information in regard to how impacts are proposed to be mitigated against.

c) **Stage 3 – Assessment of alternative solutions**: Where Stage 2 cannot show that significant effects on the integrity of the protected site(s) can be avoided, Stage 3 identifies and examines alternative ways of achieving the objectives of the plan or project that avoids these adverse effects.

d) **Stage 4 – Assessment where no alternative solutions exist and where adverse effects remain**: Where significant adverse effects remain after Stage 3, Stage 4 seeks to present the case for Imperative Reasons of Overriding Public Interest (IROPI). Where IROPI applies, Stage 4 also seeks to identify and present appropriate compensatory measures needed to maintain the overall coherence of the protected site(s) across the region.

3.2.3 In regard to Stage 1, under the Habitats Regulations a significant effect is considered likely, if:

a) It cannot be excluded, in that it is capable of having an effect, on the basis of objective information; and

b) It is likely to undermine the site's Conservation Objectives

3.2.4 During the HRA process the precautionary principle applies. That is, where the likelihood of significant effects is deemed uncertain, the Conservation Objectives of the site(s) take precedence and an impact on the site must be assumed. In addition, for an assessment to be deemed appropriate it must be specific to the qualifying features of the site(s)[3].

3.3 Site Conservation Objectives

3.3.1 With regard to the qualifying features and the known threats/vulnerabilities of the SACs included within this report, the Conservation Objectives are to:

3.3.2 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

a) The extent and distribution of qualifying natural habitats and habitats of qualifying species
b) The structure and function (including typical species) of qualifying natural habitats
c) The structure and function of the habitats of qualifying species
d) The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
e) The populations of qualifying species, and,
f) The distribution of qualifying species within the site.

3.3.3 With regard to the qualifying features and the known threats/vulnerabilities of the SPAs included within this report, the Conservation Objectives are to:

3.3.4 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

a) The extent and distribution of the habitats of the qualifying features
b) The structure and function of the habitats of the qualifying features

[3] As opposed to broad references to habitat features or similar.

c) The supporting processes on which the habitats of the qualifying features rely

d) The population of each of the qualifying features, and,

e) The distribution of the qualifying features within the site

3.3.5 In this instance, 'Favourable Conservation Status' is defined under Article 1 (sections (a), (e) and (i)) of the Habitats Directive[4] as follows:

> (a) conservation means a series of measures required to maintain or restore the natural habitats and the populations of species of wild fauna and flora at a favourable status as defined in (e) and (i)…
>
> (e) conservation status of a natural habitat means the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species within the territory referred to in Article 2.
>
> The conservation status of a natural habitat will be taken as "favourable" when:
>
> - its natural range and areas it covers within that range are stable or increasing, and
>
> - the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
>
> - the conservation status of its typical species is favourable as defined in (i);
>
> (i) conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2;
>
> The conservation status will be taken as "favourable" when:
>
> - population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
>
> - the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
>
> - there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis;

3.3.6 As previously mentioned in paragraph 2.1.6, specific

[4] European Council Directive 9/43/EEC on the Conservation of Natural Habitats and of Wild flora and Fauna, upon which the Habitats Regulations are based.

Conservation Objectives do not apply to Ramsar sites.

3.4 Guidance and Supplementary Advice

3.4.1 Guidance and supplementary advice documents have been produced by Natural England for the designated sites which provide a framework that can be used to inform an HRA:

a) Conservation Objectives Supplementary Advice: Produced for each SAC and SPA, each document "presents attributes which are ecological characteristics of the designated species and habitats within a site. The listed attributes are considered to be those that best describe the site's ecological integrity and which, if safeguarded, will enable achievement of the Conservation Objectives"

b) Site Improvement Plans (SIPs): SIPs outline the priority measures needed to achieve and maintain the qualifying species and habitats within a site in favourable condition, based on Natural England's current evidence and knowledge. They:

- Provide an overview of the issues affecting the condition of the site
- Identify the priority actions to address the issues
- Identify the potential funding sources available

3.4.2 SIPs are live documents which are updated as required based on meetings with stakeholders, and once recommended actions are prioritised/carried out.

3.4.3 Reference has also been made to:

a) The National Planning Policy Framework 2021

b) Government guidance for England and Wales: "Habitats regulations assessments: protecting a European site" (https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site)

c) North Somerset local planning policy

d) North Somerset and Mendip Bats Special Area of Conservation (SAC) Guidance on Development: Supplementary Planning Document

4 Scheme Description

4.1 Overview

4.1.1 The following section provides a brief description and overview of the Banwell Bypass and Highways Improvements Project. Reference should be made to *Environmental Statement (ES) Chapter 1 - Introduction* for the Scheme objectives, and *Environmental Statement Chapter 2 - Scheme Description* for the full description.

4.1.2 The Scheme comprises the following distinct elements:

a) a bypass of the village of Banwell (referred to as the "Banwell Bypass");

b) a route connecting the A371 at Castle Hill and the A368 at East Street (referred to as the "Southern Link"); and

c) Mitigation and enhancement measures, which broadly consist of the following:

d) *Environmental mitigation and enhancement measures in connection with the Banwell Bypass and the Southern Link*, examples of which include (but are not limited to) flood compensation areas, planting and habitat creation, attenuation basins etc.

e) *Placemaking improvements within Banwell*, comprising mitigation and enhancement measures to the public realm; and

f) Traffic mitigation in connection with the Banwell Bypass and the Southern Link, including *Improvements to the wider local road network.*

4.1.3 Together, these elements comprise the "Scheme". Each element as listed is described in more detail below.

4.2 Banwell Bypass

4.2.1 The Banwell Bypass would be located within the administrative area of North Somerset. The village of Banwell is located approximately 8km east of Weston-super-Mare. The Bypass would primarily consist of:

a) Signalisation and capacity improvements to the Summer Lane/Wells Lane junctions on the A371;

b) A 40mph single carriageway bypass, connecting the existing A371 (Knightcott Road, east of Summer Lane) to A368 (east of Towerhead Farm);

c) A 3 metre wide walking and cycling route provided along the majority of the Banwell Bypass providing a link from Weston-Super-Mare to Sandford;

d) Banwell Bypass West Junction - a three arm roundabout located east of Knightcott Industrial Estate at the western end of Banwell;

e) Wolvershill Road Junction – a traffic signalised junction, providing access for all users to the west, east, and north. Access to the south would be restricted to public transport and walking, cycling and horse-riders, and limited agricultural access only;

f) Riverside Crossing – an overbridge across Riverside and the River Banwell. There would not be a direct connection between Riverside and the Bypass;

g) A side road connection between Riverside and Moor Road; and

h) Banwell Bypass East Junction - A three-arm traffic signalised junction, with dedicated turning lanes from the bypass towards the Southern Link.

4.3 Southern Link Road

4.3.1 The Southern Link would be located within the administrative area of North Somerset and within the Mendip Hills Area of Outstanding Natural Beauty (AONB). The Southern Link would be a 30mph single carriageway, connecting the A368 (East Street) to the A371 at Castle Hill. The Southern Link would link into the Bypass at the Banwell Bypass East Junction. A T-junction located along the Southern Link would provide access into the east of Banwell (at East Street).

4.4 Mitigation Measures

Environmental mitigation and enhancement measures in connection with the Banwell Bypass and the Southern Link.

4.4.1 The Scheme would include mitigation measures which are provided to offset the impact of the Banwell Bypass proposal. These include (but are not limited to):

a) flood mitigation to ensure that the Banwell Bypass does not increase flood risk for third-party properties;
b) essential environmental mitigation, such as ecology and landscape mitigation; and
c) sustainable urban drainage systems (e.g. attenuation basins and swales), and additional groundwater mitigation, to prevent adverse water quality impacts (including the Source Protection Zone (SPZ)).

Placemaking improvements within Banwell

4.4.2 As a result of the Banwell Bypass and Southern Link, there would be a reduction in traffic through Banwell. The reduction in traffic (and resulting reduction in congestion) through the village could result in higher traffic speeds without mitigation.

4.4.3 A reduced 20mph speed limit through Banwell would discourage vehicles from travelling at higher speeds, whilst also discouraging the use of the road as a through route (instead of the Banwell Bypass and Southern Link).

4.4.4 The reduction of traffic through Banwell due to the provision of the Banwell Bypass and Southern Link provides the opportunity to make improvements to the existing road and public spaces within Banwell to enhance the historic and urban setting of the village. These improvements would include, but are not limited to:

a) Alteration to the road and footways including resurfacing, widening and narrowing (which would encourage drivers to comply with the posted 20mph speed limit);
b) Incorporation of active travel measures;
c) Soft landscaping and ecological improvements; and
d) Street signage improvements.

Improvements to the wider local road network

4.4.5 Improvements to the local road network and junctions including the surrounding villages of Churchill, Sandford and Winscombe are proposed to mitigate increases in traffic as a result of the Banwell Bypass and Southern Link. These mitigation measures would consist of:

a) Lowered speed limits:

- 20mph: A368 through Churchill, A368 through Sandford, A371 through Winscombe.
- 30mph: A368 between Churchill and Sandford Villages.

b) Gateway Features when entering and exiting the villages of Sandford, Churchill and Winscombe;

c) Non-physical traffic calming measures through and between villages (e.g. road markings and speed signage);

d) Capacity improvements to the Churchill Junction (A38/A371);

e) Provision of new / improvements to existing pedestrian and cycling crossings;

f) Active travel measures along the A368, with improved footway/cycleway access from Churchill and Langford to Churchill Academy;

g) Improvements to footways, shared pedestrian, and cycleway; and

h) Soft landscaping, native planting, rewilding, and ecological enhancements.

4.5 Plan of Route

4.5.1 The initial HRA screening carried out by WSP, (March, 2021) took into account three possible route options that were under consideration at that time (Figure 1).

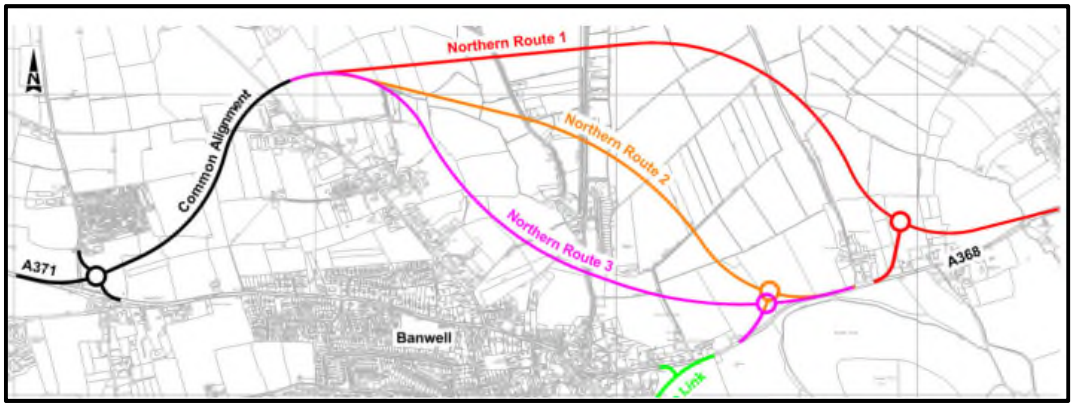


Figure 1: Original Routes Under Consideration for the Scheme

4.5.2 The Preferred Option was published in October 2021 with Route 2 assessed as the most appropriate with some minor variation (Figure 2 - Route of the Banwell Bypass Route). This updated HRA screening therefore considers the chosen route only,

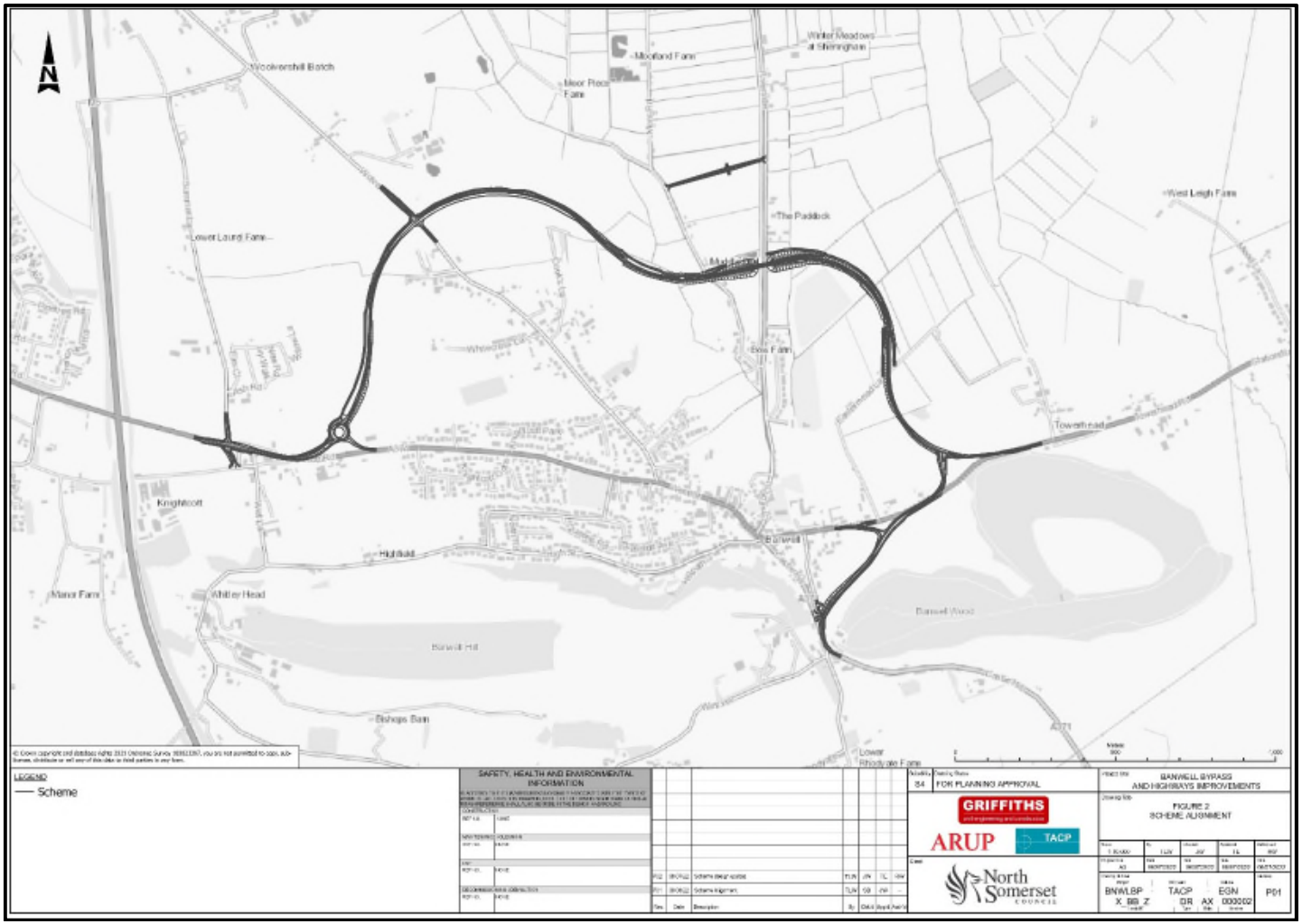


Figure 2: Route of the Banwell Bypass, Preferred Option

5 Stage 1: Screening for Impacts and Likely Significant Effects

5.1 Assessment Methodologies and Assumptions

5.1.1 Referencing Regulation 63(1)(b), the Scheme is not directly connected with or necessary to the management of any of the protected sites listed in Section 1. Consequently, further consideration through the HRA process is required to identify whether Regulation 63(1)(a) applies to the Scheme. That is, whether the Scheme will have a likely significant effect on any of the sites.

5.1.2 For the HRA screening process, the methodology as laid out in the flow diagram of Figure 3.1 within LA115 “Habitats Regulations Assessment” (DMRB) has been followed (Appendix A of this report)

5.1.3 The following information within this section therefore provides a screening assessment of the potential impacts and likely significant effects on the Sites previously listed.

5.2 Relevant European Sites

Zones of Influence for the Scheme

5.2.1 The Zone of Influence (ZoI) of the Scheme is defined by considering the potential negative effects arising from the Scheme and the available pathways for them to reach and affect any of the qualifying features of European Sites.

5.2.2 For this purpose, WSP’s HRA Screening Report was prepared in accordance with the Design Manual for Roads and Bridge (DMRB) guidance LA115 which requires a screening to be carried out for all European sites where the route corridor meets any of the following criteria:

a) within 2km of a European site or functionally linked land[5];

b) within 30km of SACs where bats are noted as one of the qualifying interests;

c) crosses or lies adjacent to, upstream of, or downstream of, a watercourse which is designated in part or wholly as a European site;

d) has a potential hydrological or hydrogeological linkage to a European site containing a groundwater dependent terrestrial ecosystem (GWDTE[6]) which triggers the assessment of European sites in accordance with LA 113.

e) has an affected road network (ARN) which triggers the criteria for assessment of European sites LA 105.

5.2.3 This updated screening has applied the same criteria.

Identified Sites

5.2.4 Eleven sites were originally identified as needing consideration under the above criteria. Given the preferred option for the bypass and referencing the same DMRB criteria, it is confirmed that there are no changes in the number of sites to be included in the updated screening for likely significant effects. The eleven sites included in the HRA screening are presented in Table 1, along with their qualifying features, and how they relate to the Scheme (the Zone of Influence).

5.2.5 The three European Sites covering the Severn Estuary (SAC, SPA and Ramsar) are presented as a single unit as the SPA and Ramsar sites fall within the larger area of the SAC and all share their eastern boundary (nearest the Scheme).

5.2.6 The Somerset Levels and Moors SPA and Ramsar sites are also presented together as they fall within the same boundary.

5.2.7 An overview of each International Site, including known vulnerabilities and threats that may have impact pathways to the Scheme, are included within the Screening Matrices presented in Appendix B. Information was collated from the appropriate

[5] Functionally linked land are areas of land/water occupied by the qualifying interests (species) of a European site that lie beyond the boundary of the site. Such areas support activities such as feeding, roosting and migration
[6] GWDTEs – wetlands which critically depend on groundwater flows or chemistries

Natura 2000 standard data forms (JNCC), Site Improvement Plans (SIPs. NE, 2014 and 2015) and relevant Citation documents (NE).

Table 1: Sites Identified for Inclusion in the HRA Screening (Stage 1)

Site	Qualifying Features	Relationship to Scheme (ZoI)
North Somerset and Mendip Bats SAC	• Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites) • Tilio-Acerion forests of slopes, screes, and ravines • Caves not open to the public • Lesser horseshoe bat (*Rhinolophus hipposideros*) • Greater horseshoe bat (*Rhinolophus ferrumequinum*)	• Within 2km Zone of Influence for direct and indirect impacts. • <30km and bats are present as a primary reason for designation • Relevant SAC components: Banwell (Bones) Caves SSSI (c600m from the western end of the bypass scheme) and Banwell Ochre Caves SSSI (adjacent to the eastern end of the bypass scheme, <50m)
Mendip Limestone Grasslands SAC	• Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites) • European dry heaths • Caves not open to the public • Tilio-Acerion forests of slopes, screes and ravines • Greater horseshoe bat (*Rhinolophus ferrumequinum*)	• 2.5km from the Scheme (<30km) and bats present as a qualifying feature. • Functionally linked to the North Somerset and Mendip Bats SAC. Bats move between the two sites[7].
Mells Valley SAC	• Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)(*Important orchid sites) • Caves not open to the public • Greater horseshoe bat (*Rhinolophus ferrumequinum*)	• c.27.5km (<30km) from the Scheme and bats present as a primary reason for designation. • Functionally linked to the North Somerset and Mendip Bats SAC. Bats move between the two sites.
Bath and Bradford Upon Avon Bats SAC	• Greater horseshoe bat (*Rhinolophus ferrumequinum*) • Bechstein's bat (*Myotis bechsteinii*) • Lesser horseshoe bat (*Rhinolophus hipposideros*)	• c.40km from the Scheme. Bats are present as a primary reason for designation. • Although >30km away, the site is functionally linked to the North Somerset and Mendip Bats SAC. Bats

[7] "European Site Conservation Objectives: Supplementary advice on conserving and restoring site features" for North Somerset and Mendip Bats Special Area of Conservation (SAC), published by Natural England (2019) identifies those additional SACs that are functionally linked

		move between the two sites. Therefore, consideration is given to this SAC
Exmoor and Quantock Oakwoods SAC	• Old sessile oak woods with Ilex and Blechnum in the British Isles • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) • Barbastelle bat (*Barbastellus barbastella*) • Bechstein's bat (*Myotis bechsteinii*) • Otter (*Lutra lutra*)	• 29km (<30km) from the Scheme and bats are present as both primary reason for designation and qualifying feature
Severn Estuary SAC/SPA/Ramsar	• Estuaries • Mudflats and sandflats not covered by seawater at low tide • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Sandbanks which are slightly covered by sea water all the time • Reefs • Sea lamprey • River lamprey • Twaite shad • Wintering/migratory population of Bewick's swan, European white fronted goose, shelduck, gadwall, dunlin redshank, wigeon, teal, pintail, pochard, tufted duck, ringed plover, grey plover, curlew, whimbrel and spotted redshank • Supports over 20,000 waterfowl • important breeding populations of lesser black-backed gulls • Important migratory fish assemblages	• Scheme is <15km upstream from sites designated wholly or in part as a watercourse (5.7km at the nearest point). • Scheme is adjacent to/crosses habitats that may be functionally linked to the European Sites – these habitats potentially offer off-site support of birds and migratory fish that are a cited as qualifying features of the sites.
Chew Valley Lake SPA	• Northern shoveler (winter-autumn passage)	• As birds are a qualifying feature, the SPA is identified as being potentially functionally linked to the habitats through which the Scheme will pass • c.16km at nearest point

Somerset Levels and Moors SPA/Ramsar	• Supports nationally important numbers of wintering Bewick's swan and golden plover • Regularly supports internationally important numbers of migratory teal and lapwing • Regularly supports over 20,000 wintering waterfowl (waterboard assemblage) including nationally important wintering numbers of gadwall, wigeon, and shoveler • 17 species of red data book invertebrates	• As birds are a qualifying feature, both the SPA and Ramsar are identified as being potentially functionally linked to the habitats through which the Scheme will pass. • c.12.5km at nearest point.

5.3 Identification of plans or projects considered for in-combination effects

5.3.1 Chapter 15 of the ES (Cumulative Impacts) considers a range of active and proposed plans and projects as part of the EIA process which can be referred to as required during the HRA process. Information was sourced from:

a) The emerging Local Plan for North Somerset including proposed developments falling the Housing Infrastructure Fund (alongside the Banwell Bypass)
b) Relevant local developments currently under construction
c) Relevant local developments that are currently proposed and under consideration by the local planning authority.

5.3.2 As covered in Section 3.2, it is a requirement of the Habitats Regulations that the plan or project being considered must be assessed for significant effect either alone or in combination with other plans and projects. It is necessary, therefore, to identify the other plans/projects which could result in such in-combination effects with the Scheme. However, if significant effects are identified from the Scheme in isolation, then such an in-combination assessment is not usually required.

5.3.3 That is, in-combination effects are only usually required to be considered where the plan/project under the HRA process has residual and/or non-significant effects which, when considered in relation to an effect from another plan/project the result may result in a significant effect. E.g. water quality effects from the Scheme may impact a site or qualifying feature without being significant by itself, but when considered in-combination with fragmentation effects caused by another plan/project the overall impacts could still be significant.

5.4 Baseline Data

5.4.1 Detailed information regarding baseline survey data is presented within Chapter 8 (the Biodiversity Chapter) of the ES and associated appendices. However, information of relevance is summarised below.

Habitat and Watercourse Surveys

5.4.2 A series of botanical surveys were carried out throughout the 2021 summer season. Earlier Phase 1 surveys had identified general habitat types and further Phase 1 habitat surveys across the wider area, as well as more detailed surveys based on NVC methodology, were then carried out:

a) Woodland surveys were carried out between April-June,

b) Marshy grassland and aquatic habitat were surveyed May to August,

c) Grassland surveys were carried out in June (prior to hay cutting).

5.4.3 In addition, 7.7km of hedgerow was also surveyed to identify species composition, management, and whether they were considered 'Important' under the Hedgerow Regulations 1997.

5.4.4 Most of the habitat surveyed was found to be improved grassland sown with perennial rye/rye grass species, managed for grazing (cattle, sheep and horses) and silage production. Although botanically of limited interest, grazed pasture (particularly cattle grazed) is an important foraging resource for greater horseshoe bats

5.4.5 River corridor surveys carried out during summer 2021 identified the watercourses across the Scheme area (a number of rhynes and the River Banwell) as having a silt substrate to the beds. This suggests that they have a low to negligible likelihood of supporting spawning of any of the Severn Estuary SAC qualifying fish species. The lifecycle of all species listed requires a return to freshwater to spawn with suitable spawning substrate having larger grain particles (sand, gravel, pebbles). Upon hatching the young fry of the two shad species remain in the freshwater for a matter of days/weeks before returning to brackish water. The larvae of the two lamprey species do bury themselves in silt but there needs to be appropriate spawning substrate upstream of the silt areas, which is lacking within the Scheme area. It is reasoned therefore that the watercourses within the Scheme area are not functionally important to the maintenance of these fish populations within the Severn Estuary.

5.4.6 Further, fish surveys carried out on seven watercourses across

the area between 14th and 16th September 2022 (including the River Banwell) did not record any of the Severn SAC qualifying fish species.

Bat Surveys

5.4.7 In regard to development and subsequent LSEs on the SAC, NSC has produced a supplementary planning document (SPD) for guidance on development in relation to the North Somerset and Mendip Bats SAC. This was initially published in January 2018. It was subsequently updated in May 2019 (Version 2.1) by Mendip District Council. The County Ecologist recommended that this is used as best practice.

5.4.8 The SPD identifies a series of "Bat Consultation Zones" where horseshoe bats may be found. The consultation zones are divided into three bands – A, B and C – which reflect the likely importance of the habitat for the bats and the proximity to maternity and other roosts. The recommended survey effort for a development that may impact bats depends on which band it falls into. However, in all Bands, where SAC bats could be adversely affected by a development appropriate mitigation is required.

5.4.9 The Banwell Scheme falls mainly into Band C, with some ingress into Band B at the eastern end (east of the proposed crossing with Riverside, and adjacent to the Banwell Ochre Caves SSSI hibernation site).

5.4.10 Paragraph 6.3 of the SPD States "*For proposals within bands A and B of the Bat Consultation Zone, full season surveys will be needed (unless minor impacts can be demonstrated) and must include automated bat detector surveys*.". While paragraph 6.4 States "*Within band C survey effort required will depend on whether a commuting structure is present and the suitability of the adjacent habitat to support prey species hunted by horseshoe bats*".

5.4.11 As linear features (hedgerows and rhynes) are present throughout Band B and Band C around Banwell, automated bat detector surveys were carried out by the University of the West of England (UWE) across the entire Scheme area (all potential routes) during Winter 2020/21 and Summer 2021. This fulfilled

the need for automated bat detector surveys as required by the SPD in the referenced Paragraph 6.3 and were carried out following the results of a horseshoe bat Habitat Suitability Index assessment completed by WSP as part of a Preliminary Ecological Appraisal in 2020

5.4.12 Alongside the UWE surveys, Geoff Billington of Greena Ecology carried out a series of a radiotracking surveys (on behalf of TACP) of greater and lesser horseshoe bats during the late summer/autumn period of 2021. This was to identify more specifically how they were living in and using the area across the Scheme. Investigations into Barbastelle and Bechstein's bats were also included, as well as research to determine if there was evidence of swarming at the closest underground sites to the Scheme (which could include all *Myotis* bat species, long-eared bats and both horseshoe bats).

5.4.13 Detailed methodology and the results of these surveys are presented within the Chapter 8 of the ES (Biodiversity) and associated appendices.

5.4.14 Survey results did not record any Bechstein's bats, although it is assumed that males could be present in small numbers. Barbastelles were only recorded individually.

5.4.15 Activity by greater and lesser horseshoe bats (foraging and commuting) were recorded across the Banwell area. Core areas of activity (the most sensitive horseshoe flight areas) are shown in figure 3 - Sensitive horseshoe bat flight areas (based on radio tracking data).

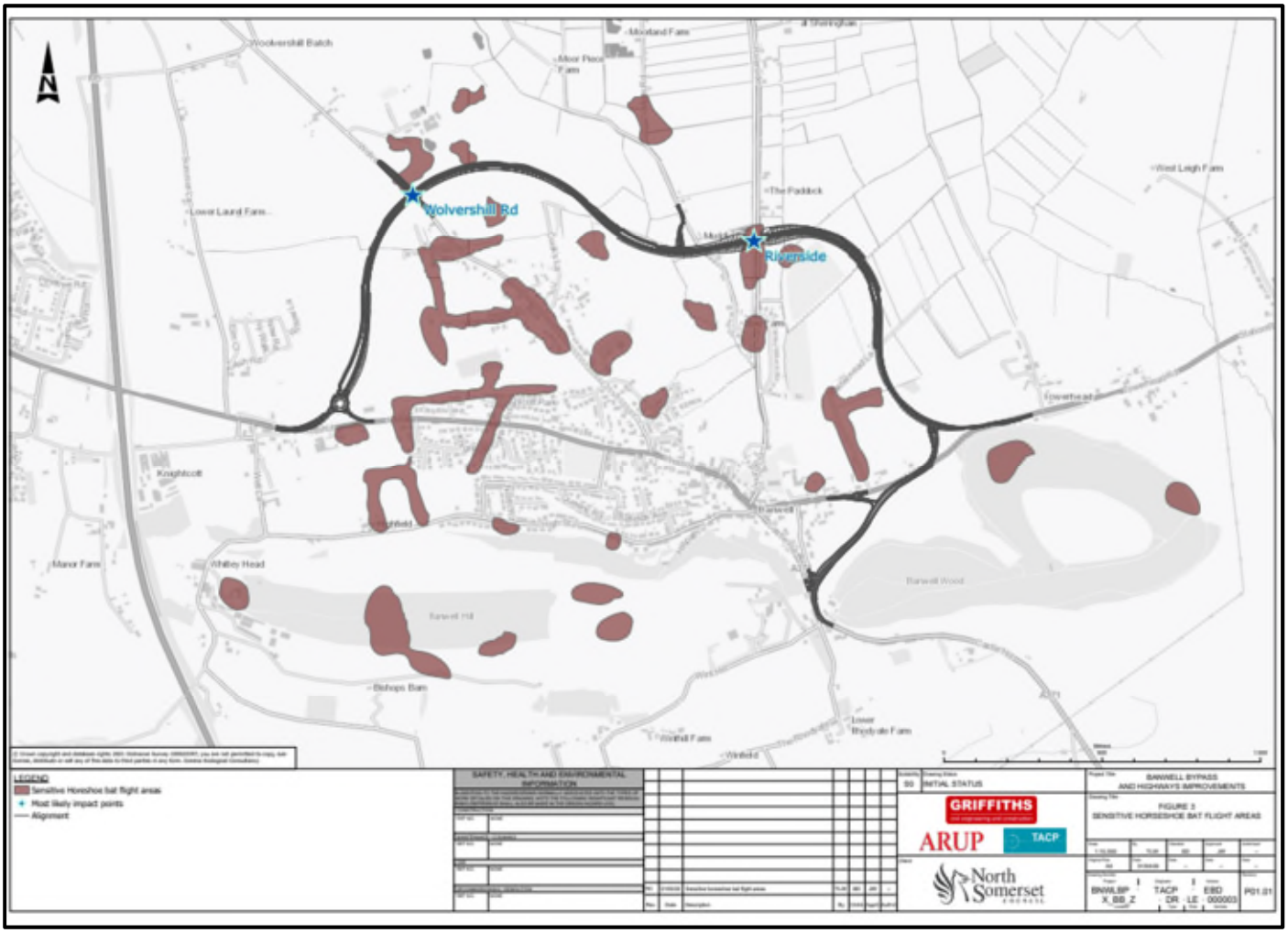


Figure 3: Sensitive horseshoe bat flight areas

5.4.16 In relation to the Scheme the sensitive flight areas most likely to be impacted are those around the Riverside area and where the bypass crosses Wolvershill Road (marked by blue stars in Figure 3).

5.4.17 Surveys (current and previous) also found direct connectivity (in regard to horseshoe bat movement) between the Banwell caves areas of the North Somerset and Mendip Bats SAC and additional areas of the SAC: Brockley Hall (c10km north-east) and the Cheddar Caves complex (c7.5km south-east).

Wintering Birds Surveys

5.4.18 During Winter 2020/21 a wintering bird survey was carried out across the Scheme area by WSP to identify the species present and the extent of use. This was in response to findings of a Preliminary Ecological Appraisal (PEA) completed in 2018 as

part of initial survey works for the HIF funding application.

5.4.19 Work was completed prior to the final alignment of the Scheme having been agreed and, as such, covered a wide area of habitat, beyond the current Scheme's land take.

5.4.20 The survey consisted of 5 transects surveyed monthly, by a team of ornithologists, between October 2020 and March 2021. Survey dates were: 26th October 2020, 18th November 2020, 8th December 2020, 26th January 2021, 17th February 2021 and 17th March 2021. Weather conditions were representative of the season and did not result in a limitation to the data set.

5.4.21 Due to the nature of such surveys being confined to individual days over a single winter season there is the potential for some species to be missed. However, it was considered that the results represented a comprehensive and reliable overview of the wintering bird community present.

5.4.22 A total of 67 bird species were recorded over the course of the winter. Recorded qualifying species for the relevant European sites considered in this HRA are listed within Table 2

Table 2: Qualifying bird species recorded around the Scheme

Species	Site(s) for which it is listed	Numbers recorded
Lapwing	Somerset Levels SPA and Ramsar	3 recorded in survey area on one visit Flock of 40 noted in flight south of Banwell (outside of survey area)
Teal	Severn Estuary Ramsar Somerset Levels SPA and Ramsar	Occasionally seen in small groups (max. 2 at a time). In flight or on watercourses
Gadwall	Severn Estuary SPA and Ramsar Somerset Levels Ramsar	Individuals seen occasionally. In flight or on water courses
Snipe	Somerset Levels Ramsar	Four recorded in December. 1 recorded in January
Lesser black-backed gull	Severn Estuary Ramsar	236 recorded in March, majority as a single flock of 226 North of the solar farm (outside of the current scheme boundary)
Mute swan	Somerset Levels Ramsar	Maximum of 4 individuals recorded during each survey month, associated with River Banwell and adjacent fields

5.4.23 The SPA/Ramsar qualifying species identified were not recorded in important numbers across the site e.g. the maximum number of lapwing recorded consist of 0.1% the wintering numbers present on the Somerset Levels SPA/Ramsar.

5.4.24 Although lesser black-backed gulls occur at numbers equivalent to 5% of the breeding population identified in the Severn Estuary Ramsar, they were recorded outside of the current scheme area.

5.4.25 Evidence collated during the wintering bird survey indicates that although qualifying bird species from the SPA and Ramsar sites do occur within the Banwell area, numbers do not indicate that the Scheme area is of functional importance.

5.5 Identification of the potential impacts of The Scheme

5.5.1 Stage 1 of the HRA Assessment - the screening of the Scheme

- was carried out for this report utilising the DMRB Screening Matrices (Appendix B).

5.5.2 Table 1 summarises the results of the Screening Matrices: the potential impact pathways, whether there could be a Likely Significant Effect (LSE), and which sites could be affected.

5.5.3 Explanations on the identified impact pathways and how and why the identified sites could suffer an LSE are expanded on below.

Table 3: Summary of Screening Matrices

International Site	Qualifying feature or key relationships impacted	Impact Pathways Identified (Construction phase)	Impact Pathways Identified (Operation phase)	Likely Significant Effect
North Somerset and Mendip Bats SAC	Lesser horseshoe bat (*Rhinolophus hipposideros*)	• Disturbance: Noise/vibration during construction – potential for disturbance of hibernating bats • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to land take and lighting • Air quality impacts: Increased dust deposition on adjacent supporting habitat features altering vegetation composition and prey availability	• Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to land take and lighting • Vehicle collision post construction: Death/injury where scheme crosses known flight paths • Air quality impacts: Increased nitrogen deposition on adjacent supporting habitat features altering vegetation composition and prey availability	Yes Potential to undermine conservation objectives by altering the distribution and populations of qualifying species and impacting the structure and function of supporting habitats.
	Greater horseshoe bat (*Rhinolophus ferrumequinum*)	• Disturbance: Noise/vibration during construction – potential for disturbance of hibernating bats • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to land take	• Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due lighting • Habitat Loss: Severance of grazing land and changes in management due to reduced cattle grazing leading to	Yes Potential to undermine conservation objectives by altering the distribution and populations of qualifying species and impacting the structure and function of supporting habitats.

		• Air quality impacts: Increased dust deposition on adjacent supporting habitat features altering vegetation composition and prey availability	reduction of GHS foraging availability • Vehicle collision: Death/injury where scheme crosses known flight paths • Air quality impacts: Increased nitrogen deposition on adjacent supporting habitat features altering vegetation composition and prey availability	
Mendip Limestone Grassland SAC	Greater horseshoe bat (*Rhinolophus ferrumequinum*)	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to land take.	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to lighting • Vehicle collision: Death/injury where scheme crosses known flight paths	Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the distribution and populations of qualifying species and impacting the structure and function of supporting habitats.
Mells Valley SAC	Greater horseshoe bat (*Rhinolophus ferrumequinum*)	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked	Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the

		commuting/foraging habitat due to land take.	commuting/foraging habitat due to lighting • Vehicle collision: Death/injury where scheme crosses known flight paths	distribution and populations of qualifying species and impacting the structure and function of supporting habitats.
Bath & Bradford on Avon Bats SAC	Greater horseshoe bat (*Rhinolophus ferrumequinum*)	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to land take.	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to lighting • Vehicle collision: Death/injury where scheme crosses known flight paths	Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the distribution and populations of qualifying species and impacting the structure and function of supporting habitats.
	Lesser horseshoe bat (*Rhinolophus hipposideros*)	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to land take.	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to lighting • Vehicle collision: Death/injury where scheme crosses known flight paths	Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the distribution and populations of qualifying species and impacting the structure and function of supporting habitats.

	Bechstein's bat (*Myotis bechsteinii*)	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to land take	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due and lighting • Vehicle collision: Death/injury where scheme crosses known flight paths	Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the distribution and populations of qualifying species and impacting the structure and function of supporting habitats.
Exmoor and Quantock Oakwoods SAC	Barbastelle bat (*Barbastellus barbastella*)	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due to land take	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked commuting/foraging habitat due lighting • Vehicle collision: Death/injury where scheme crosses known flight paths	Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the distribution and populations of qualifying species and impacting the structure and function of supporting habitats.
	Bechstein's bat (*Myotis bechsteinii*)	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked	Possibility of functional linkage to North Somerset and Mendip Bats SAC • Habitat fragmentation: Severance of functionally linked	Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the distribution and populations

		commuting/foraging habitat due to land take	commuting/foraging habitat due lighting • Vehicle collision: Death/injury where scheme crosses known flight paths	of qualifying species and impacting the structure and function of supporting habitats.
Severn Estuary SAC/SPA/Ramsar	Qualifying migratory fish species (inc. Sea lamprey, River lamprey and Twaite shad)	Functionally linkage to Site due to watercourses across scheme: • Hydrological effects: Construction pollution impacts - Silt run-off or other pollutants could impact water quality making it less suitable. If water courses across scheme are suitable for breeding, silt run-off could reduce success • Habitat fragmentation: Severance of functionally linked habitat due to culverting of watercourses	Functionally linkage to Site due to watercourses across scheme: • Habitat fragmentation: Severance of functionally linked habitat due to culverting of watercourses	Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the distribution and populations of qualifying species and impacting the structure and function of supporting habitats.
	Qualifying bird species (waders and waterfowl)	Potential for functionally linked habitat across scheme: • Habitat fragmentation: Loss of functionally linked habitat due to land take		Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the distribution and populations of qualifying species and

				impacting the structure and function of supporting habitats.
Chew Valley SPA	Northern shoveler (*Anas clypeata*)	Potential for functionally linked habitat across scheme: • Habitat fragmentation: Loss of functionally linked habitat due to land take		Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the distribution and populations of qualifying species and impacting the structure and function of supporting habitats.
Somerset Levels and Moors SPA/Ramsar	Qualifying bird species (waders and waterfowl)	Potential for functionally linked habitat across scheme: • Habitat fragmentation: Loss of functionally linked habitat due to land take		Uncertain – precautionary principle applies May have the potential to undermine conservation objectives by altering the distribution and populations of qualifying species and impacting the structure and function of supporting habitats.

Habitat Fragmentation and Loss: Functionally Linked Habitats

5.5.4 The Scheme lies immediately adjacent to the North Somerset and Mendips Bats SAC at its eastern end (Banwell Ochre Caves) and c500m from the SAC at the western end of the Scheme (Banwell Caves). Both areas are utilised by hibernating greater and lesser horseshoe bats. Land take for the Scheme's infrastructure may impact how the bats move around the site and wider landscape, and how they utilise functionally linked supporting habitat (e.g. for commuting and foraging). This could indirectly impact the SAC by preventing the ability to maintain/restore populations of qualifying species (as per the Conservation Objectives, refer to section 3.3).

5.5.5 Fragmentation of farmland may result in a reduction in cattle grazing due to severance of access between areas, leading to loss of foraging habitat for greater horseshoe bats.

5.5.6 Inappropriate or additional lighting could also have a fragmentary effect on habitats utilised by bats, particularly those species listed as qualifying features of the SAC as they are known to avoid more highly lit areas.

5.5.7 As Mendip Limestone Grassland SAC, Mells Valley SAC, and Bath and Bradford-on-Avon Bats SAC have been identified as functionally linked to North Somerset and Mendips Bats SAC (horseshoe bats move between the sites), the Scheme may also significantly impact these SACs through altering how bats use the wider landscape. There is also a theoretical linkage for bats between the Exmoor and Quantock Oakwoods SAC and the Banwell area which may suffer a similar impact. The Scheme therefore may impede access between the Somerset and Mendips Bats SAC and the functionally linked sites.

5.5.8 The Scheme is located between three sites designated for migratory over-wintering and on-passage birds: the Severn Estuary SPA/Ramsar to the west, Chew Valley Lake SPA to the east, and the Somerset Levels and Moors SPA to the south. Rivers, rhynes and associated habitat within the Scheme footprint may be utilised as functionally linked, supporting habitat to the designated sites, by qualifying bird species while on passage. Furthermore, the Somerset Levels and Moors SPA/Ramsar is also designated, in part, for internationally important numbers of breeding waders. Reference is made within the Citation8 to the potential for use

[8] http://publications.naturalengland.org.uk/file/4509541668487168

outside of the boundary of the SPA/Ramsar and, as such, there exists such potential for use within the Scheme land take area.

5.5.9 Although there will be no direct impact on the SPA/Ramsar sites, the Scheme may impact the sites indirectly by affecting how qualifying bird species move through the landscape (e.g., by movement being impeded due to new infrastructure or disturbance during the breeding season) resulting in fragmentation effects and negative impacts on the long-term conservation status of the qualifying species.

5.5.10 Finally, there is the potential for the Scheme to affect how migratory fish move through the landscape (utilising the watercourses over which the Scheme will pass), including those listed as qualifying species within the Severn Estuary SAC/Ramsar, e.g. through blocking water flow or silting of river beds[9]

Disturbance: Noise and Vibration

5.5.11 The proximity of the North Somerset and Mendips Bat SAC to the eastern end of the Scheme (c.50m) means that direct disturbance to the qualifying species during and post-construction cannot be ruled out. Noise and vibration may result in direct disturbance to bats both occupying the roosts and moving around the site and across the wider area. Research indicates that road noise may impact bats by reducing foraging frequency. In addition, due to other SACs being functionally linked, indirect impacts may occur to these sites.

Hydrological effects

5.5.12 There is potential for both construction and operation-phase drainage and pollution events leading to a likely significant effect on the qualifying features of the Severn Estuary SAC/Ramsar. These could include silt run off (due to disturbance of silt/soil or during heavy rain/flood events) and accidental oil/chemical spills.

5.5.13 Full details of potential impacts on the River Banwell and local rhyne network, which feed into the Severn Estuary, are presented in Section 13.7 of Chapter 13 of the ES (Road Drainage and Water Environment).

[9] The qualifying fish species spawn in fresh water and need a gravelly substrate. Siltation of a suitable watercourse used by such species can make it unsuitable for spawning and thus have long term negative consequences on their breeding success and population viability.

5.5.14 Chapter 13 specifically states that “the magnitude of impacts in the absence of mitigation is assessed to be moderate adverse. The overall significance of effects when considering sensitivity of receptors is therefore considered to be moderate adverse and is significant.”

Air quality effects

5.5.15 Full information regarding the modelling of Air Quality Effects is presented in Chapter 5 of the ES (‘the AQ chapter’). Consideration was given to dust deposition during construction works, and nitrogen deposition (including ammonia) and particulate matter impacts during the operational phase.

5.5.16 The Affected Road Network (ARN) is within 20m of the Banwell Woods/Banwell Ochre Caves section of the North Somerset and Mendip Bats SAC (having a standalone SSSI designation). Modelling was based on the SSSI as an ecological receptor site.

5.5.17 The AQ chapter identified dust emissions to have a high risk of ecological impacts (presented in Table 5.4 of that chapter).

5.5.18 Modelling indicated particulate impacts up until 2039 would be negligible.

5.5.19 Four transects across Banwell Woods were used in modelling of nitrogen (including ammonia) deposition across the site. Modelling considered both a do minimum scenario (DM, no road change) and do something scenario (DS, Banwell Bypass built) for both the modelled opening year (2024) and design year (2039). This found that overall, there was an increase of >1% of the critical load for the site between the DM and DS scenarios. Where modelling indicates a change of >1% it cannot be presumed insignificant without further ecological consideration (as defined in DMRB LA105).

5.5.20 Each qualifying feature of the SAC (Annex 1 Habitats and Annex 2 Species) were considered in relation to the potential impacts of Air Quality Effects. However, as the entire SAC consists of multiple smaller parts across the North Somerset region, not all qualifying features are present in each part. For the Banwell Ochre Caves section the following applies:

a) The “Tilio-Acerion forests of slopes, screes and ravines” qualifying feature of the SAC is not present within this section therefore will not be impacted.

b) The “semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)” qualifying feature of the SAC is not present within this section therefore will not be impacted.

c) The “Caves not open to the public” qualifying feature of the SAC is present within this section. However, this habitat feature is not sensitive to nitrogen deposition, including ammonia (as per the Air Pollution Information System - APIS).

d) The horseshoe bat features of the SAC are not directly impacted by increased nitrogen deposition, including ammonia (as per APIS).

5.5.21 Consideration was also made on impacts on non-qualifying habitat features within the SAC boundary, and habitat outside of the SAC boundary, which may support the underlying processes that maintain the qualifying species (horseshoe bats) at a favourable conservation status:

a) The dominant supporting habitat outside of the Banwell Woods/Ochre Caves site is improved grassland. This habitat is not considered sensitive to increased nitrogen deposition (including ammonia).

b) The supporting habitat present within the Ochre Caves site is woodland, including an area of semi-natural ancient woodland (predominantly oak, with some ash, beech, hazel and lime). Woodland is sensitive to increased nitrogen deposition (including ammonia). Critical level exceedance impacts on woodland include changes in soil processes, nutrient imbalance, altered composition of mycorrhiza and altered ground vegetation (reduction in diversity of lower plants and forbes, increase in grass cover in favour of nitrogen-favouring species but lower grass species diversity). Changes in vegetation may lead to changes in invertebrate prey which could impact the horseshoe bat features. Changes in the supporting woodland habitat may therefore lead to a significant effect on the SAC due to consequential (indirect) impacts on the horseshoe bat features.

5.6 Screening Conclusion

5.6.1 Taking into account the findings of the screening matrices (refer to Table 2) and revising them through the consideration of the species/habitat survey data (refer to Chapter 8 on Biodiversity and associated survey reports within the appendices) and Air Quality modelling (Chapter 5 and associated appendices), the conclusions of the screening are presented in Table 4.

5.6.2 An Appropriate Assessment (AA) is required where the screening identified a likely significant effect on a site, or where the precautionary principle applies. A statement to inform an appropriate assessment is therefore presented in Section 6.

Table 4: Screening Conclusions

International Site	Likely Significant Effect?	Reasoning
North Somerset and Mendip Bats SAC	Yes, in the absence of mitigation	• Fragmentation of horseshoe bat commuting/foraging habitat through land take and lighting. • Loss of grazed pasture as foraging habitat due to changes in land management post-construction • Potential for collisions between bats and traffic • Potential for reduced air quality during both the construction phase (dust deposition) and the operational phase (nitrogen deposition, including ammonia) to impact supporting functions
Mendip Limestone Grassland SAC	Uncertain – precautionary principle applies	Functional connectivity between this SAC and North Somerset and Mendip Bats SAC presumed: • Fragmentation of horseshoe bat commuting/foraging habitat through land take and lighting • Potential for collisions between bats and traffic
Mells Valley SAC	Uncertain – precautionary principle applies	As above
Exmoor and Quantock Oakwoods SAC	No	Any effect on the integrity of the Exmoor and Quantock Oakwoods SAC via impacts on functional habitat used by qualifying species is considered negligible as: • There is 26km at the nearest point between the Exmoor & Quantock Oakwoods SAC and the North Somerset & Mendips Bats SAC • Bechstein's bats (qualifying species) not recorded at Banwell. In addition, Bechstein's typically do not travel significant distances (typically <2.5km). • Barbastelle's bats (qualifying species) recorded as individuals only. Unlikely to be associated with Exmoor and Quantock Oakwoods due to distance (typically travel <20km) • Both qualifying species are woodland dependent and, referencing aerial photographs, there is minimal woodland connectivity between the Exmoor and Quantock

		Oakwoods and the Banwell sites/North Somerset & Mendip Bats SAC. • The M5 has the potential to act as a barrier to movement
Bath & Bradford on Avon Bats SAC	Uncertain – precautionary principle applies	Functional connectivity between this SAC and North Somerset and Mendip Bats SAC presumed due to: • There being 21km at the nearest point between the Bradford & Avon Bats SAC and the North Somerset & Mendip Bats SAC. Within recorded flight distances of Greater Horseshoe bats. • A significant amount of woodland connectivity between the Bradford & Avon Bats SAC and the North Somerset & Mendip Bats SAC increasing potential for flight. • No motorway acting as a potential barrier to movement Resulting (potential) impacts • Fragmentation of horseshoe bat commuting/foraging habitat through land take and lighting • Potential for collisions between bats and traffic
Severn Estuary SAC	Uncertain – precautionary principle applies	Functionally linkage to Site due to watercourses across scheme: • Hydrological effects only: Construction pollution impacts - Silt run-off or other pollutants could impact water quality.
Severn Estuary Ramsar	Uncertain – precautionary principle applies	Functionally linkage to Site due to watercourses across scheme: • Hydrological effects only: Construction pollution impacts - Silt run-off or other pollutants could impact water quality.
Severn Estuary SPA	No	• Surveys indicate scheme area is not significant for qualifying species.
Chew Valley SPA	No	• Qualifying species not present in scheme area
Somerset Levels and Moors SPA	No	• Surveys indicate scheme area is not significant for qualifying species
Somerset Levels and Moors Ramsar	No	• Surveys indicate scheme area is not significant for qualifying species

6 Stage 2: Statement to Inform the Appropriate Assessment

6.1 North Somerset and Mendips Bats SAC.

Conservation Objectives for Greater Horseshoe Bats

6.1.1 Overarching Conservation Objectives for the SAC and associated qualifying features, as presented in the site citation, have previously been stated in Section 2. Natural England's "European Site Conservation Objectives: Supplementary advice on conserving and restoring site features" for the SAC expands on these objectives to provide specific means of maintaining the favourable conservation status of the qualifying features.

6.1.2 Referencing the sections of Table 5 of NE's supplementary advice document which are of specific relevance to the Scheme, the favourable conservation status of this qualifying species will be maintained where:

a) The supporting off-site habitat flightlines from the roost into surrounding habitat and foraging areas are maintained: The presence, structure and quality of any linear landscape features which function as flightlines for greater horseshoe bats between the SAC and surrounding foraging areas are maintained. Flightlines should remain unlit, functioning as dark corridors. (Maintaining the structure/function of supporting habitat)

b) The supporting off-site foraging habitat is maintained: Any core areas of feeding habitat outside the SAC boundary that are critical to greater horseshoe bats during their breeding and hibernation periods are maintained. (Maintaining the structure/function of supporting habitat).

c) The feature's ability and that of its supporting habitat, to adapt or evolve to wider environmental change, within or external to the site, is maintained. (Supporting processes on which the feature and/or supporting habitat relies)

Assessment of Effects

Habitat Loss (Land Take)

6.1.3 The land take for the Bypass Scheme is approximately 50Ha. This is inclusive of land for mitigation, including 7.7Ha of additional land that has been incorporated into the Scheme specifically for horseshoe bat mitigation, following discussion with Natural England (NE) after the submission of the planning application. The habitat present is

predominantly improved grassland with a small amount of poor semi-improved grassland (estimated 6Ha) delineated by hedgerows. Several rhynes and ditches also cross the site. Land management is a mix of grazing (cattle, sheep and horses) and silage leys. Hedgerows are managed by mechanical means (refer to Chapter 8 for habitat information). This habitat is suitable for greater horseshoe bat foraging and commuting.

6.1.4 4.2Ha of the land take (8.4%) will be permanently lost to road surface at the operational stage. Referencing the Advanced Bat Surveys Technique (ABST) report greater horseshoe bats were recorded to range between 2.4km and 10km. Taking the smaller distances as a reference this creates a potential foraging area of 24.63km^2 around either Banwell Caves or Banwell Ochre Caves (the roosts acting as the central point). This is equivalent to 2463Ha. Therefore, in this instance 4.2Ha of land permanently lost to road surface would be equivalent 0.17% of potential foraging. Although this figure appears negligible it relies on an even distribution of activity across the potential foraging areas with all habitat having an equal importance as a foraging resource. In terms of food resources this is not typically the case and the ABST report identified that most activity occurred approximately in an area 1km north of Banwell to 1.5km south of the village with particularly sensitive areas of activity along the proposed Bypass route identified at its crossing with Wolvershill Road and at its crossing along Riverside/the River Banwell.

6.1.5 Static Bat Surveys carried out by UWE showed that spatial distribution of horseshoe bat activity was uneven with peak activity at the eastern end of the Scheme around Banwell Woods and across Castle Hill (around the position of the new Southern Link). Remaining distribution was spread relatively evenly along the proposed bypass route (Figure 3.1.1.4 of the Static Bat Survey report).

6.1.6 In addition of the permanent loss of 4.2Ha of habitat, there would also be temporary loss of habitat during construction works, which would be later reinstated. Assuming a worst-case scenario of all of the remaining c.46Ha being temporarily lost, this equates to c.1.07% of the potential available foraging area (using the same figures as in 6.1.4). With surveys showing higher spatial distribution of horseshoe bats along the Scheme route, the temporary loss of habitat has the potential to have greater negative consequences than if distribution was more even.

6.1.7 The permanent loss of 4.2Ha of foraging habitat is unlikely to be significant on its own. However, in combination within the temporary habitat loss of the

rest of the Scheme area, the known ecology of greater horseshoe bats (and their sensitivity to habitat change), and with the results of the ABST and UWE surveys in mind, presumed impacts are considered to be higher.

6.1.8 Due to the above, the effects of the habitat loss on greater horseshoe bats *without mitigation* are assessed to be moderate-severe and, as such, will likely undermine the conservation objectives of the North Somerset and Mendip Bats SAC.

Grazing Reduction

6.1.9 Besides permanent habitat loss, the severance of pasture by the Scheme has the potential to reduce the amount of grazing occurring with the Banwell area, due to increased difficulty in moving cattle between the severed land parcels. A reduction in grazing would result in a corresponding reduction in animal dung in these areas and therefore a reduction in dung beetles (and potentially cockchafers if land parcels become overgrown).

6.1.10 Although horseshoe bats rely heavily on moths as a food source, dung beetles and cockchafers are an important food resource for greater horseshoe bats, primarily between April and June. UWE's bat surveys recorded peak activity for greater horseshoe bats in June (Fig 4.3 of the UWE report) therefore a reduction in these dung beetles (due to reduced grazing) may have a significant impact on the bat's morbidity.

Severance of Linear Features

6.1.11 It has been identified that 4.76km of hedgerow will be lost due to the Scheme. Furthermore, several rhynes/drainage ditches will be culverted. Greater horseshoe bats are a low flying species, with a directional echolocation call that does not allow the species to "see" at a distance. They therefore rely on linear features such as hedgerows and drainage ditches/rhynes with well vegetated banks to guide them around the landscape.

6.1.12 There is a proven link between Brockley Hall maternity roost and the Banwell hibernation roosts. Fragmentation and severance of features will alter flight patterns, potentially limiting the range of this species and/or severing connectivity between the Banwell parts of the SAC, Brockley Hall to the North and, potentially and other areas of the SAC to the East (e.g. Cheddar Gorge Caves).

Traffic Collision Risks

6.1.13 As much of the road is to be built on an embankment, there is also the potential for greater horseshoe bats to follow the line of the embankment upwards leading to them crossing the carriageway at road height, risking collision with vehicles. (Alternatively, they may be deterred from crossing entirely with the embankment acting as a barrier, in which case a contraction of their foraging range around the hibernation roosts may occur.)

Increased Lighting

6.1.14 Information on lighting within the Banwell area – both current and proposed - is presented in the Lighting Strategy Technical Note (Ref BNWLBP-ARP-HLG-XXXX-TN-CH-000001) with the Appendices of the Technical Note showing existing lighting overlaid with proposed additional lighting (the latter also visible in the Scheme's General Arrangement drawings).

6.1.15 Proposed lighting changes are as follows:

a) New lighting to be included around the new Western junction/roundabout of the proposed Bypass (off Knightcott road)
b) New lighting to be included at the signalised junction between the Bypass and Wolvershill road (at the North West end of the junction)
c) Several lighting columns are to be removed at the Eastern end of the Scheme along the southern link Banwell Village Junction i.e. a reduction in lighting at this end,
d) No new lighting is proposed at the Eastern end of the bypass or around it's junction with the A368
e) The current lighting will be extended slightly south along the A371 near Banwell Castle. However, two lighting columns will be removed from Castle Hill therefore total length of lighting in this area will remain the same

6.1.16 The lighting strategy has been designed to avoid lighting the entire scheme so to protect the ecological value of the surrounding area, conserve dark skies and minimise the carbon impact of the Scheme. Decisions to provide additional lighting at the Western Junction (Knightcott Road) and the Wolvershill Road junction have been driven by the need for road safety in these areas.

6.1.17 However, the proposed additional lighting at the new Knightcott Road roundabout/junction and the Wolvershill junction still have the potential to negatively impact greater horseshoe bats in the area. Particularly as the

Wolvershill junction area was identified during the bat surveys for the Scheme as being particularly sensitive.

6.1.18 Considering the above, the additional lighting within the Scheme design, or (alternatively) the use of lighting during night-based construction works, will likely cause disturbance to greater horseshoe bats (as a species particularly sensitive to excess lighting) which can result in behaviour akin to that caused by direct habitat severance.

Noise/Vibration

6.1.19 Excavation and associated construction works adjacent to the hibernation sites during the winter months could lead to disturbance caused by increased noise/vibration. This can result in increased periods of wakefulness using up essential fat stores and reducing winter survival rates.

Air Quality: Construction Phase

6.1.20 The ES Chapter on Air Quality (Chapter 5) identified there to be an overall high risk of ecological impacts from dust during the construction, without appropriate mitigation.

6.1.21 Dust deposition would not have a direct impact on greater horseshoe bats. However, indirect impacts may occur due to impacts on vegetation leading to declines in associated invertebrates. Specifically, moths form the largest part of greater horseshoe bat's diet, predominantly Noctuid species such as large yellow underwing, small yellow underwing, heart and dart and dark arches. The larval food plants of these species consists mostly of common grasses, bramble, nettle, dock, ribwort plantain and other 'weed' species. Dust deposition disrupts photosynthesis, reducing plant vigour which may then lessen the available food resources for noctuid larvae ultimately leading to lower numbers of the adult moths and reduced foraging resources for Greater Horseshoe bats.

6.1.22 However, dust deposition from the construction phase would be temporary (recovery occurs with dust removal, e.g. washed away by the rain). Furthermore, the plants species that support the dominant prey larvae are extremely common/widespread, as well as robust, and would likely recover quickly from impacts, although there may be a lag time in the recovery of the associated moth larvae. However, based on the temporary nature of dust deposition and associated vegetative impacts, significant impacts on greater horseshoe food resources are considered unlikely. Resultingly the

risk of long-term negative impacts on the greater horseshoe bat population will likely be low.

6.1.23 However, although low, in combination with other factors associated with the Scheme, there is still the potential to undermine the conservation objectives of the SAC without appropriate mitigation.

Air Quality: Operational Phase

6.1.24 As identified through the screening process, direct impacts on greater horseshoe bats from increased nitrogen deposition (including ammonia) are not predicted (refer to para 4.5.20). Furthermore, the dominant supporting/foraging habitat for greater horseshoe bats outside of the SAC boundaries (Banwell Woods/Ochre Caves and Banwell Bone Caves) is improved grassland, which is not sensitive to nitrogen deposition (as per the Air Pollution Information Service, APIS). Therefore, indirect impacts on greater horseshoe bats because of habitat impacts outside of the SAC boundaries influencing food availability are not predicted.

6.1.25 Therefore, the potential for increased nitrogen (including ammonia) to indirectly impact greater horseshoe bats is limited to deposition effects within the woodland habitat of Banwell Wood[10].

6.1.26 In terms of nitrogen deposition, the critical load for woodland is 10 kg N ha-1 yr-1. The critical load is calculated based on the sensitivity of ground flora and above this level, changes in species diversity is likely to occur. Referencing the AQ Chapter, the 2018 baseline measurements across the 4 transects varies between 33.9 kg N ha-1 yr-1 and 53.9 kg N ha-1 yr-1 with the higher values near the current alignment of the A368/Towerhead Road. Projections up to 2038 show an increase in nitrogen deposition in both the DM and DS scenarios, however the DMRB stipulates that where the difference between the DM scenario and DS scenario is greater than >1% of the critical load that the effect cannot be assumed to be insignificant without further biodiversity assessment

6.1.27 The percentage changes are summarised as follows:

a) In 2024 (opening year)

- Transect 1 – Exceeds 1% in opening year across all 22 transect points.
- Transect 2 – Does not exceed 1% in opening year, and half of the transect shows a decline in nitrogen deposition (due to the

[10] Within 200m of the Affected Road Network)

alignment of the A368/Towerhead Road being moved away from the woodland)

- Transect 3 – Does not exceed 1% in opening year across all transect points.
- Transect 4 – Does not exceed 1% in opening year across all transect points.

b) In 2039

- Transect 1 – Exceeds 1%
- Transect 2 – Does not exceed up to 9th point (first 7 shows decline), remaining points exceed (maximum 2%)
- Transect 3 – Exceeds 1% at all points, but maximum is 1.6%
- Transect 4 – Exceeds but maximum is 1.6%

6.1.28 Although by 2039 projections show an increase >1% along all transects it cannot be assumed to have negative impacts (via indirect means) on the Greater Horseshoe bats without further analysis.

6.1.29 The current recorded nitrogen deposition in the woodland within 200m of the ARN is already at a level where ground flora composition will have shifted away from species that require low nitrogen levels. Although projected increases between the DM and DS scenarios are >1% than the Critical Load, the actual real term change is less than 0.2% increase in nitrogen deposition (kg N ha-1 yr-1) across the majority of transect points between the DM and DS scenarios at opening year (2024) and 0.6% or less over the majority of transect points in 2039 (Tables 7 and 8 in Appendix 5.F). As such significant additional changes in ground flora are not predicted.

6.1.30 However, if additional changes do occur, they may result in a further reduction in forb diversity and an increase in graminoid species cover in those areas of highest deposition (with the overall diversity of plant species declining, and nitrogen loving species dominating) which, as with dust deposition, may. lead to declines in associated invertebrates used by greater horseshoes as a food resource.

6.1.31 Assessing this further, as covered in paragraph 5.1.20, moths form the main part of the greater horseshoe bats' diet. In addition, cockchafers and dung beetles are a highly important secondary prey during April-June, while smaller prey items such as caddis fly and ichneumonids are taken throughout the year when other sources aren't available.

6.1.32 Changes to woodland ground flora within 200m of the ARN will not impact the availability of cockchafers and dung beetles, which are associated with pasture and grazing animals. Impacts to ichneumonids and caddis fly availability are also not predicted due to ecology and habitat preferences. Consideration is therefore given to whether any changes will impact moths as a food resource within the woodland, and if any potential changes will have a significant impact on the greater horseshoe bats.

6.1.33 Available evidence indicates that increased nutrification (higher nitrogen deposition) results in a decline in those moth species with larval host plants dependent on low nitrogen levels. However, moths with larval food plants that do well in high-nutrient (nitrogen) conditions have been found to increase in numbers[11].

6.1.34 As further mentioned in 5.1.20, the moth species that most commonly occur in greater horseshoe bats' diet have larva that feed on a range of common grass and 'weed' species. Listed food plants such as bramble, dock and nettle thrive in higher nitrogen environments.

6.1.35 With that in mind, if changes in nitrogen deposition in the woodland within 200m of the ARN result in further changes in the ground flora species composition, although there may be a corresponding change in moth species composition, total prey availability is unlikely to change significantly.

6.1.36 When considering the above, an increase in nitrogen deposition at the levels modelled by the AQ chapter is not predicted to have a significant effect on greater horseshoe bat food resources within Banwell Woods and therefore a significant effect on the greater horseshoe bat qualifying feature is considered unlikely.

Summary of Effects: Greater Horseshoe Bats

6.1.37 The following impact effects have been considered:

a) Habitat loss (land take)
b) Grazing reduction
c) Severance of linear features
d) Traffic collision risks
e) Increased lighting

[11] Fox et al (2014) Long-term changes to the frequency of occurrence of British moths are consistent with opposing and synergistic effects of climate and land-use changes. Journal of Applied Ecology. 51:4. 949-957

f) Noise/vibration
g) Air quality: construction phase
h) Air quality: operational phase

6.1.38 When considering the above and taking the Conservation Objectives for greater horseshoe bats and the associated supplementary advice into account, it is concluded that in the absence of mitigation the Scheme will have an adverse impact on the integrity of the greater horseshoe bats as a qualifying feature of the North Somerset and Mendip Bats SAC.

Mitigation

Habitat and Connectivity

6.1.39 As per the Screening Stage of this document the habitat around Banwell has been identified as functionally linked to the North Somerset and Mendip Bats Special Area of Conservation (SAC). It provides connectivity for commuting, as well as habitat for foraging, for the greater horseshoe bats that are a qualifying feature of the SAC and utilise the SAC hibernation roosts at Banwell Ochre Caves and Banwell Bone Caves.

6.1.40 The primary aim of the proposed bat mitigation for the scheme is to retain this connectivity between the SAC hibernation roosts in Banwell, the wider landscape, and other parts of the SAC. A secondary, but equally important, aim is to ensure that local foraging resources are maintained across the Banwell area through replacing lost habitat and managing new, retained and replacement habitat in a way that benefits the horseshoe bats.

6.1.41 This is to be achieved by:

- Maximising the land take of the scheme for habitat mitigation (habitat retention, re-instatement, enhancement and creation).
- Appropriate mitigation design, referencing the habitat prescriptions in the North Somerset and Mendip Bats SAC Supplementary Planning Document.
- Retention of linear connectivity through careful design and planning.
- Utilising the Habitat Evaluation Procedure of the SPD to ensure that the total habitat mitigation area being provided for bats long-term, adequately replaces that lost. It includes taking into account the

risks associated with delivering a functional offset and the timing of potential impacts.

- Utilising a phased approach to mitigation creation to ensure temporary habitat loss during the construction phase (from soil storage, compounds etc) is balanced by early mitigation provision.

- Development of a long-term management plan to ensure the mitigation will continue to be suitable for horseshoe bats in perpetuity.

Maximising Land Take

6.1.42 To maximise land availability for habitat mitigation, the land take of the Scheme (including the additional 7.7Ha, especially for bat mitigation, added through the amendments to the Scheme submitted to the LPA in December 2022,) has incorporated full fields, rather than fragmenting fields. This also allows for appropriate future management. Altogether, there is over 42Ha of land within the redline boundary proposed for essential mitigation.

Mitigation Design

6.1.43 Annex 6 of the SPD provides information on standard habitat prescriptions that can be used as replacement habitats both within development sites, or off-site: This consists of:

- Grazed pasture – either newly created or enhancement of existing.

- Creation of species rich grassland, managed to produce a long sward which will support Noctuid moths.

- Woodland

- Hedgerows, which act as a commuting structure and provide feeding perches for greater horseshoe bats. They should be 3-6m wide and 3m high. Trees incorporated into hedgerows increase moth abundance.

6.1.44 With reference to this the following is proposed, and will be developed further during the detailed design stage and through the future Management Plans:

6.1.45 **Grazed pasture**: 17.3Ha of mitigation land will be grazed which includes

land parcels along the Scheme which will be planted with Species Rich Grassland. Pasture will be enhanced for greater horseshoe bats through a combination of increased plant species diversity (through the species rich grassland planting) and through the introduction of a conservation grazing regime. Grazing has been shown to have a detrimental effect on moth abundance (as referenced in Annex 6.2 of the SPD), as does a lower plant diversity. Therefore, the aim of introducing a conservation grazing regime and to incorporate species rich grassland planting, is to reduce current grazing pressure and allow a diversification in sward structure and species composition. This in turn will result in an associated increase in Noctuid moths (Noctuid moths being the primary food source of greater horseshoe bats). Maintaining the presence of grazing animals will also ensure the retention of dung beetles which are an important food resource for greater horseshoe bats in spring and early summer (April-June).

6.1.46 Over 3.6Ha of this grazing pasture is additional land at Eastermead Lane, identified as a key foraging area near Banwell Woods. This is a recent addition to the Scheme, brought into the design through the amendments to the Scheme submitted to the LPA in December 2022 as a result of discussions with Natural England (NE). This land will be immediately available, with enhancement measures instigated prior to construction works commencing.

6.1.47 **Species Rich Grassland**: The Scheme mitigation includes the creation of additional ungrazed species rich grassland and seasonal wet meadows. (Species rich grassland and seasonal wet meadows will total 40Ha, inclusive of the grazed species rich grassland referenced in 6.1.45). These areas will provide enhanced botanical diversity leading to an associated increase in invertebrates (particularly moths where the sward is kept long for much of the year), providing a feeding resource for greater horseshoe bats.

6.1.48 **Woodland, Scrub and Woodland Edge**: 7.1Ha of planting for new woodland, scrub and woodland edge habitat will be incorporated into the scheme. This includes 0.4Ha of additional woodland edge planting along the A368 at the eastern end of the Scheme (east of the Eastern Junction to Christmas Tree farm) to thicken out the current roadside hedgerow. This has been identified as a key crossing point for greater horseshoe bats dropping out of Banwell Woods and has been incorporated into the Scheme through the amendments submitted to the LPA in December 2022.

6.1.49 **Hedgerows**: 3.4km of hedgerow will be retained and enhanced through

infilling with a range of diverse native species. Relaxation of the current mechanical management regime will allow hedges to grow out and also result in biodiversity enhancement. Additional hedgerow planting, incorporating trees (including standards at identified crossing points), amounting to 10.3km has also been included in the mitigation proposals to recreate/replace, maintain and further enhance connectivity. This is more than double the amount of hedgerow to be lost.

6.1.50 **Additional Habitat:** Attenuation ponds and flood compensation areas will form part of the infrastructure mitigation and drainage design for the bypass. However, aquatic and wetland habitats support populations of craneflies and other invertebrates which greater horseshoe bats typically rely on more heavily into the Autumn months. Ponds also provide a drinking resource for greater horseshoe bats.

Retention of Linear Connectivity

6.1.51 Pre-construction and ongoing monitoring surveys will be carried out, to ensure all active flight routes have been identified and any changes in patterns of use are recognised (to allow dynamic mitigation/management responses). The survey strategy has been developed with reference to Berthinussen a. & Altringham j. (2015) "*Development of a cost-effective method for monitoring the effectiveness of mitigation for bats crossing linear transport infrastructure. Defra report, wc1060*" and incorporates both manned and static surveys.

6.1.52 The removal of any sections of hedgerows to facilitate construction will be immediately followed by the erection of Heras fencing, incorporating debris netting or similar. This will be installed alongside retained hedgerows, crossing any gaps outside of day-time working hours, to maintain connectivity and facilitate greater horseshoe bat foraging and commuting. This will be on a temporary basis until new linear features (hedgerows, woodland edge etc) and associated connectivity mitigation has been established. Where feasible, dead hedging will be used as an alternative to Heras fencing.

6.1.53 Where construction space is limited, additional temporary measure would be considered, such as the erection of telegraph poles to provide hop over opportunities, in advance of planting as appropriate

6.1.54 As referenced in Paragraph 6.1.49 mitigation for the Scheme includes the retention and enhancement of hedgerows with new hedgerow planting and enhancement of retained hedgerows. This will improve their suitability as

linear features for commuting and foraging greater horseshoe bats (enhanced plant diversity increases invertebrate prey diversity).

6.1.55 A single span bridge will take the bypass over the River Banwell between chainage 1900 and 2000, allowing continued free movement by greater horseshoe bats (and other species) along this watercourse.

6.1.56 The rhynes which the bypass crosses will be culverted. Appropriately designed and sized culverts have been shown to be effective at offering safe flightlines for bats beneath roads[12]. This will retain functional linkage along these features. The following are incorporated into the Banwell Bypass design:

a) A box culvert for Wallymead Rhyne (W), between chainage 500 and 600 (2.8m high x 5m wide), with directional planting.
b) A box culvert for Wallymead rhyne (E) at chainage 1380 suitable for bats (3.6m height x 4m wide), with directional planting.
c) Culverting of Old Yeo Rhyne, suitable for horseshoe bats at chainage 1770 (box culvert of 3.4m heigh x 6.7m wide)
d) A box culvert for East Mead Rhyne around chainage 2310

6.1.57 Where it is not possible to install culverts to facilitate safe crossing under the road, hopover planting has been incorporated into the Scheme, including at key points at Knightcott Road, Wolvershill Road, Towerhead Road and along the new Southern Link (refer to EMPs). Directional planting, incorporating the enhanced and new hedgerow features already mentioned, will be used to direct horseshoe bats towards culverts and hopovers to encourage safe crossing of the bypass and avoid them following the line of the embankment over the road or crossing at road level.

6.1.58 Functional connectivity will therefore be maintained across the wider landscape, including between the Banwell hibernation roosts and the maternity roost at Brockley Hall, through the careful structural design, appropriate management through the construction phase, retention of and bat-appropriate management of hedgerows (and woodland), and maintaining and increasing their linkage into the wider network of existing hedgerows.

12 Berthinussen A, Altringham J (2012) Do Bat Gantries and Underpasses Help Bats Cross Roads Safely? PLoS ONE 7(6): e38775. doi:10.1371/ journal.pone.0038775
Davies, J. G. (2019) Effectiveness of mitigation of the impacts of a new road on horseshoe bats Rhinolophus ferrumequinum in Wales, UK. Conservation Evidence. 16. 17-23.

SPD Habitat Evaluation Procedure (HEP)

6.1.59 The SPD presents a methodology for calculating the amount of habitat required to mitigate for that lost to the horseshoe bat population due to development. As per Annex 5 of the SPD it is "based on the requirements for maintaining that needed to support viable populations" i.e. the purpose is to ensure that any habitat impacts are fully mitigated for, thus avoiding undermining the conservation objectives of the SAC and preventing a Significant Effect, as considered under the Habitat Regulations.

6.1.60 The HEP calculation has two stages. Stage 1 is a Habitat Loss Calculation to identify the minimum amount of replacement habitat required to replace that lost to the greater horseshoe bats through the development. This first calculates a Habitat Suitability Index score then multiplies it by a density band score (which is dependent on roost proximity and if the habitat is used for foraging, commuting, both or neither) and the area of habitat. This results in a number of "Habitat Units". The total number of Habitat Units is then divided by 18 to produce the minimum replacement hectarage of habitat. The matrices for this Calculation are presented in Table 6 of Appendix C.

6.1.61 Stage 2 is a similar calculation carried out on the proposed mitigation habitat. However, delivery and temporal risk multipliers are applied to account for the fact that the functionality of the mitigation habitat may not be achieved for several years, as explained in paragraph A5.42 of the SPD:

"...A5.42 In delivering the replacement habitat there may also be an issue or risk with delivering a functional offset and the timing of the impact. A loss in biodiversity would result and there could potentially be a risk to maintaining a species population during the intervening period even though it would recover in time. Therefore, it is important and desirable that where feasible replacement habitat is in place and functional just before development commences on site. However, functionality may not be achieved until several years after replacement habitat has been created and there is a risk that it may fail due to the difficulty in recreating or restoring. To account for these possibilities Fraction Multipliers are used. These are usually applied only once to the calculation for the value of the habitat lost to horseshoe bats..."

6.1.62 For the purposes of Stage 2, mitigation within 20m of the carriageway has been excluded from the calculation to account for possible noise and lighting impacts at the operational stage which may reduce

foraging/commuting in this area (i.e. a mitigation buffer has been applied). Further, any mitigation initially designed for reasons not related to horseshoe bats (e.g. dormouse mitigation, landscaping/visual mitigation, flood mitigation etc) has also been excluded to ensure adherence to the concept of Additionality. It should be noted that although excluded from the calculation, all habitat outside of the mitigation buffer is suitable for horseshoe bats and provides a range of connectivity and foraging opportunities. The matrices for Stage 2 of the HEP calculation are provided in Table 8 of Appendix C.

6.1.63 It is essential that the results from Stage 2 are equal to or greater than the results from Stage 1, to ensure that enough replacement/enhanced habitat is being provided. The results from Stage 1 of the calculation show that a minimum of ***13.31Ha*** of useable/accessible habitat is required within the red line boundary of the Scheme as mitigation for the greater horseshoe bats. The results for Stage 2 of the calculation shows that the total mitigation habitat being provided is ***17.31*** *equivalent hectares* which is more than the minimum requirement for greater horseshoe bats as calculated in Stage 1.

Phased Approach to Mitigation Creation

6.1.64 Development of the Scheme's mitigation offers a phased approach which maximises the retention of functional (landscape scale) connectivity in the pre-construction and early construction stages, and the reinstatement, creation and management of foraging areas (within the red line boundary) in the later construction and operational stages. This is in line with paragraph A5.48 of the NSC Bat SPD.

6.1.65 **Retention of connectivity**: It is essential that the greater horseshoe bats can continue to access foraging areas south and north of the bypass route throughout the construction stage, as well as continue to access Brockley Hall and other areas of the SAC to avoid impacts on the SAC. To ensure this, phasing will focus on enhancing retained hedgerows and planting new hedgerows *prior* to construction works commencing.

6.1.66 In Year 0, 104m of hedgerow will be removed across the scheme (in 4m sections, for access purposes). These gaps will be filled temporarily with Heras fencing to retain connectivity as per paragraph 6.1.52. In addition, management for hedgerow enhancement will begin on 3526m (3.526km) of retained hedgerows to increase their horizontal and vertical growth (as per paragraph 6.1.49), therefore improving them for horseshoe bats. A further 5658m (5.568km) of hedgerow will be planted (out of the 10km of

new hedgerows proposed for the scheme). This amounts to 9184m (9.184km) of mitigation hedgerow established in advance of works commencing in Year 1.

6.1.67 In Year 1, 4870m (4.87km) of hedgerow will require removal to facilitate work. The mitigation hedgerows in place in advance of this therefore equates to double that lost.

6.1.68 **Reinstatement, creation and management of foraging areas**: Prior to works commencing the following will be established in Year 0:

- 3.6Ha of grazing pasture at Eastermead Lane will be immediately available and enhanced through a modified (conservation) grazing regime, and modified hedgerow management programme, to allow hedges to grow out..
- 0.4Ha of woodland edge planting along Towerhead road.
- 2.8Ha of additional woodland and woodland edge planting across the scheme

6.1.69 This mitigates for the foraging habitat that will be permanently lost on completion of works (4.2Ha).

6.1.70 The remaining habitat mitigation will be established concurrently to the construction works where possible, with outstanding areas re-instated as bat suitable habitat towards the end of construction. During construction the majority of habitat lost will be temporary (i.e. less than one year) e.g. those areas subject to re-profiling for flood compensation and attenuation ponds will be re-established through mitigation seeding, planting and natural regeneration after approximately one season (similar to re-establishment of habitat after agricultural ploughing).

6.1.71 This phasing will mitigate the impacts of early works clearance, and the temporary loss of habitat in those areas to be utilised as compounds, soil storage and similar. This method of phased mitigation will assist in offsetting potential impacts on the SAC from the initiation of construction, therefore preventing a significant effect:

6.1.72 A proposed outline mitigation phasing is presented in Table 5

Outline mitigation Phasing		
Works	Description	Actions
Pre Construction (Year 0)		
Existing vegetation management	Management of existing hedgerows and retained trees along outer perimeter of redline boundary.	Hedge laying, pollarding, pruning trees, removal of diseased dead decaying limbs of existing trees, formative/regenerative pruning of fruit trees in traditional orchard, management of hedgerows to encourage greater growth from base Propagation/cuttings taken from suitable trees - Black poplar, notable trees -
Install ecological mitigation measures	Installation of Heras Fencing, bat boxes and dormouse boxes	Heras fencing and debris netting – to be installed to maintain existing connectivity Creation of hibernacula. Install bird nesting, bat and dormouse boxes within existing vegetation
Supplementary planting and advanced mitigation establishment	Review of all areas outside the highway boundary plus 10-15m buffer for construction. Establish hedgerow boundaries, woodland and woodland edge blocks to commence habitat mitigation for bat, dormouse and reptiles.	First season mitigation planting of transplant, feathered and standard stock as appropriate. Maintenance access to be created for landscape contractor throughout construction phase.
Construction (Year 1 & Year 2)		
Landscape and Biodiversity mitigation	Snagging of 2023/2024 season's planting. Staged planting of remaining landscape and habitat mitigation to areas outside construction footprint – where practicable.	Second season mitigation planting of transplant, feathered and standard stock where appropriate. Creation of hibernacula. Install remaining bird nest, bat and dormouse boxes
Scheme Landscape mitigation	Programmed planting of completed and available construction areas. Ongoing snagging/ beat up of season one.	Second season mitigation planting. Flood compensation areas to be planted once final land form has been created.
Scheme Landscape mitigation	Programmed planting of areas as completed and become available. Aim for full completion of planting. Snagging of season two planting, ongoing snagging/beat up of season one.	Third season mitigation planting of transplant, feathered and standard stock.

Development of a Long-Term Management Plan

6.1.73 Management of the mitigation habitat will be carried out as prescribed by the Management Plan which will form part of the Landscape and Ecological Management Plan (LEMP). Management proposals will be informed by the SPD and best practice for greater horseshoe bats.

6.1.74 Management proposals will include, new and retained grassland within the Scheme boundary being managed through a combination of grazing and cutting with pasture for grazing being returned to landowners under agreement. The cutting regime for grassland will allow for a long sward as previously stipulated, to maximise the availability of moths and other invertebrates as a foraging resource.

6.1.75 Management of hedgerows will maximise biodiversity with a minimal cutting regime.

Lighting

6.1.76 The proposed lighting design keeps additional lighting to a minimum (as detailed in paragraph 6.1.14). Most of the Scheme will remain dark to avoid habitat fragmentation through improper lighting. No additional lighting is proposed at the eastern end of the Scheme, nearest Banwell Woods/Banwell Ochre Caves and the design of the Scheme at this end is such that vehicle headlights will be directed away from illuminating the woodland.

6.1.77 Additional lighting as proposed around the Western junction and Wolvershill Road junction is to be designed to minimise overspill. Strategic planting will be utilised to screen lighting further from adjacent habitat to minimise impacts on bats and, as detailed in paragraph 6.1.64, habitat within 20m of the carriageway has been excluded when calculating the habitat provision for the greater horseshoe bats. This makes an allowance for potential light spill.

6.1.78 Timing restrictions are proposed in regard to night work, and associated lighting, in areas identified during bat surveys as particularly sensitive (e,g, main flight routes).

6.1.79 Current street lighting along Knightcott Road is subject to partial night lighting and is switched off October to March between midnight and 5am, and March and October between 1am and 6am. It is proposed that any new lighting incorporated into the scheme will also be subject to similar partial night lighting which will further minimise potential disturbance impacts and open up foraging opportunities within 20m of the new road later in the night.

6.1.80 Continued monitoring will allow for alterations to the lighting strategy to further reduce potential impacts, as required.

Noise/Vibration

6.1.81 There will be timing of works at the eastern end of the Scheme (adjacent to the Banwell Ochre Caves) to minimise the risk of disturbance during more sensitive times of year (hibernation) due to temporary increases in noise/vibration. Details are to be provided in the CEMP for the Scheme.

6.1.82 The design of the habitat mitigation has allowed for a 20m buffer either side of the carriageway, covering an area where road noise may disrupt foraging bats, as referenced in paragraph 6.1.65.

Air Quality

6.1.83 Appropriate mitigation for dust deposition is detailed in Chapter 5 (AQ) of the ES. This will be expanded on within the CEMP for the Scheme. An outline CEMP is available in Volume 3 Appendix 16.A of the Environmental Statement.

Conservation Objectives for Lesser Horseshoe Bats

6.1.84 Overarching Conservation Objectives for the SAC and associated qualifying features, as presented in the site citation, have previously been stated in Section 2. Natural England's "European Site Conservation Objectives: Supplementary advice on conserving and restoring site features" expands on these objectives to provide specific means of maintaining the favourable conservation status of the qualifying features.

6.1.85 The favourable conservation status of this species will be

maintained where:

a) The presence, structure and quality of any linear landscape features which function as flightlines are maintained. Flightlines should remain unlit, functioning as dark corridors. (Maintaining the structure/function of supporting habitat).

b) Any core areas of feeding habitat outside of the SAC boundary that are critical to Lesser Horseshoe bats (during their breeding or hibernation period) are maintained. (Maintaining the structure/function of supporting habitat)

c) The management measures (either within and/or outside the site boundary as appropriate) which are necessary to maintain the structure, functions and supporting processes associated with lesser horseshoe bats and/or the supporting habitats are maintained. (Maintaining the structure/function of supporting habitats).

Assessment of Effects

Habitat Loss (Land Take)

6.1.86 As for greater horseshoe bats, habitat loss will amount to 4.2Ha permanently lost to road surface out of the 50Ha of land take for the Scheme. However, lesser horseshoe bats forage closer to the roost than greater horseshoe bats. The ABST report recorded a foraging range for lesser horseshoe bats as 0.9km-2.8km. As in paragraph 5.1.4, taking the smaller value as a reference, this creates a potential foraging area 254Ha. Therefore, in this instance 4.2Ha of permanently lost land would be equivalent to 1.65% of potential foraging.

6.1.87 Spatial distribution for lesser horseshoe bats across the Scheme area was similar to that for greater horseshoes with the ABST report identifying most activity 1km north to 1.5km south of Banwell and the UWE static surveys noting peak activity around Banwell Woods with lower activity across the bypass route (although relatively evenly distributed).

6.1.88 However, lesser horseshoe bats are less reliant on grazed pasture than greater horseshoe bats, having a preference for woodland, hedgerows and vegetated watercourses, and do not travel as far when foraging. With the majority of land take for the Scheme being either grazed pasture or silage ley, loss of foraging habitat will likely not have as significant an impact for

this species compared to greater horseshoe bats.

6.1.89 Considering the above, the effects of the habitat loss on lesser horseshoe bats without mitigation are assessed to be moderate and, as such, will likely undermine the conservation objectives of the North Somerset and Mendip Bats SAC.

Grazing reduction

6.1.90 The lesser horseshoe bat has a diet consisting primarily of moths (particularly micromoths), tipulid flies, biting and non-biting midges, mosquitos and other small prey. Lacewings and caddisflies are also taken. Research in Ireland by the Vincent Wildlife Trust has also found that during the winter months they will also take smaller insects associated with cattle dung (such as dung flies). It does not, however, feed on dung beetles or cockchafers (unlike greater horseshoe bats). As such, severance of pasture by the Scheme leading to a reduction in grazing is unlikely to have a negative impact. It could, instead, potentially could have a positive impact. Scrub and longer grasses/rough grassland (which would like result from reduced grazing) is positively associated with higher micromoth numbers therefore, high food resources could result.

Severance of Linear Features

6.1.91 Lesser horseshoe bats are also low flying species, relying on linear features such as hedgerows and well vegetated watercourses to guide them around the landscape. Severance of flightlines through hedgerow loss or poor design of watercourse culverts will alter flight patterns, potentially reducing the range of this species and/or sever connectivity between the Banwell parts of the SAC and other areas to the North and East.

Traffic Collision Risk

6.1.92 As much of the road is to be built on an embankment, this may act as a physical barrier to the lesser horseshoe bats, potentially leading to a reduction in their foraging range around local roosts. Alternatively, there is a risk they would follow the line of the embankment upwards and attempts at crossing the road at low level may result in collisions with vehicles.

Increased Lighting

6.1.93 Lesser horseshoe bats are particularly sensitive to light. For further details on proposed lighting refer to Paragraphs 5.1.13-5.1.17.

6.1.94 Additional lighting within the Scheme design, or (alternatively) the use of lighting during night-based construction works, will likely cause disturbance to lesser horseshoe bats (as a species particularly sensitive to excess lighting) which can result in behaviour akin to that caused by direct habitat severance.

Noise/Vibration

6.1.95 As covered in paragraph 5.1.18 excavation and associated construction works adjacent to the hibernation sites during the winter months could lead to disturbance caused by increased noise/vibration. This can result in increased periods of wakefulness using up essential fat stores and reducing winter survival rates.

Air Quality: Construction Phase

6.1.96 As referenced in paragraph 5.1.19, the ES Chapter on Air Quality (Chapter 5) identified there to be an overall high risk of ecological impacts from dust during the construction, without appropriate mitigation.

6.1.97 Dust deposition would not have a direct impact on lesser horseshoe bats. However, as with greater horseshoe bats, indirect impacts may occur due to impacts on vegetation leading to declines in associated invertebrates.

6.1.98 Many of the lesser horseshoe bats favoured prey species (e.g. craneflies, midges, mosquitos) require water or wet soil for the larval stage of their life cycle, which is abundant within the rhynes and ditches around Banwell. Dust deposition into the watercourses from adjacent works would potentially have a nutrification effect on the water quality by adding additional phosphorus and nitrates. In turn this may impact the number of macroinvertebrates (an increase in nutrients leading to an increase in oxygen demand and deoxygenation of the water, resulting in fewer invertebrates) ultimately leading to a reduction

in the larvae of the favoured food species.

6.1.99 Furthermore, dust deposition on vegetation may disrupt photosynthesis, reducing plant vigour, which may then reduce the number of associated micromoth larvae and ultimately a reduction in adult moths.

6.1.100 However, in regard to dust deposition on water courses the additional nutrient load would be low when compared to the input from adjacent farmland (from cattle dung and added fertilisers). Furthermore, dust deposition from the construction phase would be temporary (recovery occurs with dust removal, e.g. washed away by the rain).

6.1.101 With this in mind, significant impacts on lesser horseshoe feeding resources are considered unlikely and, resultingly, the risk of long-term negative impacts on the lesser horseshoe bat population will likely be low.

6.1.102 However, although low, in combination with other factors associated with the Scheme, there is still the potential to undermine the conservation objectives of the SAC without appropriate mitigation.

Air Quality: Operational Phase

6.1.103 Direct impacts on lesser horseshoe bats from increased nitrogen deposition are not predicted.

6.1.104 Indirect impacts are considered equivalent to those identified for greater horseshoe bats. That is, although modelling indicates >1% increase in deposition rates between the DM and DS scenarios, the actual increase in real terms compared to current baseline levels is low (refer to paragraph 6.1.28) and therefore significant impacts on vegetation (and sequential impacts on associated invertebrates) are not predicted. Further, any shift towards an increase in nitrogen loving plant species will result in an associated increase in moths with larvae that use such species as their food plant. That is, even where there is a decline in moth diversity, there is not a decline in overall food availability for horseshoe bats.

6.1.105 As such, it can therefore be concluded an increase in nitrogen deposition at the levels modelled by the AQ chapter is not predicted to have a significant effect on lesser horseshoe bat food resources within Banwell Woods and therefore a significant effect on the lesser horseshoe bat qualifying feature of the SAC is considered unlikely.

Summary of Effects: Lesser Horseshoe Bats

6.1.106 The following impact effects have been considered in relation lesser horseshoe bats as a qualifying feature of the North Somerset and Mendip bats SAC:

a) Habitat loss (land take)
b) Grazing reduction
c) Severance of linear features
d) Traffic collision risks
e) Increased lighting
f) Noise/vibration
g) Air quality: construction phase
h) Air quality: operational phase

6.1.107 When considering the above and taking the Conservation Objectives for lesser horseshoe bats and the associated supplementary advice into account, it is concluded that in the absence of mitigation the Scheme will have an adverse impact on the integrity of the greater horseshoe bats as a qualifying feature of the North Somerset and Mendip Bats SAC.

Mitigation Measures

6.1.108 As for greater horseshoe bats, Annex 6 of the SPD provides information on standard habitat prescriptions for lesser horseshoe bats that can be used as replacement habitat within development sites. This differs slightly to the prescription for greater horseshoe bats due to lesser horseshoes hunting smaller insects including micromoths, gnats, midges, mosquitos, craneflies, lacewings, caddis flies and ichneumon wasps. The proposed habitat prescription for horseshoe bats therefore consists of:

- Woodland with Water

- Grassland. Long sward grassland is beneficial, particularly where rough grassland and scrub occur together as they're an important predictor of micromoth abundance.

- Hedgerows. As for greater horseshoe bats, these act as commuting structures and provide feeding perches for lesser horseshoe bats.

6.1.109 The mitigation measures presented above (paragraphs 6.1.43 to 6.1.50) in relation to greater horseshoe bats are also applicable to the lesser horseshoe bats within the SAC. Paragraph 1.5 of the SPD states: *"In the case of the North Somerset and Mendip bats SAC Greater Horseshoe bats are taken to be the most sensitive species therefore the 'Precautionary Principle' dictates that if their requirements are met, then the other SAC bat species are also likely to be protected"*

6.1.110 Although it can be assumed, following the 'Precautionary Principle' that the proposed mitigation is adequate for lesser horseshoe bats, as well as greater horseshoe bats. To confirm this was the case a Stage 1 HEP Calculation, was also carried out on habitat loss for lesser horseshoe bats and a Stage 2 calculation based on the proposed mitigation. These can be seen in Tables 7 and 9, Appendix C.

6.1.111 As for the greater horseshoe bats, for the purposes of the Stage 2 calculation, mitigation within 20m of the carriageway and mitigation initially designed for other reasons, has been excluded from the calculation.

6.1.112 The Stage 1 calculation shows that the minimum replacement habitat required for lesser horseshoe bats is 10.10Ha. The results for the Stage 2 calculation show *the mitigation habitat being provided is 13.60 equivalent hectares*. As for greater horseshoe bats, this is more than the minimum requirement as calculated at Stage 1.

Residual Effects of the Scheme

Mitigation Summary

6.1.113 The mitigation proposals are designed to mitigate the impacts listed in Paragraphs 6.1.37 and 6.1.97, and can be summarised as follows:

- **Habitat loss** will be mitigated through enhancement of retained habitat and creation of new habitat within the red line boundary. Additional land specifically for horseshoe bats has been taken into the Scheme through an amendment to the Scheme submitted to the LPA in December 2022. The HEP Calculation has shown that the mitigation proposals will ensure enough habitat will be available post-development to support the local greater horseshoe bat population. The HEP calculation also includes multipliers that makes an allowance for the lagtime between works starting and mitigation habitat reaching full functionality. The HEP calculation shows there will be enough habitat even when a habitat buffer around the bypass, and habitat originally designed for other reasons, is excluded.

- **Grazing reduction** will be mitigated through prescriptive management, including modification of the remaining grazing regime to increase prey abundance and diversity, as well as planting species rich grassland to enhance prey availability further. A long-term management plan will be developed to ensure the habitat quality is maximised for horseshoe bats.

- **Severance of linear features** will be mitigated for during the construction phase through the use of Heras fencing and debris netting or similar, where required, to maintain links overnight. Longer term provision includes enhancing retained hedges and planting new hedgerows across the Scheme to replace and increase functional connectivity and maintain links across the wider landscape (including between Banwell and other parts of the SAC).

- **Traffic collision risks** will be mitigated through creating safe crossing points via a combination of culverts under the road (to further retain connectivity), planting of hopovers (where culverts are not feasible) and directional planting.

- **Increased lighting** will be mitigated for through careful design of the lights, strategic planting for screening, incorporation of a 20m habitat buffer, the use of partial night lighting during the operational phase (as is currently in place along Knightcott Road) and timing restrictions for night work (construction phase).

- **Noise/Vibration** will be mitigated for through appropriate timing during the construction phase and the use of a 20m habitat buffer alongside the road during the operational phase.

- **Air quality impacts** during the construction phase (dust deposition) will be mitigated for using accepted best practice through the construction phase.

- Significant air quality impacts during the operation phase were not predicted.

Residual Effects

6.1.114 The possible impacts of the Scheme, and the associated potential significant effects on the SAC, have been carefully considered through the mitigation design. Assuming all the mitigation measures outlined above for both greater and lesser horseshoe bats are put into place, it is concluded that the potential negative impacts of the Banwell Scheme on these two qualifying species will be avoided, and there will therefore be no adverse effect on the integrity of the SAC.

6.1.115 No residual effects are predicted.

6.2 Mendip Limestone Grasslands

Conservation Objectives for Greater Horseshoe Bats

6.2.1 Overarching Conservation Objectives for the SAC and associated qualifying features, as presented in the site citation, have previously been stated in Section 2. Natural England's "European Site Conservation Objectives: Supplementary advice on conserving and restoring site features" expands on these objectives to provide specific means of maintaining the favourable conservation status of the qualifying features, of which some are relevant to the Scheme.

6.2.2 The favourable conservation status of this qualifying species will be maintained where:

a) The total extent of the habitat(s) which support greater horseshoe bats is maintain or, if necessary, restored. (Supporting habitat: extent and distribution)

b) The flightlines from roosts into surrounding habitat and foraging areas are maintained13. (Supporting habitat: extent and distribution).

Assessment of Effects

6.2.3 Due to the presumed functional connectivity between the Mendip Limestone Grasslands SAC and the North Somerset and Mendips Bats SAC the assessment of effects listed for greater horseshoe bats under the latter would also apply here.

6.2.4 Considering the Conservation Objectives for greater horseshoe bats and the associated supplementary advice, it is concluded that in the absence of mitigation the Scheme will have an adverse impact on the integrity of the greater horseshoe bats as a qualifying feature of the Mendip Limestone Grasslands SAC. However, as the association between the Mendip Limestone Grasslands SAC and the North Somerset and Mendips Bats SAC is not currently quantifiable, any adverse impact on the integrity on this site is assumed based on the precautionary principle.

[13] Although this is in reference to roosts and habitats within the Mendips Limestone Grasslands SAC, due to the potential for bats within this SAC to be using roosts around Banwell it can be applicable at the wider level

Mitigation Measures

6.2.5 The mitigation measures presented in relation to the horseshoe bats of the North Somerset and Mendips Bats SAC are also applicable to here (paragraphs 6.1.39-6.1.76).

Residual Effects

6.2.6 Once the mitigation measures outlined in Section 5.1 are considered, it is concluded that the Scheme at Banwell will not result in a significant effect on the integrity of the greater horseshoe bat qualifying feature of the Mendip Limestone Grasslands SAC, and thus the integrity of the site.

6.2.7 No residual effects are predicted.

6.3 Mells Valley SAC

Conservation Objectives for Greater Horseshoe Bats

6.3.1 Overarching Conservation Objectives for the SAC and associated qualifying features, as presented in the site citation, have previously been stated in Section 2. Natural England's "European Site Conservation Objectives: Supplementary advice on conserving and restoring site features" expands on these objectives to provide specific means of maintaining the favourable conservation status of the qualifying features.

6.3.2 The favourable conservation status of this qualifying species will be maintained where:

a) The distribution and continuity of the qualifying feature and its supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site, are restored14. (Supporting habitat: Extent and Distribution)

b) The presence, structure and quality of any linear landscape features which function as flightlines are maintained. Flightlines should remain unlit, functioning as dark corridors. (Supporting habitat: structure/function)

14 Although this is specific to the Mells Valley SAC ("The Site" as referenced) it can be considered at a broader level in regard to supporting habitat features, where functional connectivity is presumed

c) Maintain any core areas of feeding habitat outside of the SAC boundary that are critical to greater horseshoe bats during their breeding and hibernation periods (Supporting habitat: structure/function)

d) The horseshoe bat's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site, is restored (Supporting processes on which the feature and/or its supporting habitat relies)

Assessment of Effects

6.3.3 Due to the presumed functional connectivity between the Mells Valley SAC and the North Somerset and Mendips Bats SAC the assessment of effects listed for greater horseshoe bats under the latter would also apply here.

6.3.4 Considering the Conservation Objectives for greater horseshoe bats and the associated supplementary advice, it is concluded that in the absence of mitigation the Scheme will have an adverse impact on the integrity of the greater horseshoe bats as a qualifying feature of the Mells Valley SAC. However, as the association between the Mells Valley SAC and the North Somerset and Mendips Bats SAC is not currently quantifiable, any adverse impact on the integrity on this site is assumed based on the precautionary principle,

Mitigation Measures

6.3.5 The mitigation measures presented in relation to the horseshoe bats of the North Somerset and Mendips Bats SAC are also applicable to here (paragraphs 6.1.39-6.1.76).

Residual Effects

6.3.6 Once the mitigation measures outlined above are considered, it is concluded that the Scheme will not result in a significant effect on the integrity of the greater horseshoe bat qualifying feature of the Mells Valley SAC, and thus the integrity of the site.

6.3.7 No residual effects are predicted.

6.4 Bath and Bradford on Avon Bats SAC

Conservation Objectives for Qualifying Bat Species[15]

6.4.1 Overarching Conservation Objectives for the SAC and associated qualifying features, as presented in the site citation, have previously been stated in Section 2. Natural England's "European Site Conservation Objectives: Supplementary advice on conserving and restoring site features" expands on these objectives to provide specific means of maintaining the favourable conservation status of the qualifying features.

6.4.2 The favourable conservation status of the qualifying species will be maintained where:

a) The abundance of the populations above their baseline population-size is maintained (while deterioration from current levels are avoided). (Population of the features)

b) The total extent of the habitats which support the features are maintained. (Supporting habitat: extent and distribution)

c) The distribution and continuity of the features and their supporting habitats are maintained. (Supporting habitat: extent and distribution)

d) The presence, structure and quality of any linear features, which function as flightlines, are maintained and remain unlit, functioning as dark corridors. (Supporting habitat: structure/function)

e) Any core areas of feeding habitat outside of the SAC boundary that are critical to the bat features during their hibernation period is maintained.

Assessment of Effects

6.4.3 Due to the presumed functional connectivity between the Bath and Bradford on Avon Bats SAC and the North Somerset and Mendips Bats SAC, the assessment of effects listed for the qualifying features (both horseshoe bat species) under the latter would also apply here.

6.4.4 Considering the Conservation Objectives for both greater and

[15] Greater horseshoe bats, lesser horseshoe bats and Bechstein's bats are presented together within the SupplementaryAdvice. However, this is specifically applicable to the two horseshoe bat species.

lesser horseshoe bats and the associated supplementary advice, it is concluded that in the absence of mitigation the Scheme will have an adverse impact on the integrity of the greater horseshoe bats as a qualifying feature of the Bath and Bradford on Avon SAC. However, as the association between the Bath and Bradford on Avon SAC and the North Somerset and Mendips Bats SAC is not currently quantifiable, any adverse impact on the integrity on this site is assumed based on the precautionary principle.

Mitigation Measures

6.4.5 The mitigation measures presented in relation to the horseshoe bats of the North Somerset and Mendips Bats SAC (paragraphs 6.1.39-6.1.76). are also applicable to here.

Residual Effects

6.4.6 Once the mitigation measures outlined above are considered, it is concluded that the Scheme will not result in a significant effect on the integrity of the greater horseshoe bat qualifying feature of the Mells Valley SAC, and thus the integrity of the site.

6.4.7 No residual effects are predicted.

6.5 Severn Estuary SAC

Conservation Objectives for the Severn Estuary SAC

6.5.1 Overarching Conservation Objectives for the SAC and associated qualifying features, as presented in the site citation, have previously been stated in Section 2.

6.5.2 Natural England has not produced supplementary advice in relation to the Conservation Objectives of the Severn Estuary.

Assessment of Effects

Construction Phase Impacts

6.5.3 Chapter 13 of the ES (Road Drainage and Water Environment)

assesses the impacts of the Scheme on the local surface water features around Banwell. These consist of the River Banwell and several rhynes which drain into the river (Old Yeo Rhyne, Liddy Yeo, Wallymead Rhyne and East Mead Rhyne). The River Banwell flows into the Severn Estuary at Woodspring Bay, north of Weston-super-Mare and impacts on the local surface water features can be extrapolated to give a broad assessment on the likely effects (or lack there of) on the Severn Estuary SAC.

6.5.4 The primary construction impacts identified were:

a) The disturbance of silt/soil during works resulting in surface run off with a high sediment content
b) Accidental spillage of fuels, oils, chemicals and materials (e.g. concrete, plant fuels/oils, lubricants, hydraulic fluids and floating solids such as litter).
c) Dewatering discharges containing high levels of suspended solids.

6.5.5 Excessive silt run off and particulate matter can have several effects at the local level including light reduction and smothering. However, the scale of impacts on the Severn Estuary from silt run off/suspended solids is considered negligible-low when the Scheme's distance from the Estuary, particulate settlement and the size of the Severn is considered. Larger solids will settle out before reaching the Severn and smaller silt particles will result in a negligible addition to the silt/particulate matter that naturally occurs within the Severn.

6.5.6 Particulate matter will also introduce increased amounts of phosphates and nitrates. These will likely have negligible impact on the Severn in isolation, however the nutrient load within the Estuary is already high therefore further addition will add to negative impacts on the underlying processes of the SAC.

6.5.7 Spillages of fuels, oils, chemicals and materials have the potential to have a larger impact. Qualifying fish species may be directly impacted through smothering or poisoning while chemicals may have an impact on smaller organisms that have a role to play in maintaining the structure and function of the SAC.

6.5.8 The distance of the Scheme from the Severn Estuary, and the diluting effect of the Severn itself, may considerably reduce the

potential for significant impacts. However, as it is not possible to quantify the impacts (with or without a dilution effect), for the purpose of this assessment and following the precautionary principle, in the absence of mitigation a significant effect is presumed.

Operational phase impacts

6.5.9 Chapter 13 ES states: During the operation phase of the study area, impacts on surface water quality could arise as result of pollutants such as hydrocarbons, metals and particulate matter being discharged from the study area to surface waterbodies crossed by the study area or in close proximity, including the River Banwell, Old Yeo Rhyne and smaller rhynes.

6.5.10 As is the case with construction phase impacts, such pollutants may directly impact SAC qualifying fish species or impact smaller organisms that have a role to play in the underlying processes and/or the structure and function of the SAC. E.g. Resultant effects could include:

a) Deoxygenation of the water.
b) Reduction in light levels
c) Changes in water pH
d) Eutrophication
e) Smothering of aquatic species (blocking fish gills, coating leaves of aquatic plants etc)
f) Poisoning of aquatic species.

6.5.11 As per Paragraph 5.5.8 both the distance of the Scheme from the Severn Estuary, and the diluting effect of the Severn will likely reduce the potential for significant impacts. However, the in-combination effects when other sources of pollutants are considered combined with the fact it is not possible to quantify the potential impacts (with or without a dilution effect), means that in the absence of mitigation, it must be concluded the Scheme will have an adverse impact on the Site integrity and a significant effect is presumed (following the precautionary principle).

Summary of Effects

6.5.12 The HRA screening identified that any likely significant effect on

the estuary would be the result of pollution impacts where functionally connected watercourses that cross the Scheme were contaminated during the construction and operational phases. Further assessment has identified that the quantity of potential pollutants entering water courses will be significantly diluted once entering the Severn. However, when considered in combination with other sources of pollution, they are presumed to have the likelihood to undermine the supporting processes on which the qualifying natural habitats and the habitats of qualifying species rely without appropriate mitigation.

Mitigation Measures

Construction Phase

6.5.13 An outline Construction Environmental Management Plan (CEMP) has been prepared, in accordance with relevant CIRIA guidance documents, as part of the documentation being produced for the Scheme (Refer to Appendix 16.A of the ES). This is a dynamic document that will be regularly reviewed, refined and updated throughout the life of the project until completion. The final iteration will be appropriate for the support of future management and operation of the completed Scheme.

6.5.14 However, in regard to the construction phase of the Scheme, the CEMP will incorporate a range of control measures (mitigation) for avoidance of pollution impacts on the watercourses across the Scheme area, which may potentially arise as a result of works.

6.5.15 All mitigation measures for avoidance will follow best practice with guidance taken from current Guidance for Pollution Prevention (GPPs), and all proposed measures within will be fully implemented during construction works.

6.5.16 Such measures will consist of:

a) The provision of spill kits
b) Restricting traffic to dedicated hall roads
c) Construction of appropriate fuel storage areas, as per regulations, to be regularly inspected and maintained.
d) A surface water management system:

- Temporary silt fencing installed prior to construction works, or as needed, which will be regularly inspected and maintained.
- Bunds
- Permanent cut-off ditches
- Settlement basins – to be set up early in the construction period to capture all run off (to prevent ingress into rhynes etc)

e) Dust suppression measures.

f) Construction of specific concrete washout points, as per regulation, to be regularly inspected and maintained.

g) Water with a high risk of contamination (e.g. concrete wash waters) to be contained and appropriately treated (or, if not possible on site, to be pumped to a suitably licensed tanker for off site treatment)

h) Suspension of work near water courses where weather forecast indicates increased risk.

6.5.17 Vegetation removal to enable construction will be minimised and staged to limit the amount of exposed soil and the associated risk of potential sediment runoff. Where areas of exposed soil/sediment are present and identified as being at risk of erosion (from rain or flooding) it will be protected using temporary measures (e.g. sheeting) or semi-permanent measures (e.g. coir matting)/

6.5.18 In addition, an Environmental Clerk of Works will be employed for the duration of the construction works to ensure all ecological and environmental mitigation measures, as laid out within the CEMP, are followed.

Operational phase

6.5.19 Pollution impacts from the operation phase of the Bypass scheme will be mitigated for through embedded mitigation features in the design. These will include, but not be limited to:

a) Swales within the embankment

b) Wet ponds

c) Filter drains

d) Fully lined attenuation basins

6.5.20 Full details of proposed mitigation measures are presented within Chapter 13 of the ES (Road Drainage and Water Environment).

6.5.21 In combination this will prevent pollutants contaminating groundwater or overland flow, thus avoiding impacts on the SAC/Ramsar.

Residual Effects

6.5.22 Once the mitigation measures outlined above are taken into account, it is concluded that the potential negative impacts of the Scheme will be avoided and thus will result in no significant effect on the supporting processes underpinning the Severn Estuary SAC. Therefore, the integrity of the site will be maintained.

6.5.23 No residual effects are predicted.

6.6 Severn Estuary Ramsar

Conservation Objectives of the Severn Estuary Ramsar

6.6.1 As already covered under paragraph 2.1.6 there are no specific Conservation Objectives applied to Ramsar sites as the Ramsar Convention predominantly covered wetland conservation and 'wise use'

6.6.2 However, consideration can be given to the potential impacts on the species for which the Severn is designated as a Ramsar site. Specifically, potential impacts on migratory fish (including the European eel, twait shad and Atlantic salmon) and migratory birds, particularly waders (e.g. common plovers, dunlin. whimbrel and redshank)

Assessment of Effects

Construction Phase Impacts

6.6.3 Under the "Assessment of Effects" for the Severn Estuary SAC, paragraph 6.5.4 lists the potential sources of pollutants associated with the construction phase of the Scheme.

6.6.4 In regard to potential impacts on migratory fish, increasing levels of nutrients within a watercourse (nitrates, phosphates) can result in behavioural and physiological changes resulting in long term harm to individuals and populations. Direct negative impacts, including smothering and poisoning, are also possible.

6.6.5 Indirect impacts on wading birds may occur where increasing nutrients impact lower trophic levels resulting in a reduced food supply.

6.6.6 However, as is the case with the SAC, the distance of the Scheme from the Severn Estuary, and the diluting effect of the Severn itself, will reduce the potential for significant impacts on the species for which the Ramsar is designated. However, as it is not possible to quantify the impacts (with or without a dilution effect), for the purpose of this assessment in the absence of mitigation a significant effect is presumed (following the precautionary principle).

Operational Phase Impacts

6.6.7 Pollution sources and potential impacts identified under the “Assessment of Effects” for the Severn Estuary SAC (refer to paragraphs 6.5.9-6.5.11) are also applicable to the Severn Estuary Ramsar site.

6.6.8 As for the construction phase, the operational phase may have negative impacts on both migratory fish and birds. However significant impacts may be avoided due to the diluting effects of the River Severn.

6.6.9 As with the construction phase, it is not possible to quantify the impacts of the operational phase on the Severn Estuary Ramsar. Therefore, for the purpose of assessment, in the absence of mitigation a significant effect is presumed.

Mitigation Measures

6.6.10 The mitigation measures presented in relation to the Scheme, which will result in an avoidance of impacts on the Severn Estuary SAC (paragraphs 6.5.13-6.5.21) are also applicable to the Severn Estuary Ramsar.

Residual Effects

6.6.11 Once the mitigation measures outlined above are taken into account, it is concluded that the potential negative impacts of the Scheme will be avoided and thus will result in no significant effect on the supporting processes underpinning the Severn Estuary Ramsar. Therefore, the integrity of the site will be maintained.

6.6.12 No residual effects are predicted.

7 Proposals for monitoring and reporting

7.1 Pre-Construction

7.1.1 Monitoring in the form of pre-construction bat surveys will be carried out to provide up to date information on the presence of horseshoe bat species across the Scheme footprint, and to provide increasing accuracy on how the landscape is used by the SAC qualifying species. They will also ensure that all active flight routes have been identified.

7.1.2 Pre-construction surveys for bats will comprise the following elements:

a) Manned 'hopover' surveys of hedgerows at the severance points. Carried out monthly between April and October starting August 2022.

b) Static activity monitoring of identified flight lines. To be carried out monthly between April and October starting April 2023.

c) Additional radio tracking – to be carried out in Spring 2023.

7.1.3 The survey strategy has been developed with reference to "WC1060 Development of a Cost-effective Method for Monitoring the Effectiveness of Mitigation for Bats Crossing Linear Transport Infrastructure" (as referenced).

7.2 During Construction

7.2.1 During the construction phase, monitoring surveys for bats will continue, following the agreed methodology for the pre-construction surveys. This will record numbers passing through the construction areas and to identify changes in behaviour. Full details of the level of monitoring and survey effort required have yet to be decided however this will be discussed and agreed with Natural England prior to the commencement of works.

7.2.2 Monitoring protocols in relation to pollution impacts of watercourses during the construction phase are presented within the CEMP. A series of method statements and plans for the main works will be put in place to ensure the prevention of impacts, and observational monitoring will be carried out by the

Environmental Clerk of Works.

7.3 Post Construction

7.3.1 Monitoring will be undertaken for 5 years post construction, with further monitoring carried out as required, subject to discussion/agreement with Natural England. Monitoring will incorporate:

a) Annual assessment of the condition of the new mitigation features.

b) Monitoring of the effective use of the culverts for use by horseshoe bats

7.4 Criteria for Success

7.4.1 Mitigation measures will be concluded as being effective where the following criteria applies:

a) Both greater and lesser horseshoe bats continue to be recorded across the Scheme (to the north and south of the Bypass) at activity levels comparable to those recorded pre-construction.

b) 90% of greater and lesser horseshoe bats recorded crossing the Scheme do so safely, using a culvert or hopover (i.e. pass under the road, or over the road at >4m above the surface of the carriageway)16

7.4.2 If the surveys show that these criteria are not met during any of the post-construction monitoring years, then the mitigation will be reviewed. Any necessary alterations required to improve the effectiveness of the mitigation will be agreed upon with Natural England.

7.5 Reporting

7.5.1 The results of the monitoring will be reported to the appropriate statutory environmental body on an annual basis, or as required.

[16] 90% is recommended as the figure required to avoid a detrimental effect on the viability of the local population. From Berthinussen, A. & Altringham J. (2015) “Development of a Cost-Effective Method for Monitoring the Effectiveness of Mitigation for Bats Crossing Linear Transport Infrastructure”. DEFRA.

7.6 In-Combination Effects

7.6.1 As covered in Section 4.3 the consideration of in-combination effects is only required in the absence of a significant effect arising from the assessed Scheme. Through the Statement to Inform the Appropriate Assessment it was confirmed that the Scheme would have a significant effect in the absence of mitigation therefore the criteria for assessing in-combination effects was not met.

7.6.2 However, the proposed Bypass will open opportunity for further housing development at the western end of the Scheme as proposed under the HIF, with further information to be provided under the emerging local plan.

7.6.3 The modelling for air quality (Chapter 5) took into account the predicted increase in traffic that may occur as a result of the proposed additional housing being constructed to the west of Banwell under the HIF. Therefore, the cumulative impacts of increased nitrogen deposition on the SAC have been considered within this Assessment. It is not however, within the scope of this Assessment to consider other impacts of such future proposals where there is no clear confirmation of location and layout or EIA. A further HRA will be therefore required on such developments when the time arises.

7.6.4 Any future development will be required to retain all mitigation proposed under the Bypass scheme, alongside any additional mitigation required for that development, to avoid future significant effects.

7.6.5 Consideration of this HRA will be needed when planning any future development relating to the HIF.

8 Consultations

8.1.1 Under Regulation 63(3) of the Habitats Regulations, the competent authority "..must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specifies" before consent or permission is granted for a plan or project that requires an appropriate assessment.

8.1.2 The original HRA screening carried out by WSP and included within the "Environmental Impact Assessment - Combined Screening and Scoping Report" was produced following earlier consultation with Natural England.

8.1.3 Since the appointment of the AGC Team, regular meetings, communications and informal discussions have been held with stakeholders, including NSC and Natural England, to discuss the ongoing progress of the Environmental Statement including ecological (and other) surveys and the assessment of effects.

9 Conclusions (Based on the information presented)

9.1.1 It is recommended by LA115: Habitats Regulations Assessment, of the DMRB, that the questions presented below are clearly answered to conclude the appropriate assessment (based on the information previously presented):

Is the proposal directly connected with or necessary to site management for nature conservation?

9.1.2 The Scheme is neither directly connected with nor necessary to the European Sites being considered.

Is the proposal likely to have a significant effect on the features of the site of European importance, alone or in combination with other plans and projects?

9.1.3 Stage 1 of the HRA (Screening) identified that there would be a likely significant effect on lesser and greater horseshoe bats. These are qualifying features of several of the European sites under consideration, but specifically the North Somerset and Mendip Bats SAC, part of which lies adjacent to the eastern end of the Scheme.

9.1.4 It was also considered that the Scheme would have a likely significant effect on the Severn Estuary SAC due to hydrological connectivity.

What are the implications of the effects of the proposal on the site's Conservation Objectives and will it delay or interrupt progress towards achieving the objectives?

9.1.5 For clarity, a summary of the mitigation for the Banwell Scheme in relation to bats is presented in Table 6 within the context of the Conservation Objectives for the North Somerset Mendips Bats SAC (and other bat SACs mentioned within this report).

Table 5: Banwell habitat mitigation in relation to the Bat SAC conservation objectives.

Conservation Objective	
With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features'), and subject to natural change, ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:	
1. The extent and distribution of qualifying natural habitats and habitats of qualifying species	The proposed development is not within the SAC and will not impact the extent and distribution of the SAC qualifying natural habitats
	The proposed mitigation for the scheme will maintain the extent and distribution of off-site habitats utilised by the SAC qualifying species (horseshoe bats) through replacing lost habitat and enhancing retained habitat. The extent and design of the mitigation habitat is appropriate for the qualifying species and fulfils the requirements of the SPD. Mitigation proposals will ensure the habitat will be more beneficial to the qualifying species (horseshoe bats) and will assist in maintaining the extent and distribution of the qualifying species. Phasing of mitigation planting will prevent a reduction in the extent and distribution of the habitats of the qualifying species.
2. The structure and function (including typical species) of qualifying natural habitats	The proposed development will not impact the structure and function of the SAC qualifying natural habitats
3. The structure and function of the habitats of qualifying species	The proposed mitigation for the Scheme will maintain the structure and function of off-site habitats utilised by the qualifying species (horseshoe bats)
4. The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely	The proposed mitigation for the Scheme and associated management will allow the natural processes of the habitats outside of the SAC, upon which the qualifying species rely, to continue.
5. The populations of qualifying species	The proposed mitigation for the Scheme will retain connectivity across the wider landscape, maintaining access to foraging areas and retaining connectivity between the SAC hibernation sites and SAC maternity sites. Further, the proposed mitigation incorporates features to allow safe crossing of the proposed road and also enhances and replaces foraging habitat. As such breeding failure risks, road mortality risks, and mortality risks associated with reduced foraging are mitigated for. Therefore, the development will not impact the populations of the qualifying species.
6. The distribution of qualifying species within the site	The proposed mitigation will maintain off site connectivity allowing continued movement of the qualifying species (horseshoe bats) between the different sections of the SAC e.g. between the Barnwell hibernation caves and Brockley Hall Maternity Roost, thus maintaining the distribution of the qualifying species.

9.1.6 Referencing Table 6, it can be shown that, once the proposed mitigation for the Scheme is considered, the development will not undermine the Conservation Objectives of the SAC, nor interrupt or prevent progress towards achieving the Conservation

Objectives of the referenced protected bat sites.

9.1.7 In addition to the North Somerset and Mendip Bats SAC, and associated Bat Sites, the mitigation proposals and standard best practice construction methods proposed in relation to the Severn Estuary SAC and Severn Estuary Ramsar, will also ensure that the development will not interrupt or prevent progress towards these sites Conservation Objectives.

Can it be ascertained that the proposal will not adversely affect the integrity of the site beyond reasonable scientific doubt?

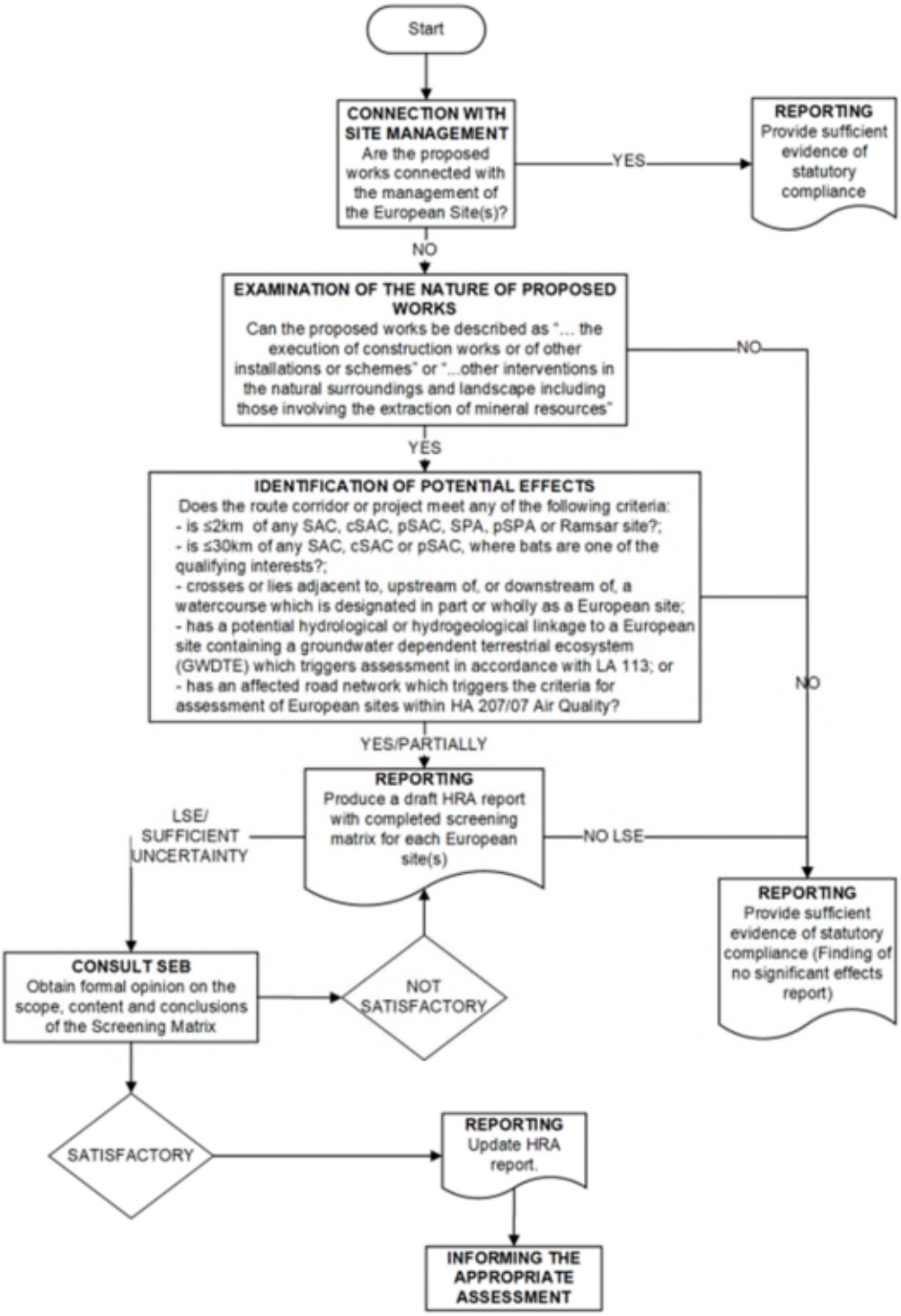
9.1.8 The purpose of the North Somerset and Mendip Bats Supplementary Planning Document (SPD) is to offer both guidance, and a methodology (through the HEP calculation), that will ensure that any development following it will avoid adversely affecting the integrity of the Bats SAC beyond reasonable scientific doubt. The Scheme has a mitigation design in relation to bats that has considered all aspects of the SPD. It has ensured acquisition of additional land for horseshoe bats, will retain and enhance functional connectivity across Banwell and the wider area so maintaining links to foraging areas and other parts of the SAC, and proposes both replacement foraging habitat and enhanced retained habitat to benefit horseshoe bats. Importantly, the proposals also offer more habitat than is required under the HEP calculation and the phased approach to the mitigation planting/habitat creation will ensure that potential impacts caused by early clearance works/temporary habitat loss (from compounds etc) will be adequately addressed.

9.1.9 Taking all aspects of the Assessment into account, with reference to all of the above, it can be ascertained that the proposal will not adversely affect the integrity of the North Somerset and Mendip Bats SAC (and functionally linked Bat Sites) beyond reasonable scientific doubt.

9.1.10 It can also be ascertained that, through the proposed construction mitigation and best practice work methods, that the integrity of the Severn Estuary SAC, SPA and Ramsar will also not be adversely affected by the development.

Appendices

Appendix A Screening Process



Appendix B DMRB Screening Matrices

B.1.1.1 Where the DMRB screening matrices includes a description of standard avoidance/mitigation measures, these have been provided but have not been used to influence the outcome of the screening. As per recent case law, mitigation will only be used to draw conclusions during the Appropriate Assessment stage. Screening matrices have been completed for the Banwell Scheme.

B.1.1.2 Screening has been carried out for the Banwell Scheme on the following designated sites

a) Somerset and Mendip Bats SAC
b) Mendip Limestone Grasslands SAC
c) Mells Valley SAC
d) Bath and Bradford Upon Avon Bats SAC
e) Exmoor and Quantock Oakwoods SAC
f) Severn Estuary SAC
g) Severn Estuary SPA
h) Severn Estuary Ramsar
i) Chew Valley Lake SPA
j) Somerset Levels and Moors SPA
k) Somerset Levels and Moors Ramsar

B.2 North Somerset and Mendip Bats SAC

HRA Screening Matrix		
Project Name	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	North Somerset and Mendip Bats SAC	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation**
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, WolversHill Road and the new southern link, and a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the SAC	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is <50m from the SAC at its nearest point	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the SAC.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	Construction phase: Silt run off, accidental chemical/oil spillage. The operational phase will result in an increase in atmospheric pollution and associated deposition of >1% which is not considered insignificant. (As per modelling presented in the AQ chapter of the ES.)	
Excavation requirements (e.g. impacts of local hydrogeology)	There would be minor excavation <100m from the SAC boundary as part of construction works	

Transportation requirements	N/A Transportation of materials would utilise the local road network and Scheme footprint.
Duration of construction, operation, etc.	It is planned that construction will last approximately 28months. The operational phase of the development is aimed to be >60years.
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	UK0030052 North Somerset and Mendips Bats SAC
Location and distance of the European Site from the proposed works	The SAC consists of multiple small sites (individually designated as SSSIs) spread across the North Somerset and Mendips region. The nearest part of the site (Banwell Ochre Caves SSSI) lies immediately adjacent to the south-east of the Scheme. A second part of the site (Banwell Caves) lies c.500m south of the south-west of end of the Scheme.
European Site Size	555.93 Ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SAC is designated for the following features • Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites) • Tilio-Acerion forests of slopes, screes, and ravines • Caves not open to the public

	• Lesser horseshoe bat (Rhinolophus hipposideros) • Greater horseshoe bat (Rhinolophus ferrumequinum)
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Relevant impact pathways listed on Natura 2000 Standard Data Form: • Other urbanisation, industrial and similar activities • Grazing • Unknown threat or pressure Relevant impact pathways listed in Site Improvement Plan (NE) • Under grazing • Planning permission, general • Change to site conditions • Air pollution: impact of atmospheric nitrogen deposition
European Site Conservation Objectives – where these are readily available	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring: • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
Construction of the new road will result in severance of functionally linked habitat (through habitat loss or lighting) used by the qualifying bat species. Severance of grazing land by the bypass may result in reduced grazing/changes in land management by landowners which could lead to loss of additional foraging. Once the bypass is operational there is a collision risk between bats and vehicles if bats cross the Scheme, leading to injury or death of the qualifying species. Impacts on qualifying habitat may occur due to increased atmospheric pollutant deposition The part of the SAC adjacent to the Scheme is situated above the level of the affected road network therefore sediment runoff and hydrogeological changes through excavation are not considered to have a potential impact. However, increased air pollution may impact	

supporting processes e.g. changes on adjacent woodland vegetation could impact invertebrate numbers (prey availability)	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No predicted impacts
Disturbance to key species	The construction phase may cause disturbance to qualifying bat species through noise/vibration adjacent to the SAC
Habitat or species fragmentation	Potential for impacts on the horseshoe bat populations through severing functionally linked commuting and foraging habitat
Reduction in species density	Disruption to foraging and commuting corridors may result in reduced survival of bat species through the winter period. Potential impacts from collision with vehicles.
Changes in key indicators of conservation value (water quality, etc)	No predicted impacts
Climate change	No predicted impacts
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts predicted
Interference with key relationships that define the function of the site	Air quality effects (e.g. increased deposition) on supporting habitat adjacent to the Banwell Ochre caves could impact vegetation that assists in maintaining hibernation site humidity, or impact invertebrate numbers reducing prey availability during the winter period
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant
Disturbance to key species	Potentially significant
Habitat or species fragmentation	Potentially significant
Loss	Potentially significant
Fragmentation	Potentially significant
Disruption	Not significant
Disturbance	Potentially significant
Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Not significant
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	

Potential for significant effects on the horseshoe bat populations within the SAC due to severance of functionally linked commuting/foraging habitat through habitat loss and inappropriate lighting. Potential of death/injury of horseshoe bats trying to cross the Scheme. Potential for significant effects on the horseshoe bat populations due to disturbance to hibernating bats caused by increased noise/vibration during the construction phase.	
Outcome of Screening (delete as appropriate)	Significant effects are likely
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

B.3 Mendip Limestone Grasslands SAC

HRA Screening Matrix		
Project	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	Mendip Limestone Grasslands SAC	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation**
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, WolversHill Road and the new southern link, and a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the SAC	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is c2.5km from the SAC at its nearest point	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the SAC.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	There SAC is not close enough for surface water runoff to be of concern. The SAC does not lie within 200m of the ARN for atmospheric pollution considerations	
Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavations within or near the SAC	
Transportation requirements	N/A Transportation of materials would utilise the local road network and Scheme footprint.	
Duration of construction, operation, etc.	It is planned that construction will start in early 2023 and last approximately 28months (to be finished winter 2024/spring 2025). The	

	operational phase of the development is aimed for >60years
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	UK0030203 Mendip Limestone Grasslands SAC
Location and distance of the European Site from the proposed works	The SAC is c2.5km south of the proposed works
European Site Size	415.24Ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SAC is designated for the following features: • Semi-natural dry grasslands and scrubland facies on calcareous substrates • European dry heaths • Caves not open to the public • Tilio-Acerion forests of slopes, screes and ravines • Greater horseshoe bat
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Relevant pathways listed on Natura 2000 Standard Data Form: • Modification of cultivation practices • Air pollution, air-borne pollutants Relevant pathways listed within NE Site Improvement Plan • Change in land management

	• Air pollution, impact of atmospheric nitrogen deposition
European Site Conservation Objectives – where these are readily available	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of qualifying natural habitats and habitats of qualifying • species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site.
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
Movement of greater horseshoe bats occurs between this SAC and the North Somerset and Mendip bats SAC. Construction of the new road will result in severance of functionally linked habitat (through habitat loss or lighting) used by the qualifying bat species. Once the bypass is operational there is a collision risk between bats and vehicles if bats cross the Scheme, leading to injury or death of the qualifying species.	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No predicted impacts
Disturbance to key species	No predicted impacts. Roosts are far enough away from the Scheme to avoid direct disturbance
Habitat or species fragmentation	Potential for impacts on the horseshoe bat populations through severing functionally linked commuting and foraging habitat
Reduction in species density	Potential impacts from collision with vehicles.
Changes in key indicators of conservation value (water quality, etc)	No predicted impacts
Climate change	No predicted impacts

Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts predicted
Interference with key relationships that define the function of the site	No impacts predicted
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species fragmentation	Uncertain – depends on extent of movement of bats between Mendip Limestone Grasslands and the Banwell part of the North Somerset and Mendip Bats SAC
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not siginficant
Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Not significant
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
In regard to bats, the level of functional connection between the Mendip Grassland SAC and the Banwell parts of the North Somerset and Mendips Bats SAC is uncertain. There may be potential for significant effects on the horseshoe bat populations within the Mendips Grassland SAC if they utilise the Banwell area, due to severance of functionally linked commuting/foraging habitat through habitat loss and inappropriate lighting. There may also be the potential of death/injury of horseshoe bats trying to cross the Scheme.	
Outcome of Screening (delete as appropriate)	Sufficient uncertainty remains
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

B.4 Mells Valley SAC

HRA Screening Matrix		
Project	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	Mells Valley SAC	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation**
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, WolversHill Road and the new southern link, and a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the SAC	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is c27.5km from the SAC at its nearest point	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the SAC.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	The SAC is not close enough for surface water runoff to be of concern. The SAC does not lie within 200m of the ARN for atmospheric pollution considerations	
Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavations within or near the SAC	
Transportation requirements	n/a	
Duration of construction, operation, etc.	It is planned that construction will last approximately 28months. The operational	

	phase of the development is aimed to be >60years.
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	UK0012658 Mells Valley SAC
Location and distance of the European Site from the proposed works	Approximately 27.5km south-east of the Scheme
European Site Size	28.77Ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SAC is designated for the following reasons • Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)(*Important orchid sites) • Caves not open to the public • Greater horseshoe bat (*Rhinolophus ferrumequinum*)
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Relevant pathways listed on the Natura 2000 Standard Data Form: • Unknown threat or pressure
European Site Conservation Objectives – where these are readily available	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

	• The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species ¬ The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site.
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
Movement of greater horseshoe bats occurs between this SAC and the North Somerset and Mendip bats SAC. Construction of the new road will result in severance of functionally linked habitat (through habitat loss or lighting) used by the qualifying bat species. Once the bypass is operational there is a collision risk between bats and vehicles if bats cross the Scheme, leading to injury or death of the qualifying species.	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No impacts predicted
Disturbance to key species	No impacts predicted – roost sites within the SAC are enough distance from the Scheme to avoid disturbance
Habitat or species fragmentation	Potential for impacts on the horseshoe bat populations through severing functionally linked commuting and foraging habitat
Reduction in species density	Potential impacts from collision with vehicles.
Changes in key indicators of conservation value (water quality, etc)	No predicted impacts
Climate change	No predicted impacts
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts predicted
Interference with key relationships that define the function of the site	No impacts predicted
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant

Disturbance to key species	Not significant
Habitat or species fragmentation	Uncertain – depends on extent of movement of bats between Mells Valley and the Banwell part of the North Somerset and Mendip Bats SAC. The Banwell sites are the most westerly of the areas that make up the SAC and therefore the furthers from Mells Valley
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Not significant
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
In regard to bats, the level of functional connection between the Mells Valley SAC and the Banwell parts of the North Somerset and Mendips Bats SAC is uncertain. There may be potential for significant effects on the horseshoe bat populations within the Mells Valley SAC if they utilise the Banwell area, due to severance of functionally linked commuting/foraging habitat through habitat loss and inappropriate lighting. There may also be the potential of death/injury of horseshoe bats trying to cross the Scheme.	
Outcome of Screening (delete as appropriate)	Sufficient uncertainty remains
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

B.5 Bath & Bradford On Avon Bats SAC

HRA Screening Matrix		
Project	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	Bath and Bradford Upon Avon Bats SAC	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation**
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, WolversHill Road and the new southern link, and a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the SAC	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is c.40km from the SAC at its nearest point	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the SAC.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	The SAC is not close enough for surface water runoff to be of concern. The SAC does not lie within 200m of the ARN for atmospheric pollution considerations	
Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavations within or near the SAC	
Transportation requirements	n/a	
Duration of construction, operation, etc.	It is planned that construction will last approximately 28months. The operational	

	phase of the development is aimed to be >60years.
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	UK0012584 Bath & Bradford on Avon Bats SAC
Location and distance of the European Site from the proposed works	c.40km east of the Scheme
European Site Size	106.45Ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SaC is designated for the following reasons: Greater horseshoe bat (*Rhinolophus ferrumequinum*) Bechstein's bat (*Myotis bechsteinii*) Lesser horseshoe bat (*Rhinolophus hipposideros*)
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Relevant pathways listed on the Natura 2000 Standard Data Form: • Other urbanisation, industrial and similar activities • Other ecosystem modifications • Unknown threat or pressure Relevant pathways listed in the Site Improvement Plan (NE) • Planning permission: general • Offsite habitat availability/management

European Site Conservation Objectives – where these are readily available	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of the habitats of qualifying species • The structure and function of the habitats of qualifying species • The supporting processes on which the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site.
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
Movement of greater horseshoe bats occurs between this SAC and the North Somerset and Mendip bats SAC. Construction of the new road will result in severance of functionally linked habitat (through habitat loss or lighting) used by the qualifying bat species. Once the bypass is operational there is a collision risk between bats and vehicles if bats cross the Scheme, leading to injury or death of the qualifying species.	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No impacts predicted
Disturbance to key species	No impacts predicted – roost sites within the SAC are enough distance from the Scheme to avoid disturbance
Habitat or species fragmentation	Potential for impacts on the horseshoe bat populations through severing functionally linked commuting and foraging habitat
Reduction in species density	Potential impacts from collision with vehicles.
Changes in key indicators of conservation value (water quality, etc)	No predicted impacts
Climate change	No predicted impacts
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts predicted
Interference with key relationships that define the function of the site	No impacts predicted
Indicate the significance as a result of the identification of impacts set out above in terms of:	

Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species fragmentation	Uncertain – depends on extent of movement of bats between Bath & Bradford On Avon Bats SAC and the Banwell part of the North Somerset and Mendip Bats SAC. The Banwell sites are the most westerly of the areas that make up the SAC and therefore the furthest from Bath & Bradford on Avon SAC
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Not significant
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
In regard to bats, the level of functional connection between the Bath & Bradford on Avon SAC and the Banwell parts of the North Somerset and Mendips Bats SAC is uncertain. There may be potential for significant effects on the horseshoe and Bechstein's bat populations within the Bath & Bradford on Avon SAC if they utilise the Banwell area, due to severance of functionally linked commuting/foraging habitat through habitat loss and inappropriate lighting. There may also be the potential of death/injury of horseshoe bats trying to cross the Scheme.	
Outcome of Screening (delete as appropriate)	Sufficient uncertainty remains
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

B5: Exmoor and Quantock Oakwoods SAC

HRA Screening Matrix		
Project	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	Exmoor and Quantock Oakwoods SAC	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation)**
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, WolversHill Road and the new southern link, and a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the SAC	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is c.30km from the SAC at its nearest point	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the SAC.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	The SAC is not close enough for surface water runoff to be of concern. The SAC does not lie within 200m of the ARN for atmospheric pollution considerations	
Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavations within or near the SAC	
Transportation requirements	n/a	
Duration of construction, operation, etc.	It is planned that construction will last approximately 28months. The operational	

	phase of the development is aimed to be >60years.
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	UK0030148 Exmoor and Quantock Oakwoods
Location and distance of the European Site from the proposed works	c.30km southwest of the proposed works
European Site Size	1894.05Ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SAC is designated for the following reasons: • Old sessile oak woods with Ilex and Blechnum in the British Isles • Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) • Barbastelle bat (*Barbastellus barbastella*) • Bechstein's bat (*Myotis bechsteinii*) • Otter (*Lutra lutra*)
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Relevant pathways as listed on the Natura 2000 Standard Data Form • Air pollution, air-borne pollutants Relevant pathways as listed on the Site Improvement Plan. • Air pollution: risk of atmospheric deposition
European Site Conservation Objectives – where these are readily available	Ensure that the integrity of the site is maintained or restored as appropriate, and

	ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of the habitats of qualifying species • The structure and function of the habitats of qualifying species • The supporting processes on which the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site.
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
There may be movement of qualifying bat species between this SAC and the North Somerset and Mendip Bats SAC. Impacts are assumed based on this. Construction of the new road will result in severance of functionally linked habitat (through habitat loss or lighting) used by the qualifying bat species. Once the bypass is operational there is a collision risk between bats and vehicles if bats cross the Scheme, leading to injury or death of the qualifying species.	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No impacts predicted
Disturbance to key species	No impacts predicted – roost sites within the SAC are enough distance from the Scheme to avoid disturbance
Habitat or species fragmentation	Assuming movement of bats between the Quantock SAC and Banwell area/Mendip Bats SAC, there is potential for impacts on the barbastelle and bechstein bat populations through severing functionally linked commuting and foraging habitat
Reduction in species density	Potential impacts from collision with vehicles.
Changes in key indicators of conservation value (water quality, etc)	No predicted impacts
Climate change	No predicted impacts
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No predicted impacts
Interference with key relationships that define the function of the site	No predicted impacts
Indicate the significance as a result of the identification of impacts set out above in terms of:	

Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species fragmentation	Uncertain – depends on extent of movement of bats (if anyt) between the Exmoor & Quantock Oakwoods SAC and the Banwell area.
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Not significant
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
In regard to bats, the level of functional connection between the Exmoor and Quantock Oakwoods SAC and the Banwell area is uncertain. There may be potential for significant effects on the Barbastelle and Bechstein's bat populations within the Exmoor and Quantock Oakwoods SAC if they utilise the Banwell area, due to severance of functionally linked commuting/foraging habitat through habitat loss and inappropriate lighting. There may also be the potential of death/injury of horseshoe bats trying to cross the Scheme.	
Outcome of Screening (delete as appropriate)	Sufficient uncertainty remains
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

B6: Severn Estuary SAC

HRA Screening Matrix		
Project	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	Severn Estuary SAC	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation**
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, WolversHill Road and the new southern link, culverting of several rhynes/ditches and the construction of a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the SAC	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is c.5.7km from the SAC at its nearest point and is hydrologically connected via watercourses	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the SAC.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	During the construction phase, in the event of heavy rainfall/flooding there is the potential for silt run-off entering connecting water courses. During the operational phase polluted surface run off from the new carriageway (containing oil, salt or other substances) may enter connecting water courses. The SAC does not lie within 200m of the ARN for atmospheric pollution/deposition although connecting watercourses do	

Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavations within or near the SAC
Transportation requirements	n/a
Duration of construction, operation, etc.	It is planned that construction will last approximately 28months. The operational phase of the development is aimed to be >60years.
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	UK0013030 Severn Estuary SAC
Location and distance of the European Site from the proposed works	c6.7km west of the proposed works
European Site Size	73714.11
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SAC is designated for the following reasons: • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) • Sandbanks which are slightly covered by sea water all the time • Reefs • Sea lamprey • River lamprey • Twaite shad

Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Relevant pathways as listed on the Natura 2000 Standard Data Form: • Other urbanisation, industrial and similar activities • Human induced changes in hydraulic conditions • Changes in abiotic conditions Relevant pathways as listed in the Site Improvement Plan (NE) • Impacts of development • Water pollution • Air pollution: impact of atmospheric nitrogen deposition
European Site Conservation Objectives – where these are readily available	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site.
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
There may be movement of qualifying fish species between the watercourses over which the Scheme crosses. Culverting water courses and building a bridge may cause severance of connecting habitat impede movement of such species. There is the potential for polluted/sediment laden run-off to enter connecting watercourses, effecting water quality and consequently having an impact on qualifying habitats and species. If there is an increase in atmospheric pollution resulting from the Scheme this may increase deposition in the connecting watercourses effecting water quality and consequently having an impact on qualifying habitats and species.	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No impacts predicted

Disturbance to key species	No impacts predicted
Habitat or species fragmentation	Potential impacts: Habitat severance through culverting watercourses
Reduction in species density	Potential impacts: Qualifying fish species breed in freshwater. If they occur in the watercourses on site culverting may impede movement upstream and prevent breeding
Changes in key indicators of conservation value (water quality, etc)	Potential impacts: Pollution run-off may impact the water quality of the site (assumed no mitigation)
Climate change	No predicted impacts
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts predicted
Interference with key relationships that define the function of the site	Without appropriate controls there is the potential for pollution and/or sediment run-off to enter the Banwell river, or other local watercourses, tributary to the site.
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species fragmentation	Not significant.
Loss	Uncertain. There may be qualifying species loss.
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Uncertain. Without mitigation. The quantity of potential pollution resulting from the Scheme is likely to be insignificant in relation to the size of the SAC
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
In regard to qualifying fish species, the level of functional connection between the Severn Estuary SAC and the watercourses around the Banwell area is uncertain. There may be potential for significant effects on the fish populations if the watercourses are of a type suitable for extensive breeding. In this instance, culverting water courses may reduce breeding success. The Scheme is relatively small and any pollution effects on the watercourses around Banwell will likely be insignificant when considering the diluting effect of the Severn Estuary SAC. However, this does not take into account cumulative impacts.	

Outcome of Screening (delete as appropriate)	Sufficient uncertainty remains
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

B7: Severn Estuary SPA

HRA Screening Matrix		
Project	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	Severn Estuary SPA	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation**
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, WolversHill Road and the new southern link, culverting of several rhynes/ditches and the construction of a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the SPA	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is c.5.7km from the SPA at its nearest point and is hydrologically connected via watercourses	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the SPA.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	During the construction phase, in the event of heavy rainfall/flooding there is the potential for silt run-off entering connecting water courses. During the operational phase polluted surface run off from the new carriageway (containing oil, salt or other substances) may enter connecting water courses. The SPA does not lie within 200m of the ARN for atmospheric pollution/deposition although connecting watercourses do	

Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavations within or near the SPA
Transportation requirements	n/a
Duration of construction, operation, etc.	It is planned that construction will last approximately 28months. The operational phase of the development is aimed to be >60years.
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	UK9015022 Severn Estuary SPA
Location and distance of the European Site from the proposed works	c6.7km west of the proposed works
European Site Size	17600Ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SPA is designated for the following reasons: • Supports an internationally important wintering population of: Bewick's swan, European white fronted goose, shelduck, gadwall, dunlin, and redshank, • Supports nationally important winter populations of: wigeon, teal, pintail, pochard, tufted duck, ringed plover, grey plover, curlew, whimbrel and spotted redshank • Regularly supports over 20,000 waterfowl

	• Supports nationally important numbers of the following species on spring/autumn passage: ringed plover, dunlin, whimbrel and redshank. • Supports nationally important breeding populations of lesser black-backed gulls
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Relevant pathways as listed on the Natura 2000 Standard data form • Human induced changes in hydraulic conditions • Changes in sbiotic conditions • Other urbanisation, industrial and similar activities Relevant pathways as listed in the Site Improvement Plan (NE) • Impacts of development • Water pollution • Air pollution: impact of atmospheric nitrogen deposition
European Site Conservation Objectives – where these are readily available	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring; • The extent and distribution of the habitats of the qualifying features • The structure and function of the habitats of the qualifying features • The supporting processes on which the habitats of the qualifying features rely • The population of each of the qualifying features, and, • The distribution of the qualifying features within the site.
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
The land and waterways around Banwell are functionally linked habitats to the SPA which may support qualifying species outside of the SPA boundary. The landtake of the Scheme may impact the population of the qualifying features if it has significant use.	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No impacts predicted
Disturbance to key species	No impacts predicted

Habitat or species fragmentation	No impacts predicted – qualifying species do not occur in significant numbers around scheme area
Reduction in species density	No impacts predicted
Changes in key indicators of conservation value (water quality, etc)	Potential impacts: Without listed mitigation, pollution run-off may impact the water quality of the site
Climate change	No predicted impacts
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts predicted
Interference with key relationships that define the function of the site	Without appropriate controls there is the potential for pollution and/or sediment run-off to enter the Banwell river, or other local watercourses, tributary to the site
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species fragmentation	Not significant
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Uncertain – assumed pollution impacts (without mitigation) may not be significant when dilution effects considered
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
The Scheme is relatively small and any pollution effects (without mitigation) on the watercourses around Banwell will likely be insignificant when considering the diluting effect of the Severn Estuary SAC. However, this does not take into account cumulative impacts.	
Outcome of Screening (delete as appropriate)	Sufficient uncertainty remains
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

B8: Severn Estuary Ramsar

HRA Screening Matrix		
Project	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	Severn Estuary Ramsar	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation**
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, WolversHill Road and the new southern link, culverting of several rhynes/ditches and the construction of a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the Ramsar site	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is c.5.7km from the Ramsar site at its nearest point and is hydrologically connected via watercourses	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the Ramsar site.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	During the construction phase, in the event of heavy rainfall/flooding there is the potential for silt run-off entering connecting water courses. During the operational phase polluted surface run off from the new carriageway (containing oil, salt or other substances) may enter connecting water courses. The Ramsar site does not lie within 200m of the ARN for atmospheric pollution/deposition although connecting watercourses do	

Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavations within or near the Ramsar site
Transportation requirements	n/a
Duration of construction, operation, etc.	It is planned that construction will last approximately 28months. The operational phase of the development is aimed to be >60years.
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	Severn Estuary Ramsar
Location and distance of the European Site from the proposed works	c6.7km west of the proposed works
European Site Size	17600Ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The Ramsar site is designated under Ramsar Criteria 1, 3, 4, 5, 6 and 8: 1 – Habitats Directive Annex 1 features • Sandbanks which are slightly covered by sea water all the time • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Atlantic salt meadows 3 – Due to unusual estuarine communities, reduced diversity and high productivity 4 – Important for the run of migratory fish between sea and river via estuary (inc. Salmon, sea trout, sea lamprey, river lamprey,

	allis shad, twaite shad and eel). Also important for migratory birds in spring/autumn 8 – Fish of the whole estuarine and river system one of the most diverse in Britain with over 110 species recorded. 5 – Bird assemblages of international importance with peak winter counts of 70919 waterfowl 6 – Species/populations occurring at levels of international importance: Bewick's swan, greater white-fronted goose, common shelduck, Gadwall, Dunlin, Common redshank. Also (identified subsequent to designation): Lesser black backed gull, ringed plover, Eurasion teal, Northern pintail
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Impacts for SAC/SPA also relevant to he Ramsar Relevant pathways as listed on the Natura 2000 Standard data form for the SAC/SPA • Human induced changes in hydraulic conditions • Changes in sbiotic conditions • Other urbanisation, industrial and similar activities Relevant pathways as listed in the Site Improvement Plan (NE) for the SAC/SPA • Impacts of development • Water pollution Air pollution: impact of atmospheric nitrogen deposition
European Site Conservation Objectives – where these are readily available	No specific Conservation Objectives are available
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
The land and waterways around Banwell are functionally linked habitats to the Ramsar which may support qualifying species outside of the site boundary. The landtake of the Scheme may impact the population of the qualifying bird features if it has significant use. Culverting waterways may impact qualifying migratory fish species if there is use of the site	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No impacts predicted
Disturbance to key species	No impacts predicted
Habitat or species fragmentation	No impacts predicted – qualifying species do not occur in significant numbers around scheme area.
Reduction in species density	No impacts predicted

Changes in key indicators of conservation value (water quality, etc)	Potential impacts: Without listed mitigation, pollution run-off may impact the water quality of the site
Climate change	No predicted impacts
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts predicted
Interference with key relationships that define the function of the site	Without appropriate controls there is the potential for pollution and/or sediment run-off to enter the Banwell river, or other local watercourses, tributary to the site
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species fragmentation	Not significant
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Uncertain – assumed pollution impacts (without mitigation) may not be significant when dilution effects considered
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
The Scheme is relatively small and any pollution effects (without mitigation) on the watercourses around Banwell will likely be insignificant when considering the diluting effect of the Severn Estuary SAC. However, this does not take into account cumulative impacts.	
Outcome of Screening (delete as appropriate)	Sufficient uncertainty remains
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

B9: Chew Valley Lake SPA

HRA Screening Matrix		
Project	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	Chew Valley Lake SPA	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation**
	Victoria Nicholls - TACP	
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, WolversHill Road and the new southern link, culverting of several rhynes/ditches and the construction of a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the SPA	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is c.15km from the SPA at its nearest point.	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the SPA.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	Construction phase: Silt run off, accidental chemical/oil spillage entering water courses. During the operational phase polluted surface run off from the new carriageway (containing oil, salt or other substances) may enter connecting water courses. The SPA does not lie within 200m of the ARN for atmospheric pollution/deposition.	

Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavations within or near the SPA
Transportation requirements	n/a
Duration of construction, operation, etc.	It is planned that construction will last approximately 28months. The operational phase of the development is aimed to be >60years.
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	UK9010041 Chew Valley Lake SPA
Location and distance of the European Site from the proposed works	The site is c.15km east of the Scheme. There is no direct connectivity via watercourses but functional connectivity through habitat is assumed
European Site Size	575.94Ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SPA is designated due to the following qualifying species: • Northern shoveler (winter/autumn passage)
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	No relevant direct effect pathways listed in the Standard Data form or Site Improvement Plan. The supplementary advice document on conserving and restoring site features references the need to maintain the extent and distribution of supporting habitat outside of the SPA boundary therefore loss/degradation of such habitat can be considered a vulnerability of the Site.

European Site Conservation Objectives – where these are readily available	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring; • The extent and distribution of the habitats of the qualifying features • The structure and function of the habitats of the qualifying features • The supporting processes on which the habitats of the qualifying features rely • The population of each of the qualifying features, and, The distribution of the qualifying features within the site.
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
The Land take of the Scheme could remove functionally linked habitat which may impact qualifying species (Undefined functional link assumed between this SPA, the Severn Estuary SPA and the Somerset Levels SPA [from the document for the SPA "European Site Conservation Objectives: Supplementary advice on conserving and restoring site features"]. The Scheme footprint is positioned centrally to all 3 therefore functional linkage/use of habitat possible.)	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No impacts predicted
Disturbance to key species	No impacts predicted
Habitat or species fragmentation	No impacts predicted – qualifying species do not occur in significant numbers around scheme area
Reduction in species density	No impacts predicted
Changes in key indicators of conservation value (water quality, etc)	No impacts predicted
Climate change	No impacts predicted
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts predicted
Interference with key relationships that define the function of the site	No impacts predicted
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant

Disturbance to key species	Not significant
Habitat or species fragmentation	Not significant
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Not significant
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Outcome of Screening (delete as appropriate)	LSE Not Predicted
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

B10: Somerset Levels and Moors SPA

HRA Screening Matrix		
Project	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	Somerset Levels and Moors SPA	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation**
	Victoria Nicholls - TACP	
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, WolversHill Road and the new southern link, culverting of several rhynes/ditches and the construction of a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the SPA	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is c.12.7km from the SPA at its nearest point.	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the SPA.	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	During the construction phase, in the event of heavy rainfall/flooding there is the potential for silt run-off entering local water courses. During the operational phase polluted surface run off from the new carriageway (containing oil, salt or other substances) may enter connecting water courses. The SPA does not lie within 200m of the ARN for atmospheric pollution/deposition.	

Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavations within or near the SPA
Transportation requirements	n/a
Duration of construction, operation, etc.	It is planned that construction will last approximately 28months. The operational phase of the development is aimed to be >60years.
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	UK9010031 Somerset Levels & Moors SPA
Location and distance of the European Site from the proposed works	12.7km south of the Scheme. No direct connectivity via watercourses. Functional connectivity presumed
European Site Size	6394.18Ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The SPA is designated due to the following reasons: • Supports nationally important numbers of wintering Bewick's swan and golden plover • Regularly supports internationally important numbers of migratory teal and lapwing • Regularly supports over 20,000 wintering waterfowl (waterboard assemblage) including nationally important wintering numbers of gadwall, wigeon, and shoveler

Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	No relevant pathways listed on the Natura 2000 Standard Data Form Relevant pathways listed in the Site Improvement Plan (NE) • Offsite habitat availability/management
European Site Conservation Objectives – where these are readily available	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring; • The extent and distribution of the habitats of the qualifying features • The structure and function of the habitats of the qualifying features • The supporting processes on which the habitats of the qualifying features rely • The population of each of the qualifying features, and, The distribution of the qualifying features within the site.
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
The Land take of the Scheme could remove functionally linked habitat which may impact qualifying species (This SPA is ecologically linked to the Severn Estuary SPA with bird species notified as mobile qualifying features using either the inland or coastal European Sites as alternative winter feeding grounds according to weather conditions [from the document for the SPA “European Site Conservation Objectives: Supplementary advice on conserving and restoring site features”]. The Scheme footprint is positioned between both sites functional linkage/use of habitat possible.)	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No impacts predicted
Disturbance to key species	No impacts predicted
Habitat or species fragmentation	Potential impacts: severing/fragmentation of functionally supportive habitat
Reduction in species density	No impacts predicted
Changes in key indicators of conservation value (water quality, etc)	No impacts predicted
Climate change	No impacts predicted
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts predicted

Interference with key relationships that define the function of the site	No impacts predicted
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species fragmentation	No impacts predicted – surveys indicate qualifying species do not occur in significant numbers around scheme area
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant
Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Not significant
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
n/a	
Outcome of Screening (delete as appropriate)	LSE Not predicted
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

B11: Somerset Levels and Moors Ramsar

HRA Screening Matrix		
Project	HIF Banwell Bypass and Highways Improvement Project	
European Site under Consideration	Somerset Levels and Moors Ramsar	
Date	**Author (Name/Organisation)**	**Verified (Name/Organisation**
Description of project		
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of:		
Size and Scale (road type and probable traffic volume)	A new 3.5km (approx.) 2 lane bypass around the north of Banwell to redirect current traffic flow away from the centre of the village. A 0.6km link road to the south of the village is also planned. The bypass will support later housing development proposals The Scheme will include a new roundabout junction at the west end, additional junctions/junction improvements where the Scheme meets Summer Lane, Wolvershill Road and the new southern link, culverting of several rhynes/ditches and the construction of a bridge over the River Banwell north of the village. Most of the road will be constructed on an embankment.	
Land take	The footprint of the Scheme covers an area of approximately 50Ha, which combines all land required for construction, operation and maintenance, and associated biodiversity enhancement/landscaping. None of which is in the SPA	
Distance from the European site or key features of the site (from edge of the project assessment corridor)	The Scheme is c.12.7km from the Ramsar site at its nearest point.	
Resource requirements (from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts	There would be no resource requirement from within or near the Ramsar site	
Emissions (e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)	During the construction phase, in the event of heavy rainfall/flooding there is the potential for silt run-off entering local water courses. During the operational phase polluted surface run off from the new carriageway (containing oil, salt or other substances) may enter connecting water courses. The Ramsar site does not lie within 200m of the ARN for atmospheric pollution/deposition.	

Excavation requirements (e.g. impacts of local hydrogeology)	There will be no excavations within or near the Ramsar site
Transportation requirements	n/a
Duration of construction, operation, etc.	It is planned that construction will last approximately 28months. The operational phase of the development is aimed to be >60years.
Other	n/a
Description of avoidance and/or mitigation measures	
Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:	
Nature of proposals	Standard pollution prevention measures as required under legislation and best practice, including management of silt/sediment
Location	Within the development area
Evidence for effectiveness	Known to be highly effective at the prevention of pollution incidents near watercourses when prepared under relevant CIRIA and Environment Agency guidance
Mechanism for deliver (legal conditions, restrictions or other legally enforceable obligations)	Implementation of a Construction Environmental Management Plan (CEMP), to be conditioned into planning permission and assurance for implementation through the use of an onsite Environmental Clerk of Works (ECoW) during the entity of the construction phase
Characteristics of European Site(s)	
A brief description of the European Site to be produced, including information on:	
Name of European Site and its EU code	Somerset Levels & Moors Ramsar
Location and distance of the European Site from the proposed works	12.7km south of the Scheme. No direct connectivity via watercourses. Functional connectivity presumed
European Site Size	6394.18Ha
Key features of the European Site including the primary reasons for selection and any other qualifying interests	The Ramsar is designated under Ramsar Criteria 2, 5 and 6 (for international importance): • 2 – Supports vulnerable/endangered/critically endangered species (17 species of red data book invertebrates) • 5 – Regularly supports >20,0000 waterbirds (SPA listed species and others) • 6 – Supports >1% population of individual SPA species
Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	Relevant pathways listed in the Site Improvement Plan for the SPA (NE) also relevant here

	• Offsite habitat availability/management
European Site Conservation Objectives – where these are readily available	No Conservation Objectives available
Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the European Site.	
The Land take of the Scheme could remove functionally linked habitat which may impact qualifying bird species (The Ramsar site covers the same area as the Somerset Levels SPA which is ecologically linked to the Severn Estuary SPA. Bird species notified as mobile qualifying features using either the inland or coastal European Sites as alternative winter feeding grounds according to weather conditions [from the document for the SPA "European Site Conservation Objectives: Supplementary advice on conserving and restoring site features"]. The Scheme footprint is positioned between both sites functional linkage/use of habitat possible.)	
Initial Assessment	
The key characteristics of the site and the details of the European Site to be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	
Reduction of habitat area	No impacts predicted
Disturbance to key species	No impacts predicted
Habitat or species fragmentation	Potential impacts: severing/fragmentation of functionally supportive habitat
Reduction in species density	No impacts predicted
Changes in key indicators of conservation value (water quality, etc)	No impacts predicted
Climate change	No impacts predicted
Describe any likely impacts on the European Site as a whole in terms of:	
Interference with the key relationships that define the structure of the site	No impacts predicted
Interference with key relationships that define the function of the site	No impacts predicted
Indicate the significance as a result of the identification of impacts set out above in terms of:	
Reduction of habitat area	Not significant
Disturbance to key species	Not significant
Habitat or species fragmentation	No impacts predicted – qualifying species do not occur in significant numbers around scheme area
Loss	Not significant
Fragmentation	Not significant
Disruption	Not significant
Disturbance	Not significant

Changes to key elements of the site (e.g. water quality, hydrological regime etc)	Not significant
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale or magnitude of impacts is not known.	
Outcome of Screening (delete as appropriate)	LSE not predicted
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Document to be shared with Natural England as needed.

Appendix C Calculation of Area of Mitigation Habitat Required Within Red Line Boundary

Summary (Refer to Calculation Matrices below – Tables 6-8):

i. The Calculations in this Appendix include the additional 7.7ha of land that is subject to the Supplementary Compulsory Purchase Order (CPO).
ii. The identified habitat in Table 6 is based on the NVC habitat surveys carried out as part of the pre-planning ecology works.
iii. within the Habitat Loss Calculation (Stage 1) all hedgerows within the redline boundary of the Scheme were included as a single habitat unit, assumed species rich, and uncut / unmanaged, resulting in the highest potential score for this habitat. ***Note*** The habitat area for hedgerows was calculated by multiplying the recorded linear length of hedgerows across the Scheme by 3m (as recommended by the Supplementary Planning Document).
iv. The Primary Habitat Score is taken from the North Somerset and Mendip Bats SAC Supplementary Planning Document. (Appendix 2: Greater Horseshoe Bat Suitability Index). The highest possible score is 6. A score of 3 is average.
v. A Matrix Code is applied where a habitat matrix is present e.g. if a habitat unit consists of improved grassland with scattered scrub a Matrix Score will be applied for the scrub (taken from Appendix 2 of the SPD). The Matrix score can have a positive or negative value and is added/subtracted from the Primary Habitat Score. Where there is no effect from a Matrix type then a default score of 0 is used. No matrix habitats were present in any of the habitat blocks at Banwell.
vi. The Habitat Suitability Index (HSI) Score is calculated by combining the Primary Habitat Score with the Matrix Score then multiplying by the Formation and Management Scores.
vii. The formation score is a multiplier. Where there is no effect from Formation a default score of 1 is used. (No Formation codes are applicable to grassland habitat.)
viii. The Density Band Score is taken from Table 2 on p29 of the Supplementary Planning Document. It relates to the distance from a roost. Band A applies to maternity roosts (Scores 3). Band B (within 610m of a non-maternity roost) scores 2 and Band C (611-2440m from a non-maternity roost). These Scores have then been modified as per paragraph A5.30 of the SPD which states:

"*The following criteria should be used to modify the Band following the results of site surveys and applied to the whole of the*

proposed development site:

***Not present** – where potential habitat is present reduce the Band score down by 0.5, e.g. at Band A from 3 to 2.5; at B from 2 to 1.5, except at C where it is reduced to 0.*
***Commuting only** – as the Band the site falls within.*
***Commuting and Foraging** – increase the Band score by 0.5 e.g at Band C from 1 to 1.5; at B from 2 to 2.5; A stays at it is."*

ix. The Habitat Unit Value is calculated by multiplying the HSI Score by the Density Band Score. The maximum potential value is 18 (where a HSI of 6 is multiplied by a density band score of 3)

x. Multiplying the Habitat Unit Value by the habitat area (in Hectares) results in a value known as Habitat Units.

xi. The Total Habitat Unit value is then divided by 18 to give the *minimum* number of Hectares required for habitat mitigation within the Scheme boundary. The figure 18 is taken from the maximum Habitat Unit Vale score (refer to point ix) as the working assumption is that the created habitat will be optimal for the target species.

xii. For the Replacement Habitat Calculation (Stage 2) the same method is followed as for Stage 1. However, risk multipliers are applied to modify the score: Delivery Risk Value and the Temporal Risk Value.

xiii. The Delivery Risk is a multiplier based on the difficulty in recreating or restoring the proposed habitat:

Difficulty of re-creation/restoration	Multiplier
Very High	0.1
High	0.33
Medium	0.67
Low	1

xiv. The Temporal Risk is a multiplier used in consideration of the lag time between implementation of the development and the functionality of the replacement habitat:.

Years to target condition	Multiplier
1	0.965
5	0.837
10	0.70
15	0.59
20	0.49

xv. A modifier is also applied based on which Density Band the proposed mitigation falls in to.

Table 6: HEP Calculation for Habitat Loss – Greater Horseshoe Bats

Unit No.	Habitat	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Density Band Score	Area (Ha)	Habitat Units
		IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score				
1	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	2.5	1.66	12.45
2	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	2.5	3.67	27.53
3	Poor semi-improved grassland	GU0	4	-	0	-	1	GM1	1	4	2.5	5.26	52.60
4	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	1.53	6.89
5	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	2.30	10.35
6	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	2.13	9.59
7	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.93	4.19
8	Improved grassland (mixed grazing)	GI0	3	-	0	-	1	GM14	0.8	2.4	1.5	0.51	1.84
9	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	1.25	5.63
10	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	1.60	7.20
11	Improved grassland (sheep/mixed grazing)	GI0	3	-	0	-	1	GM14	0.8	2.4	1.5	1.93	6.95
12	Improved grassland (sheep/mixed grazing)	GI0	3	-	0	-	1	GM14	0.8	2.4	1.5	1.18	4.25
13	Improved grassland (sheep/mixed grazing)	GI0	3	-	0	-	1	GM14	0.8	2.4	1.5	2.10	7.56
14	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.32	1.44
15	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	1.34	6.03
16	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.08	0.36
17	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.62	2.79
18	No access (horse paddock)	GU0	4	-	0	-	1	GM13	0.8	3.2	1.5	1.09	5.23
19	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	1.49	6.71
20	Not surveyed (treeline)	LF12	6	-	0	-	1	LH1	1	6	2.5	0.01	0.15

Unit No.	Habitat	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Density Band Score	Area (Ha)	Habitat Units
		IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score				
21	Not surveyed (roadside verge)	LF272	0	-	0	-	1	LT4	0.5	0	2.5	0.02	0.00
22	Not surveyed (roadside verge)	LF272	0	-	0	-	1	LT4	0.5	0	2.5	0.01	0.00
23	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.05	0.23
24	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.16	0.72
25	Poor semi-improved grassland	GU0	4	-	0	-	1	GM1	1	4	1.5	0.14	0.84
26	Poor semi-improved grassland	GU0	4	-	0	-	1	GM1	1	4	1.5	0.01	0.06
27	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.31	1.40
28	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.29	1.31
29	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.02	0.09
30	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.97	4.37
31	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.11	0.50
32	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.01	0.05
33	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.02	0.09
34	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	1.15	5.18
35	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.01	0.05
36	Improved grassland (mixed grazing)	GI0	3	-	0	-	1	GM14	0.8	2.4	1.5	0.81	2.92
37	Improved grassland (mixed grazing)	GI0	3	-	0	-	1	GM14	0.8	2.4	1.5	1.06	3.82
38	Improved grassland (sheep grazing)	GI0	3	-	0	-	1	GM12	0.75	2.25	1.5	0.03	0.10
39	Orchard BAP Priority Habitat	GU0	4	TS1	1	CL31	1	GM1	1	5	1.5	0.08	0.60
40	Improved grassland (football pitch)	GI0	3	-	0	-	1	GL12	0	0	1.5	2.41	0.00
43	Not surveyed (boundary wall)	LF23	2	-	0	-	1	LT4	0.5	1	1.5	0.01	0.02

Unit No.	Habitat	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Density Band Score	Area (Ha)	Habitat Units
		IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score				
44	Poor semi-improved grassland	GU0	4	-	0	-	1	GM1	1	4	2.5	0.20	2.00
45	Not surveyed (garden verge)	UR0	1	-	0	-	1	UA3	0	0	2.5	0.01	0.00
46	Not surveyed (garden verge)	UR0	1	-	0	-	1	UA3	0	0	2.5	0.00	0.00
47	Not surveyed (garden verge)	UR0	1	-	0	-	1	UA3	0	0	2.5	0.01	0.00
48	Not surveyed (garden verge)	UR0	1	-	0	-	1	UA3	0	0	2.5	0.01	0.00
49	Not surveyed (garden verge)	UR0	1	-	0	-	1	UA3	0	0	2.5	0.04	0.00
50	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	2.5	0.03	0.23
51	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.50	2.25
52	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.69	3.11
53	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.06	0.27
54	Improved grassland	GI0	3	-	0	-	1	GM1	1	3	1.5	0.08	0.36
	Hedgerows	LFI1	6	-	0	-	1	-	1	6	2	2.45	29.40
											TOTAL	*42.76*	**239.61**
										Minimum amount of replacement equivalent habitat required for mitigation (Ha)			**13.31**

Table 7: HEP Calculation for Habitat Loss – Lesser Horseshoe Bats

Unit No.	Habitat Class	Primary Habitat		Matrix		Formation		Management/Land use		Habitat Suitability Index Score	Density Band Score	Habitat Unit Value	Area (Ha)	Habitat Units
		IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					
1	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	2.5	5	1.66	8.32
2	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	2.5	5	3.67	18.34
3	Poor semi-improved grassland	GU0	3	-	0	-	1	GM1	1	3	2.5	7.5	5.26	39.47
4	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	1.53	4.60
5	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	2.30	6.91
6	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	2.13	6.40
7	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.93	2.79
8	Improved grassland (mixed grazing)	GI0	2	-	0	-	1	GM14	0.8	1.6	1.5	2.4	0.51	1.23
9	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	1.25	3.76
10	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	1.60	4.79
11	Improved grassland (mixed grazing)	GI0	2	-	0	-	1	GM14	0.8	1.6	1.5	2.4	1.93	4.63
12	Improved grassland (mixed grazing)	GI0	2	-	0	-	1	GM14	0.8	1.6	1.5	2.4	1.18	2.84
13	Improved grassland (mixed grazing)	GI0	2	-	0	-	1	GM14	0.8	1.6	1.5	2.4	2.10	5.05
14	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.32	0.95
15	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	1.34	4.01
16	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.08	0.23
17	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.62	1.85
18	No access (horse paddock)	GU0	3	-	0		1	GM13	0.8	2.4	1.5	3.6	1.09	3.93
19	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	1.49	4.47
20	Not surveyed (treeline)	LF12	6	-	0		1	LH1	1	6	2.5	15	0.01	0.12
21	Not surveyed (roadside verge)	LF272	0	-	0		1	LT4	0.5	0	2.5	0	0.02	0.00
22	Not surveyed (roadside verge)	LF272	0	-	0		1	LT4	0.5	0	2.5	0	0.01	0.00

Unit No.	Habitat Class	Primary Habitat		Matrix		Formation		Management/Land use		Habitat Suitability Index Score	Density Band Score	Habitat Unit Value	Area (Ha)	Habitat Units
		IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					
23	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.05	0.15
24	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.16	0.48
25	Poor semi-improved grassland	GU0	3	-	0	-	1	GM1	1	3	1.5	4.5	0.14	0.61
26	Poor semi-improved grassland	GU0	3	-	0	-	1	GM1	1	3	1.5	4.5	0.01	0.04
27	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.31	0.92
28	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.29	0.88
29	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.02	0.05
30	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.97	2.90
31	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.11	0.32
32	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.01	0.03
33	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.02	0.05
34	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	1.15	3.45
35	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.01	0.02
36	Improved grassland (mixed grazing)	GI0	2	-	0	-	1	GM14	0.8	1.6	1.5	2.4	0.81	1.94
37	Improved grassland (mixed grazing)	GI0	2	-	0	-	1	GM14	0.8	1.6	1.5	2.4	1.06	2.55
38	Improved grassland (sheep grazing)	GI0	2	-	0	-	1	GM12	0.75	1.5	1.5	2.25	0.03	0.08
39	Orchard BAP Priority Habitat	GU0	3	TS1	1	CL31	1	GM1	1	4	1.5	6	0.08	0.49
40	Improved grassland (football pitch)	GI0	2	-	0	-	1	GM1	1	2	1.5	3	2.41	7.22
43	Not surveyed (boundary wall)	LF23	2	-	0		1	LT4	0.5	1	1.5	1.5	0.01	0.01
44	Poor semi-improved grassland	GU0	3	-	0	-	1	GM1	1	3	2.5	7.5	0.20	1.53
45	Not surveyed (garden verge)	UR0	1	-	0		1	UA3	0	0	2.5	0	0.01	0.00
46	Not surveyed (garden verge)	UR0	1	-	0		1	UA3	0	0	2.5	0	0.00	0.00
47	Not surveyed (garden verge)	UR0	1	-	0		1	UA3	0	0	2.5	0	0.01	0.00
48	Not surveyed (garden verge)	UR0	1	-	0		1	UA3	0	0	2.5	0	0.01	0.00

Unit No.	Habitat Class	Primary Habitat		Matrix		Formation		Management/Land use		Habitat Suitability Index Score	Density Band Score	Habitat Unit Value	Area (Ha)	Habitat Units
		IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					
49	Not surveyed (garden verge)	UR0	1	-	0		1	UA3	0	0	2.5	0	0.04	0.00
50	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	2.5	5	0.03	0.14
51	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.50	1.49
52	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.69	2.06
53	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.06	0.17
54	Improved grassland	GI0	2	-	0	-	1	GM1	1	2	1.5	3	0.08	0.23
	Hedgerows	LFI1	6	-	0	-	1		1	6	2	12	2.45	29.39
													42.74	**181.88**
										Minimum amount of replacement equivalent habitat required for mitigation (Ha)				**10.10**

Table 8: HEP Calculation for proposed replacement habitat (mitigation) outside of the 20m buffer: Greater Horseshoe Bats.

Habitat Unit	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Area (Ha)	Delivery Risk	Temporal Risk	Spatial Risk		Equivalent Ha
	IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					Development site density band	Mitigation site density band	
Reinstated grassland	GP0	3	-	0	-	1	GM1	1	3	1.62	1	0.84	1.5	1.5	1.36
Reinstated grassland	GP0	3	-	0	-	1	GM1	1	3	0.66	1	0.84	1.5	1.5	0.55
Reinstated grassland	GP0	3	-	0	-	1	GM2	0.3	0.9	0.71	1	0.84	1.5	1.5	0.18
Reinstated grassland	GP0	3	-	0	-	1	GM2	0.3	0.9	0.91	1	0.84	2.5	2.5	0.14
Reinstated grassland	GP0	3	-	0	-	1	GM1	1	3	0.71	1	0.84	1.5	1.5	0.60
Reinstated grassland	GP0	3	-	0	-	1	GM2	0.3	0.9	0.12	1	0.84	1.5	1.5	0.03
Reinstated grassland	GP0	3	-	0	-	1	GM1	1	3	1.60	1	0.84	1.5	1.5	1.34
Reinstated grassland	GP0	3	TS11	1	-	1	GM1	1	4	2.57	1	0.84	1.5	1.5	2.88
Reinstated grassland	GP0	3	-	0	-	1	GM2	0.3	0.9	0.83	1	0.84	1.5	1.5	0.21
Species rich grassland	GU0	4	TS11	1	-	1	GM2	0.3	1.5	0.33	0.67	0.70	1.5	1.5	0.08
Species rich grassland	GU0	4	-	0	-	1	GM12	0.75	3	0.52	0.67	0.70	1.5	1.5	0.24
Species rich grassland	GU0	4	TS11	1	-	1	GM2	0.3	1.5	0.18	0.67	0.70	1.5	1.5	0.04

Habitat Unit	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Area (Ha)	Delivery Risk	Temporal Risk	Spatial Risk		Equivalent Ha
	IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					Development site density band	Mitigation site density band	
Species rich grassland	GU0	4	SC21	1	-	1	GM2	0.3	1.5	0.13	0.67	0.70	1.5	1.5	0.03
Species rich grassland	GU0	4	SC21	1	-	1	GM2	0.3	1.5	0.31	0.67	0.70	1.5	1.5	0.07
Species rich grassland	GU0	4	TS11	1	-	1	GM2	0.3	1.5	0.12	0.67	0.70	1.5	1.5	0.03
Species rich grassland	GU0	4	-	0	-	1	GM2	0.3	1.2	0.17	0.67	0.70	2.5	2.5	0.02
Species rich grassland	GU0	4	TS11	1	-	1	GM2	0.3	1.5	0.18	0.67	0.70	2.5	2.5	0.03
Species rich grassland	GU0	4	SC21	1	-	1	GM2	0.3	1.5	0.05	0.67	0.70	2.5	2.5	0.01
Species rich grassland	GU0	4	SC21	1	-	1	GM1	1	5	0.41	0.67	0.70	2.5	2.5	0.19
Species rich grassland	GU0	4	-	0	-	1	GM2	0.3	1.2	0.13	0.67	0.70	2.5	2.5	0.01
Species rich grassland	GU0	4	-	0	-	1	GM2	0.3	1.2	0.10	0.67	0.70	2.5	2.5	0.01
Species rich grassland	GU0	4	-	0	-	1	GM1	1	4	0.25	0.67	0.70	2.5	2.5	0.09
Species rich grassland	GU0	4	-	0	-	1	GM2	0.3	1.2	0.12	0.67	0.70	2.5	2.5	0.01
Species rich grassland	GU0	4	-	0	-	1	GM2	0.3	1.2	0.30	0.67	0.70	2.5	2.5	0.03
Conservation grazing	GU0	4	TS11	1	-	1	GM12	0.75	3.75	0.13	1	0.84	1.5	1.5	0.14

Habitat Unit	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Area (Ha)	Delivery Risk	Temporal Risk	Spatial Risk		Equivalent Ha
	IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					Development site density band	Mitigation site density band	
Conservation grazing	GU0	4	TS11	1	-	1	GM12	0.75	3.75	0.22	1	0.84	1.5	1.5	0.23
Conservation grazing	GU0	4	SC21	1	-	1	GM12	0.75	3.75	0.99	1	0.84	1.5	1.5	1.04
Conservation grazing	GU0	4	TS11	1	-	1	GM12	0.75	3.75	0.72	1	0.84	1.5	1.5	0.76
Conservation grazing	GU0	4	TS11	1	-	1	GM12	0.75	3.75	0.14	1	0.84	1.5	1.5	0.15
Conservation grazing	GU0	4	SC21	1	-	1	GM12	0.75	3.75	1.04	1	0.84	2.5	2.5	0.66
Conservation grazing	GU0	4	TS11	1	-	1	GM12	0.75	3.75	0.28	1	0.84	2.5	2.5	0.18
Conservation grazing	GU0	4	TS11	1	-	1	GM12	0.75	3.75	0.60	1	0.84	2.5	2.5	0.38
Conservation grazing	GU0	4	-	0	-	1	GM12	0.75	3	0.70	1	0.84	2.5	2.5	0.35
Conservation grazing	GU0	4	-	0	-	1	GM12	0.75	3	2.65	1	0.84	2.5	2.5	1.34
Conservation grazing	GU0	4	TS11	1	-	1	GM12	0.75	3.75	0.85	1	0.84	2.5	2.5	0.54
Conservation grazing	GU0	4	TS11	1	-	1	GM12	0.75	3.75	0.71	1	0.84	2.5	2.5	0.45
Hedgerow >20m buffer, retained and new	LFI1	6	-	0	-	1	-	1	6	1.08	1	0.83	1.5	1.5	1.79

Habitat Unit	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Area (Ha)	Delivery Risk	Temporal Risk	Spatial Risk		Equivalent Ha
	IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					Development site density band	Mitigation site density band	
Hedgerow >20m buffer, retained and new	LFI2	6	-	0	-	1	-	1	6	0.90	1	0.83	2.5	2.5	0.90
Hedgerow, Moor Road Connection, new	LFI1	6	-	0	-	1	-	1	6	0.17	1	0.70	1.5	1.5	0.24
								Actual Area		24.21		**TOTAL EQUIVALENT HECTARES**			**17.31**

Table 9: HEP Calculation for proposed replacement habitat (mitigation) outside of the 20m buffer: Lesser Horseshoe Bats.

Habitat	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Area (Ha)	Delivery Risk	Temporal Risk	Spatial Risk		Equivalent Ha
	IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					Development site density band	Mitigation site density band	
Reinstated grassland	GP0	2	-	0	-	1	GM1	1	2	1.62	1	0.84	1.5	1.5	0.91
Reinstated grassland	GP0	2	-	0	-	1	GM1	1	2	0.66	1	0.84	1.5	1.5	0.37
Reinstated grassland	GP0	2	-	0	-	1	GM2	0.3	0.6	0.71	1	0.84	1.5	1.5	0.12
Reinstated grassland	GP0	2	-	0	-	1	GM2	0.3	0.6	0.91	1	0.84	2.5	2.5	0.09
Reinstated grassland	GP0	2	-	0	-	1	GM1	1	2	0.71	1	0.84	1.5	1.5	0.40
Reinstated grassland	GP0	2	-	0	-	1	GM2	0.3	0.6	0.12	1	0.84	1.5	1.5	0.02
Reinstated grassland	GP0	2	-	0	-	1	GM1	1	2	1.60	1	0.84	1.5	1.5	0.90
Reinstated grassland	GP0	2	TS11	1	-	1	GM1	1	3	2.57	1	0.84	1.5	1.5	2.16
Reinstated grassland	GP0	2	-	0	-	1	GM2	0.3	0.6	0.83	1	0.84	1.5	1.5	0.14
Species rich grassland	GU0	3	TS11	1	-	1	GM2	0.3	1.2	0.33	0.67	0.70	1.5	1.5	0.06
Species rich grassland	GU0	3	-	0	-	1	GM12	0.75	2.25	0.52	0.67	0.70	1.5	1.5	0.18
Species rich grassland	GU0	3	TS11	1	-	1	GM2	0.3	1.2	0.18	0.67	0.70	1.5	1.5	0.03

Habitat	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Area (Ha)	Delivery Risk	Temporal Risk	Spatial Risk		Equivalent Ha
	IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					Development site density band	Mitigation site density band	
Species rich grassland	GU0	3	SC21	1	-	1	GM2	0.3	1.2	0.13	0.67	0.70	1.5	1.5	0.02
Species rich grassland	GU0	3	SC21	1	-	1	GM2	0.3	1.2	0.31	0.67	0.70	1.5	1.5	0.06
Species rich grassland	GU0	3	TS11	1	-	1	GM2	0.3	1.2	0.12	0.67	0.70	1.5	1.5	0.02
Species rich grassland	GU0	3	-	0	-	1	GM2	0.3	0.9	0.17	0.67	0.70	2.5	2.5	0.01
Species rich grassland	GU0	3	TS11	1	-	1	GM2	0.3	1.2	0.18	0.67	0.70	2.5	2.5	0.02
Species rich grassland	GU0	3	SC21	1	-	1	GM2	0.3	1.2	0.05	0.67	0.70	2.5	2.5	0.01
Species rich grassland	GU0	3	SC21	1	-	1	GM1	1	4	0.41	0.67	0.70	2.5	2.5	0.15
Species rich grassland	GU0	3	-	0	-	1	GM2	0.3	0.9	0.13	0.67	0.70	2.5	2.5	0.01
Species rich grassland	GU0	3	-	0	-	1	GM2	0.3	0.9	0.10	0.67	0.70	2.5	2.5	0.01
Species rich grassland	GU0	3	-	0	-	1	GM1	1	3	0.25	0.67	0.70	2.5	2.5	0.07
Species rich grassland	GU0	3	-	0	-	1	GM2	0.3	0.9	0.12	0.67	0.70	2.5	2.5	0.01
Species rich grassland	GU0	3	-	0	-	1	GM2	0.3	0.9	0.30	0.67	0.70	2.5	2.5	0.03
Conservation grazing	GU0	3	TS11	1	-	1	GM12	0.75	3	0.13	1	0.84	1.5	1.5	0.11

Habitat	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Area (Ha)	Delivery Risk	Temporal Risk	Spatial Risk		Equivalent Ha
	IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					Development site density band	Mitigation site density band	
Conservation grazing	GU0	3	TS11	1	-	1	GM12	0.75	3	0.22	1	0.84	1.5	1.5	0.18
Conservation grazing	GU0	3	SC21	1	-	1	GM12	0.75	3	0.99	1	0.84	1.5	1.5	0.83
Conservation grazing	GU0	3	TS11	1	-	1	GM12	0.75	3	0.72	1	0.84	1.5	1.5	0.60
Conservation grazing	GU0	3	TS11	1	-	1	GM12	0.75	3	0.14	1	0.84	1.5	1.5	0.12
Conservation grazing	GU0	3	SC21	1	-	1	GM12	0.75	3	1.04	1	0.84	2.5	2.5	0.52
Conservation grazing	GU0	3	TS11	1	-	1	GM12	0.75	3	0.28	1	0.84	2.5	2.5	0.14
Conservation grazing	GU0	3	TS11	1	-	1	GM12	0.75	3	0.60	1	0.84	2.5	2.5	0.30
Conservation grazing	GU0	3	-	0	-	1	GM12	0.75	2.25	0.70	1	0.84	2.5	2.5	0.26
Conservation grazing	GU0	3	-	0	-	1	GM12	0.75	2.25	2.65	1	0.84	2.5	2.5	1.00
Conservation grazing	GU0	3	TS11	1	-	1	GM12	0.75	3	0.85	1	0.84	2.5	2.5	0.43
Conservation grazing	GU0	3	TS11	1	-	1	GM12	0.75	3	0.71	1	0.84	2.5	2.5	0.36
Hedgerow >20m buffer, retained and new	LFI1	6	-	0	-	1	-	1	6	1.08	1	0.83	1.5	1.5	1.79

Habitat	Primary Habitat		Matrix		Formation		Management/Land use		HSI Score	Area (Ha)	Delivery Risk	Temporal Risk	Spatial Risk		Equivalent Ha
	IHS Code	Score	IHS Code	Score	IHS Code	Score	IHS Code	Score					Development site density band	Mitigation site density band	
Hedgerow >20m buffer, retained and new	LFI2	6	-	0	-	1	-	1	6	0.90	1	0.83	2.5	2.5	0.90
Hedgerow, Moor Road Connection, new	LFI1	6	-	0	-	1	-	1	6	0.17	1	0.70	1.5	1.5	0.24
								AREA		24.21		**TOTAL EQUIVALENT HECTARES**			**13.60Ha**

Appendix D References

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