Amey OW Ltd

Hereford Relief Road

Habitats Regulations Assessment

Route Corridor Options Screening Report

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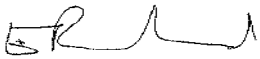
Approver	Elaine Richmond	

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1 INTRODUCTION

There are proposals for a Relief Road for the City of Hereford, in Herefordshire. A total of four broad route corridor options have been identified for further assessment, with two options to the east and two options to the west of Hereford. At present, it is anticipated that the construction of the Hereford Relief Road would be dual carriageway standard formation.

This Screening Report reviews the potential impacts on Natura 2000 Sites associated with each of the broad route corridor options currently under consideration. A Screening Exercise of the project has been undertaken, which has identified the Natura 2000 Sites which have the potential to be affected by the development of the proposed HRR. Three Natura 2000 Sites have been identified through this process: The Wye Valley Woodlands Special Area of conservation (SAC); The Wye Valley/Forest of Dean Bat Sites SAC and; the River Wye SAC.

The Hereford Relief Road project is not directly connected with the management of any of the Natura 2000 sites. Under the Conservation of Habitats and Species Regulations (2010), also known as the Habitats Regulations, it is therefore necessary for a Screening Exercise to be undertaken in relation to the project. This Screening Exercise represents the first stage of a Habitats Regulations Assessment for the proposed HRR, and considers whether impacts upon the Natura 2000 sites may be significant. When assessing potential impacts, a number of mitigation measures have been considered to be embedded into Scheme design. These have been taken into account when determining the likelihood of significant adverse impacts. These measures include the use of clear-span crossings of the River Wye/Lugg; the use of good-practice drainage design and pollution control measures during construction, in accordance with Environment Agency and CIRIA Pollution Prevention Guidelines (PPG); the use of Sustainable Drainage Systems incorporating pollution control measures such as oil interceptors and treatment ponds during operation; designing the works so as to avoid the need for in-channel working; and undertaking works at a time and in such a manner as to avoid or minimise disturbance to key species.

Should the Screening Exercise identify the potential for significant adverse impacts, the next stage of the process would be to produce a Statement to Inform an Appropriate Assessment (SIAA). This would assess in detail the potential for the proposed HRR to adversely affect the integrity of any of the Natura 2000 Sites, and would consider mitigation measures required to avoid or reduce impacts. It is envisaged that the SIAA would be produced following confirmation of the route corridor option to be used. Whilst this report represents the first stage of the Habitats Regulations assessment process only, i.e. screening, as much consideration as possible has been given to the likelihood and certainty of significant adverse effects on the integrity of the SAC resulting from the road construction.

Should it not be possible to rule out significant adverse effects, the next stage would be to undertake an Assessment of Alternative Solutions, although it should be noted that the work undertaken to inform this Screening Exercise has considered a number of options for the proposed HRR, in accordance with the Route Selection Study. If significant impacts still remained, the final stage of the Habitats Regulations Assessment would be an Assessment where no alternative solutions exist and where adverse impacts remain.

It should be noted that at this relatively early stage in the development of the proposals, design information is limited, and the Screening Exercise assessment has necessarily followed the precautionary principle when assessing the potential for impacts to occur.

Hyder Consulting have been commissioned by Amey OW Ltd, on behalf of Herefordshire Council, to undertake this assessment work. This has involved consultation with Natural England, the Local Planning Authority, and the Environment Agency. The results of desk study

research and field surveys, undertaken between May and October 2010, have also been taken into account, where relevant.

A more detailed outline of the process is presented in Appendix I.

2 BACKGROUND TO THE PROJECT

2.1 Project justification

The need for a Relief Road around Hereford has been under consideration since the late 1980s, when the first strategic studies began. A number of studies have been undertaken since this time, with a Multi-modal Study jointly commissioned by The Highways Agency and Herefordshire Council published in 2009 by JMP Consultants Limited. This identified that the transport network within Hereford City suffered from congestion, and that this situation would be exacerbated by proposals in the emerging LDF for future population growth in Hereford. The Multi Modal Study identified a relief road as an effective way to mitigate the impacts of this predicted growth.

Further to the Multi-modal Study, a Study of Options Report (Amey, 2010) was produced, which identified a Preferred Corridor for the Relief Road to the west of Hereford. This study considered social, economic, environmental and engineering constraints and opportunities. In parallel with this work, a more detailed Traffic Forecasting Study was carried out (WSI, 2010). This modelled predicted traffic flows, congestion and journey times across key routes through and around Hereford in 2026. Assessments were made of the effect of building the different Relief Road options, including analysis of the effects of various 'sustainable travel' options, both with and without the Relief Road.

The Traffic Forecasting Study indicated that whilst implementing sustainable transport measures reduced future congestion, the future situation remained significantly worse than the 2008 baseline. This study also confirmed that implementing the sustainable options in parallel with the proposed Hereford Relief Road would provide a significant reduction in journey times and congestion. The HRR is therefore being taken forward, with proposals to include it within the emerging Core Strategy and the Local Transport Plan for Herefordshire.

The emerging Core Strategy is undergoing a separate, but linked, HRA assessment in order to identify the potential impacts of the proposed policies and plans within it. This includes the proposed Hereford Relief Road as a policy. The Core Strategy HRA has drawn upon a draft of this report during production. It has also been possible to use the initial findings of the draft Core Strategy HRA to inform an assessment of cumulative impacts with the proposed Hereford Relief Road document. This is reported in Section 4.3, below.

2.2 Project Proposals

The assessment of potential impacts on designated Natura 2000 sites (Wye Valley Woodlands SAC, Wye Valley & Forest Of Dean Bat Sites SAC, and River Wye SAC) is based on the information currently available, and is subject to change as the Scheme develops.

The HRR will provide a north-south route bypassing the city of Hereford, reducing the amount of through-traffic currently passing through the frequently congested city centre. At present, it is anticipated that any route would be of a dual-carriageway construction although there remains a possibility that a single carriageway road could be used.

There are six broad options for route corridors currently under consideration, with a number of variations within each option. At this stage, each corridor is a minimum of 200m wide, allowing scope for future realignment as preferred route corridor option(s) are developed in the future and further information on constraints to route alignments becomes available.

Any route taken forward would need to include a largely newly-constructed road to either the west or east of Hereford. The eastern or western corridor would then tie into route corridor options north and south of Hereford, providing links to the existing road network. The north and south corridors would be achieved by a combination of new road construction and upgrading existing roads to up to dual carriageway standard. Both the north and south corridors would be required for any overall route.

The route corridor options can be summarised as follows and are presented in Appendix IV, Figures 551497-Stage2-Env-06-1-551497-Stage2-Env-06-14:

- Northern Corridor, linking the existing A49 north of Hereford to the proposed Relief Road;
- Southern Corridor, linking the existing A465 to the A49 at the junction with the Rotherwas Access Road and widening the Rotherwas Access Road to dual carriageway to provide links to the Rotherwas Industrial Estate;
- Western Corridor: two broad route corridor options, both linking the proposed Northern Corridor with the proposed Southern Corridor to the west of Hereford, including a crossing of the River Wye;
- Eastern Corridor: two broad route corridor options, both linking the proposed Northern Corridor with the Rotherwas Access Road to the east of Hereford, including crossings of the rivers Wye, and for one corridor the River Lugg.

The proposed HRR has the potential for adverse impacts on ecological features and designated sites. The potential impacts of the route options/combinations are evaluated and discussed in a separate report: Hereford Relief Road: Study of Options, Amey 2010 (Ecology and Nature Conservation sections).

3 PROTECTED SITES POTENTIALLY AFFECTED BY THE PROPOSALS

One Natura 2000 site, the River Wye/Afon Gwy Special Area of Conservation (SAC) also designated as a Site of Special Scientific Interest (SSSI) is crossed by each of the proposed route corridor options, and the potential exists for direct impacts upon this site. It will not be possible to develop a route option that avoids the River Wye, as it flows east to west across the entire Study Area.

Two Natura 2000 Sites that are designated for the Habitats Directive Annex II bat species that they support, are present within 30km of the proposed route corridor options. These are the Wye Valley and Forest of Dean Bat Sites/ Safleoedd Ystlumod Dyffryn Gwy a Fforest y Ddena SAC, and the Wye Valley Woodlands/ Coetiroedd Dyffryn Gwy SAC. Although these sites are located in excess of 20 km from the nearest route corridor option, they require consideration due to the presence of lesser and greater horseshoe bats (highly mobile species') as qualifying interests.

Detailed information about the qualifying interests, vulnerabilities, and, where available, conservation objectives for the three SAC sites, is presented in Appendix II. No other Natura 2000 sites are present within 30km of the site.

3.1 Wye Valley Woodlands SAC

Three woodland habitat types are listed as primary reasons for site selection in the SAC citation. These are *Asperulo-Fagetum* beech forests, *Tilio-Acerion* forests of slopes, screes and ravines, and *Taxus baccata* woods of the British Isles. Lesser horseshoe bats are listed as being a qualifying feature in the SAC citation. The closest part of the site is located 20.5 km from the nearest part of the proposed Hereford Relief Road, downstream of Hereford adjacent to the River Wye.

3.2 Wye Valley and Forest of Dean Bat Sites SAC

This SAC comprises a number of constituent sites, including buildings and mines and surrounding habitats used by roosting and hibernating lesser horseshoe bats and greater horseshoe bats (*Rhinolophus ferrumequinum).* The SAC Citation estimates that around 26% of the UK population of lesser horseshoe bats is present within the complex of sites, and around 6% of the UK population of greater horseshoe bats. Lesser and greater horseshoe bats are the only qualifying interests of the site, with both species primary reasons for site selection. The closest part of the site is located approximately 21.5km south of the proposed HRR.

3.3 River Wye/Afon Gwy SAC

The Wye is a major river, flowing west to east from Plynlimon in Wales to the Severn estuary. The River Wye SAC is of European importance for the riverine habitats and species it supports. Annex I Habitats included as primary reasons for selection of the SAC include watercourses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. The River Lugg, a major tributary of the Wye, flows in a southerly direction, joining the Wye south-east of Hereford. The lower reaches of the River Lugg are included in the SAC designation. The River Lugg is also separately designated as a SSSI. Lugg Meadows SSSI is a lowland hay meadow adjacent to the River Lugg, to the east of Hereford. Although not designated as a European site, the Lugg Meadows SSSI is nevertheless noteworthy due to both its location, adjacent to the River Lugg SSSI and River Wye SAC, and the habitats it contains.

A number of Annex II species are also listed as primary reasons for site selection of the river Wye SAC, these are:

- White-clawed crayfish (*Austropotamobius pallipes*),
- Sea lamprey (*Petromyzon marinus*),
- Brook lamprey (*Lampetra planeri*),
- River lamprey (*Lampetra fluviatilis*),
- Twaite shad (*Alosa fallax*),
- Allis shad (*Alosa alosa*),
- Atlantic salmon (*Salmo salar*),
- Bullhead (*Cottus gobio*), and
- Otter (*Lutra lutra*).

Freshwater pearl mussel (*Margaritifera margaritifera*) and lesser horseshoe bat (*Rhinolophus hipposideros*) are also listed as present on the Natura 2000 Standard Data Form for the site.

Conservation Objectives for the English sections of the SAC have been produced by Natural England. Conservation Objectives include the continued presence of populations of white-clawed crayfish, free of crayfish plague, and the maintenance of a diverse aquatic invertebrate assemblage representative of the habitats present along the river. Targets for maintaining the extent of riverine habitats have also been included. A number of targets for conserving populations of lamprey and shad species, and for bullheads and salmon have also been set, with recommendations for monitoring the condition and health of individuals in the River Wye. Conservation Objectives have also been established for otters, including maintaining the extent of riverside habitats for the species, and minimising disturbance and mortality as a result of human activities. Finally, a number of conservation objectives relating to river channel morphology and other physical characteristics, chemical and biological water quality, and vegetation community composition have also been set

Detailed information about the SAC, including information on the qualifying features, vulnerabilities and conservation objectives, is presented in Appendix II of this report.

4 POTENTIAL IMPACTS OF THE PROPOSALS

4.1 Methodology

4.1.1 Desktop Review and Site Visits

A desktop review of the scheme corridors and wider study area was undertaken in order to identify the known ecological constraints. Data on habitats, species and designated sites were obtained from several sources, including the Multi-Agency Geographic Information on the Countryside (MAGIC) website, the Herefordshire Biological Records Centre, Herefordshire Nature Trust, the Joint Nature Conservation Committee (JNCC), Natural England and the National Biodiversity Network (NBN). The review included a search for Natura 2000 sites up to 30km from the proposed route corridor options, designated with bats as one of the qualifying features.

Initial Site visits were undertaken in June 2010. These were followed up with a survey of the proposed crossing points of the River Wye and Lugg on the 20th November 2010. This survey was undertaken from the river channel, in order to gather as much information as possible about the habitats present at each of the proposed crossing points. The presence of *Ranunculus* beds, and other in-channel aquatic vegetation was recorded where present, and notes on the composition of bank-side vegetation made. The character of the substrate was also assessed where the base of the river could be seen, for example determining the relative proportion of silts, gravels, and larger stones as part of the overall substrate.

Critically, the suitability of the habitats at each crossing point for the species that are qualifying interests for the River Wye SAC, including the important fish species it supports, was also assessed. This assessment considered, as far as possible, the differing physiological and behavioural requirements of the various life stages of the species concerned. For example, the habitat requirements for lamprey ammocoetes (lavae) differ considerably from those of the adults.

A search for bank-side features that could be used as holts by otters was also carried out. The majority of the survey was undertaken from the river channel, but in some locations it was necessary to leave the river channel in order to inspect features on the bank more closely. It should be noted that very steep banks at the locations of the proposed western corridors, meant that it was not possible to safely gain access to much of the bank-side habitat.

4.1.2 Consultations

Consultations with statutory agencies have been undertaken and are currently ongoing. Consultees include:

- Herefordshire Council (Planning Ecologist);
- Natural England (Environmental Planning Officer for Herefordshire and Worcestershire); and
- Environment Agency (Biodiversity Officer).

This has included meetings with Natural England and Herefordshire Council's Ecologist on the 30th June, 2010, and a further meeting with Herefordshire Council Ecologist and other representatives of Herefordshire Council on the 30th of September 2010. A further meeting with Herefordshire Council, Natural England and Land Use Consultants (the latter were working with

Herefordshire Council to produce a Habitats Regulations Assessment for the draft Herefordshire local Development Framework) was held on the 16th of November, to discuss issues relating to the Hereford Relief Road HRA, in the context of the wider Herefordshire Local Development Framework.

The initial results of the consultation process indicated that the statutory consultees were broadly in agreement with the findings of the wider ecological assessment work undertaken so far (Hereford Relief Road Study of Options Report, Amey 2010) and; that the potential ecological impacts of the western route corridor options were likely to be lower than those associated with the eastern options.

A detailed consultation response was received from Natural England on 14th March 2011. This has been taken into account in the production of this Screening Report.

This included consideration of the different route corridor options in relation to their potential impacts upon Natura 2000 sites, principally the River Wye SAC and its tributary the River Lugg, which is included within the designated site boundary.

4.2 Results and impact assessment

4.2.1 Natura 2000 sites

One Natura 2000 site, the River Wye SAC, could potentially be directly or indirectly affected by the proposed HRR. Other than the River Wye SAC, no SAC sites are present within 20km of Hereford City. As described in Section 3, the Wye Valley Woodlands and Wye Valley and Forest of Dean Bat Sites SACs are located within 20.5 and 21.5 km of the proposals, respectively. The nearest SPA/Ramsar site is 35km distant. The River Wye and River Lugg are also designated as Sites of Special Scientific Interest (SSSI) where they are crossed by the route corridor options currently under consideration.

4.2.2 The proposed Route Corridor Options

Six broad route corridor options are currently under consideration, and therefore neither the exact location nor the detailed design of the HRR have been finalised. All options incorporate both north and south routes around Hereford, with two western options and two eastern options, one of which would be used to connect the north and south links. Whilst this means that the assessment is necessarily broad at this time, the flexibility in route alignment and design will allow measures to minimise negative effects on European Sites to be incorporated as the project develops. The assessment of potential impacts on designated Natura 2000 sites is based on the information currently available, and will be subject to refinement and review as the project develops.

Regardless of which of the proposed route corridor options are chosen, a new bridge crossing of the River Wye will be required. The route corridor options to the east of Hereford may also require construction works to be undertaken within the floodplain of the River Lugg, in close proximity to the Lugg Meadows SSSI, and the outer eastern route corridor options would also require the construction of two new bridge crossings over the River Lugg, in addition to a new crossing over the River Wye. The inner eastern option is also likely to lead to the extensive realignment, and potentially culverting, of the Lugg Rhea, a tributary of the River Lugg, where it is part of the River Wye SAC.

The proposed road will be of a dual carriageway standard, and significant engineering works will be required for any bridge crossing, regardless of the location. It is envisaged that wide-span crossings would be used whichever option is taken forward, with no permanent structures in the river channel itself. Direct and indirect construction and operational impacts, for example construction within the river channel (if needed), run-off and site drainage, shadowing, light pollution, habitat loss and fragmentation may impact on the qualifying features of the SAC if not appropriately assessed and mitigated for.

The options west of Hereford would involve a bridge crossing through at most 300 m of flood plain. The options to the east would be constructed through between 4 to 5.5 km of flood plain. Given the fact that a route corridor option to the east of Hereford would have greater potential for negative interactions with the River Lugg/Wye floodplain, these eastern options may be more likely to give rise to impacts on the integrity of the River Wye SAC (although long-term hydrological effects may be reduced by raising the road on pillars either side of the river).

Screening matrices for each of the six route corridor options for the HRR are presented in Appendix II of this report. A map showing the route corridor options and their relationship to the River Wye SAC and other designated sites is provided in Appendix IV.

The Screening Matrix format is taken from Annex C of the Design Manual for Roads and Bridges (DMRB) (*Volume 11, Section 4, Part 1: HD 44/09*, 2009).

4.2.3 The Wye Valley Woodlands

This SAC has been designated primarily on the basis of supporting Annex 1 Woodland habitats, with lesser horseshoe bats recorded as an Annex II qualifying interest, but not as a primary reason for site selection. Given the distance of the site from the proposals (20.5km at closest point), it is extremely unlikely that the construction and operation of the Hereford Relief Road could result in any adverse effects on the integrity of the SAC.

The woodland habitats of the site could be affected if the proposed HRR resulted in significant changes in air quality in their vicinity. However the distance makes such effects, either from traffic using the new HRR or increased traffic on other roads, extremely unlikely. DMRB Volume 11 Section 3 Part 1 Air Quality (HA 207/07) pg 3 states: "Only properties and Designated Sites within 200m of roads affected by the project need be considered." 'Affected roads' include the proposed route alignment as well as locations where traffic flows/speeds will change by more than a number of set criteria. Although theoretically a location 20km away from a route could be affected by it, it is highly unlikely, and there is therefore a very low likelihood of significant effects upon designated habitats within the SAC. Detailed traffic modelling and forecasting would be undertaken as the project develops. It is not anticipated that this would identify the potential for air quality impacts in the vicinity of the Wye Valley Woodlands SAC. Nevertheless, if air quality impacts were anticipated, the findings of this Screening Exercise would need to be reviewed.

In light of the above, it is not considered that there could be Likely Significant Effects as a result of air quality changes associated with the proposals.

Lesser horseshoe bats most regularly forage up to a few km from their roost sites (Schofield, 2008; Bontadina *et al,* 2002*)*. It is therefore extremely unlikely that individuals associated with the SAC will forage in the vicinity of the proposed HRR. Spring/autumn movements between summer roost sites and winter hibernation sites may be considerably further than this, with maximum recorded migration distances in excess of 50km. However, hibernation sites are usually located within 5-10km of maternity roosts (www.jncc.gov.uk), and it is likely that only small numbers of bats move in excess of 20km to their hibernation sites each year.

Both the Wye Valley Woodlands and Wye Valley/Forest of Dean Bat sites are located south-east of Hereford. The next nearest SAC supporting the species is the Usk Bat Sites SAC, approximately 42km south-west of Hereford, which is believed to support approximately 5% of the UK population of lesser horseshoe bats. Although SAC sites designated for lesser horseshoe bats are present north of Hereford, these are located in North Wales, in excess of 50 km north of the city, and further consideration of these sites is not considered necessary.

Desk study records, earlier survey work, and anecdotal information have confirmed that small numbers of lesser horseshoe bats are present in the vicinity of the proposed Hereford Relief Road. The most significant record was for a roost site located at grid reference SO 529 372, where a peak count of 40 lesser horseshoe bats were recorded in 2007. This location is approximately 50 m south of the proposed HRR. The number of individuals recorded, and consultations with the County Ecologist (B. Symons, pers. comm.), indicate that this site is likely to represent a small maternity roost. These bats are not considered to be part of the SAC populations.

Whilst further investigations will be required to determine the status of any roosts present, and to fully inform the impact assessment process and mitigation proposals for the HRR (and to

comply with species licensing requirements under the Habitat Regulations (2010), it is unlikely that any bats present are strongly associated with the Wye Valley Woodlands.

The draft HRA of the draft Herefordshire Core Strategy has identified the potential for impacts on air quality as a result of development measures that are proposed for Ross-On-Wye. The Core Strategy Work has identified that the development proposals could result in increased traffic flows along local roads, particularly the A438 which passes within 200m of the SAC. The draft HRA considers that there is the potential for this to negatively affect air quality in the vicinity of the Wye Valley Woodlands, with possible effects on the habitats present. The need for additional work to clarify these impacts and any mitigation measures that may be required has been identified in the draft Core Strategy HRA. This work would need to be undertaken at the detailed planning stages, as the proposals in the Core Strategy are not in sufficient detail to undertake detailed assessments of likely changes in traffic flows and speeds.

There is therefore the possibility for negative impacts on air quality within the SAC as a result of proposals within the draft Core Strategy. Consideration has been given to whether these effects could interact with those of the proposed Relief Road, and lead to more significant in-combination effects. Given the guidance in DMRB Vol. 11 in relation to air quality modelling, it is considered highly unlikely that in-combination effects between the development at Ross-on-Wye and the proposed Hereford Relief Road would increase any impacts associated with the Ross-On-Wye developments.

The draft Core Strategy also identified the potential for development proposals in the draft core strategy, particularly around Ross-On-Wye to result in disturbance to lesser horseshoe bat populations that are qualifying interests of the SAC to be affected by increases in noise and light, during construction and subsequent occupation of new developments. These impacts are considered to be reasonably unlikely to be significant, and to be relatively easily mitigated at the detailed planning stage. Given the scale of impacts anticipated, increased in-combination effects with the proposed Hereford Relief Road are considered extremely unlikely to occur.

In light of the above, the proposed HRR would have no significant adverse effects on the favourable conservation status of the Wye Valley Woodlands SAC, whichever route corridor option is taken forward.

4.2.4 The Wye Valley/Forest of Dean Bat Sites

This SAC has been designated solely on the basis of the populations of greater and lesser horseshoe bats the site supports. Both species are primary reasons for site selection. The nearest component of the site lies approximately 21.5 km south-east of the proposed HRR.

As stated in Section 3.2, the site is believed to support approximately 6% of the UK population of greater horseshoe bats. Greater horseshoe bats are at the northern edge of their range in the UK at this site (Altringham, 2003; www.jncc.gov.uk), with no SAC sites for the species located further north. It is believed that the majority of the population hibernate in disused mines within the Wye Valley/Forest of Dean. No desk study records for greater horseshoe bats were obtained from within two kilometres of the proposed HRR during the desk study undertaken in 2010. Given this, it is considered highly unlikely that greater horseshoe bats associated with the SAC would be affected by the construction or operation of the HRR.

A radio-tracking study undertaken for Natural England in 2008 found that ten radio-tracked greater horseshoe bats from a maternity colony at Littledean, near the Forest of Dean, commuted a maximum of 10 km from their roost when foraging. This roost, located approximately 25-30 km from the proposed HRR, is one part of the Wye Valley and Forest of Dean bat sites SAC.

The complex of hibernation and roost sites and associated areas of foraging habitat are believed to support up to 26% of the UK population of lesser horseshoe bats. This may equate to a population of up to 5000 pre-breeding individuals, although recent evidence suggests that numbers of lesser horseshoe bats in Wales are increasing, and the numbers may therefore be higher. The citation states that the site "has been selected on the grounds of the exceptional breeding population" (www.jncc.gov.uk).

As described in Section 4.2.3, the majority of lesser horseshoe foraging activity takes place within a few km of summer roost sites, with winter foraging around hibernation sites usually restricted to suitable habitat within a few hundred metres. It is therefore extremely unlikely that individuals associated with the SAC will forage in the vicinity of the proposed HRR. Spring/autumn movements between summer roost sites and winter hibernation sites may be considerably further than this. However, hibernation sites are usually located within 5-10km of maternity roosts (www.jncc.gov.uk), and it is likely that only small numbers of bats move in excess of 20km to hibernation sites each year. The JNCC Conservation Status Assessment for the species (JNCC, 2006) states that "Undisturbed hibernation sites in underground caves, mines or cellars must be available at a maximum distance of 30 kilometres from the summer roosts."The draft Core Strategy also identified the potential for development proposals in the draft core strategy, particularly around Ross-On-Wye, to result in increased lighting disturbance to lesser and greater horseshoe bat populations that are qualifying interests of the SAC to be affected by increases in noise and light, during construction and subsequent occupation of new developments. These impacts are considered reasonably unlikely to be significant, and to be relatively easy to mitigate at the detailed planning stage. Given the scale of impacts anticipated, increased in-combination effects with the proposed Hereford Relief Road are not anticipated, as the Relief Road is not anticipated to have any Likely Significant Effects.

In light of the above, the proposed HRR would have no significant adverse effects on the favourable conservation status of the Wye Valley/Forest of Dean Bat Sites SAC, whichever route corridor option is taken forward.

4.2.5 The River Wye/Afon Gwy SAC

As described in Section 3.1, the River Wye SAC has been designated for the riverine habitats it supports, along with white-clawed crayfish, lamprey and shad species, Atlantic salmon, bullhead and otter. The potential impacts of the HRR on these species are described in the screening matrices in Appendix III in detail, and are summarised below, along with a description of mitigation measures that have been considered to be embedded in scheme design.

The North Core and South Core route corridor options are located 400 m and 1 km respectively from the River Wye SAC, including this section of the River Lugg, at their closest point. Given the distances involved, it is considered that there is a low likelihood of significant effects on the SAC. Any new road construction in this area would have to meet more stringent environmental standards than the existing roads, with improved drainage design including features such as oil interceptors, balancing ponds and Sustainable Drainage Systems (SuDS) in order to manage runoff from the road. These features would ensure that any drainage from the road reaching the SAC, would be effectively treated, to a higher standard than is currently the case for the existing roads in this area.

Experience on other recent road construction projects has found that water quality does not suffer in the long term. For example, more than five years of biological water quality monitoring on watercourses crossed by the M6 Toll have shown there to be a general improvement in water quality since the scheme has constructed in 2003. Water quality downstream of the scheme has not been adversely affected, and in many watercourses, the biological water quality is higher downstream than upstream.

Both the western and eastern route corridor options would require a new bridge crossing over the River Wye SAC. The eastern route corridor options would pass through a much greater length of floodplain than the western route corridor options and, in the case of the eastern outer corridor, would require two additional crossings of the River Lugg, which also forms part of the River Wye SAC.

There is currently limited information available with regard to design, construction methodologies and air and water quality modelling, and mitigation strategies for each of the route corridor options. It is therefore not possible to conclusively determine whether or not any of the route corridor options would result in significant adverse effects on the River Wye SAC, or inhibit the delivery of the Conservation Objectives for the site.

Nevertheless, it has been possible to undertake a comparison of the different route corridor options, and make an initial assessment of the potential effects of the east and west route corridor options on the River Wye SAC. Analysis of the screening matrices has allowed a comparison of the route corridor options to be made in terms of their potential to have significant adverse effects on the integrity of the SAC. Table 4-1 below summarises the key differences between the route corridor options, with more detail presented in Appendix III. The length of floodplain crossed by each route option refers to flood zone 2, with a 0.1% risk of flooding in any year (Amey, 2010).

Table 4-1

Potential Environmental Impact	Eastern Inner	Eastern Outer	Western Inner	Western Outer
Length of floodplain crossed by scheme	2.5 km	4-5.5 km	0.2 km	0.3 km
Culverting of Lugg Rhea (tributary of River Lugg)	Approximately 1 km may be culverted	No	No	No
Number of bridge crossings of River Lugg	0	2	0	0
Number of bridge crossings over the River Wye	1	1	1	1

As described in Section 3.1, the River Wye SAC has been designated for the riverine habitats it supports, along with white-clawed crayfish, lamprey and shad species, Atlantic salmon, bullhead and otter. The potential impacts of the HRR on these species are described in the screening matrices in Appendix III in detail, and are summarised below, along with a description of relevant mitigation measures that have been considered to be embedded in scheme design.

Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

The surveys undertaken in June and October 2010 identified *Ranunculus* beds within the river channel within each of the 200 m wide route corridors. Vegetation communities within the river could be affected by increased silt deposition, diffuse and point source pollution, including both air and waterborne, and shading of the river by new bridge structures. It is anticipated that shading of the river would not result in significant adverse effects on the vegetation communities

in the SAC, as less than 0.001% of the surface area of the SAC would be affected. Implementing appropriate pollution prevention strategies (in accordance with EA PPG and CIRIA guidance), should minimise the risk of silt and waterborne pollutants from the scheme entering the river for the western options, although further investigation of the potential impacts of airborne pollutants would need to be considered once this is available.

Discussions with the wider design and engineering teams for the project have indicated that delivering an effective pollution prevention strategy, particularly during construction of the scheme, would be much more challenging for the eastern route corridor options relative to the western route corridor options. This is due principally to the increased length of the flood plain affected by the inner and outer eastern route corridor options, with approximately 250 m affected with the western options compared to between 3 km and 5.5 km with the eastern options. Measures to control run-off, and consequent heavy silt-loading of the River Lugg & within downstream habitats of the river Wye during construction of an eastern option would be very technically demanding. For example, it may not be possible to install attenuation and treatment ponds, or oil interceptors within the floodplain, as the effectiveness of these could be compromised by flooding. There would be a large footprint of stripped soil during construction, and a wide variety of materials within the construction footprint that could potentially act as sources of pollution.

White-clawed crayfish

White-clawed crayfish populations in the UK are under sustained pressure from a number of sources, including reductions in water quality, the spread of invasive species including Signal Crayfish (*Pacifasticus leniusculus*) and Chinese Mitten Crab (*Eriocheir sinensis*), and outbreaks of crayfish plague (usually associated with signal crayfish and other non-native crayfish species). There is evidence that populations of white-clawed crayfish have suffered serious declines in the Wye catchment over recent years, and this is considered to be largely as a result of the spread of signal crayfish and crayfish plague through catchments of the Wye, including the Lugg. This is despite substantial trapping operations targeted at removing signal crayfish being undertaken by statutory and non-statutory conservation organisations. White-clawed crayfish populations in the River Wye have been assessed as being in unfavourable condition, with further declines forecast (Dyson *et al*, 2008). It is therefore particularly important that any route corridor option for the HRR taken forward avoids causing any further impacts upon the species.

It will be important to update desk study information as the project is developed, and potentially to undertake targeted crayfish surveys once a final route alignment has been selected. This would establish as far as possible whether white-clawed (or signal) crayfish were present in the vicinity of the proposed HRR, allowing targeted mitigation measures to be developed as required.

If present, particularly in any downstream habitats of any route corridor option taken forward, construction and operation of the scheme could have a number of effects upon white-clawed crayfish populations. White-clawed crayfish have a fine gill structure which is easily clogged, and could therefore be vulnerable to increased silt run-off and sedimentation during construction of the Scheme (Holdich, 2003). They are usually found in watercourses meeting Environment Agency General Quality Assessment Class Grades A or B. Any reductions in water quality as a result of pollutants entering the river during construction or operation of the HRR could therefore negatively affect crayfish populations (if present). However, the authors (Cresswell Associates), have found white-clawed crayfish in silty streams in large numbers during trapping operations carried out in advance of construction of the M6 Toll Road, suggesting crayfish are capable of surviving in watercourses with high silt loadings. For the western options the risk would be minimal, as following Environment Agency pollution prevention guidelines and developing a suitable drainage design for the scheme would make significant pollution events unlikely. It

would be much more difficult to avoid or mitigate for pollution events with the proposed eastern options, due to the extensive lengths of floodplain that would be affected by the footprint of the Scheme. Flooding during construction could lead to large quantities of silt, and potentially other pollutants being washed into the River Lugg, and subsequently into downstream habitats of the River Wye.

Fish species

A number of fish species are included within the River Wye SAC designation. A brief description of the relevant species is provided below, along with an assessment of the potential implications of the proposed HRR on these.

Sea, river and brook lamprey are qualifying interests of the River Wye SAC. The River Wye is considered to be one of the best sites in the country for these species. Sea and river lamprey are migratory, with adults inhabiting marine and estuarine habitats, and migrating up the river to breed. Brook lamprey are non-migratory, and remain in the river and its tributaries throughout their lifespan, although localised upstream movements to find suitable spawning sites are thought to occur (Maitland PS., 2003).

Allis and twaite shad are both present in the River Wye catchment, with twaite shad a primary reason for site selection and allis shad present as a qualifying interest only. Both species are migratory, with adults inhabiting marine and estuarine habitats, and migrating up the river to breed between April and June (Hillman. RJ., *et al,* 2003*)*. Allis shad are thought to be very rare within the catchment, with larger populations of twaite shad. Populations of both species are thought to be in unfavourable condition, although the data on which this assessment is based is limited (CCW, 2008).

Atlantic salmon is also a qualifying interest of the River Wye SAC. The species is also migratory, with adults inhabiting marine environments, and migrating up the river to breed. The timing of upstream migrations ('salmon runs') is not as strongly seasonal as in lamprey and shad species, and there is thought to have been a decline in spring migrations over recent decades (Hendry K., and Cragg-Hine D., 2003). The adults spawn in 'redds', comprising excavated depressions in the river substrate. Spawning takes place in the winter, with the eggs hatching the following spring. Spawning typically takes place in clean, gravel-dominated substrates.

Bullhead are a further qualifying interest of the River Wye SAC. The species is relatively sedentary and non-migratory, inhabiting the bottom of watercourses, typically favouring stony substrates. Spawning takes place between February and June, with the males creating a nest under a stone or other piece of debris, to which they attempt to attract females (Tomlinson ML., & Perrow MR., 2003). Bullhead populations are thought to be vulnerable to predation and competition from non-native signal crayfish, and populations in the Wye catchment could decline if signal crayfish populations increase. Bullhead populations are currently thought to be in unfavourable condition throughout the Wye catchment, although this assessment is based on proxy water quality data, rather than monitoring of populations themselves (CCW, 2008).

Construction of the HRR could result in noise & vibration disturbance to fish species, and in the case of the migratory species could interfere with their migrations. Works that involve percussive construction techniques, such as pile-driving, are likely to have the greatest effects. Such activities should be avoided in the vicinity of the river if possible, or undertaken outside the key migration period and only during daylight hours.

Lamprey and shad species and Atlantic salmon spawn in gravel beds with low levels of fines, and eggs could therefore be vulnerable to increased silt deposition as a result of uncontrolled run-off during construction of the Scheme. Some suitable gravel/pebble beds were noted within

each of the four 200 m wide route corridor options when surveys were undertaken in June and October 2010. Bullheads spawn in clean cobble/pebble/gravel beds with low levels of fines, and require large stones above hard substrates for males to use as nest sites. Eggs are covered by a sticky membrane, and are attached to the bottom of stones and could therefore also be vulnerable to increased silt deposition. Larval lamprey (ammocoetes) inhabit sandy silt beds, and could also be impacted by increased silt deposition in these locations. Potentially suitable silt beds were noted in the vicinity of all of the proposed route corridor options.

Any reductions in water quality as a result of pollutants or silt entering the river during construction or operation of the HRR could negatively affect fish species, by interfering with migrations, reducing breeding success, or contributing to mortality of the species'. In the event of a severe pollution event leading to high levels of suspended solids, individual fish could be physically choked, or their feeding behaviour affected. For the western options the risk would be minimal, as following Environment Agency pollution prevention guidelines and developing a suitable drainage design for the scheme would significantly reduce the likelihood of waterborne pollution events. The use of clear-span structures for the River Wye crossing would also help to minimise potential impacts.

As for the other qualifying interests, it would be considerably more difficult to avoid or mitigate for pollution events with the proposed eastern options, due to the extensive lengths of floodplain within the construction footprint. Flooding during construction could lead to large quantities of silt being washed into the River Lugg and Wye, and potentially other pollutants if sources could not be removed from site prior to flooding. There would also be increased effects on tributaries of the River Wye & Lugg with the eastern route corridor options, and two additional bridge crossings with the eastern outer route corridor option.

Otter

Otters are recorded as being present throughout the River Wye and its tributaries (Heaver *et al*, 2009), including up and downstream of all proposed crossing points of the HRR. Desk study records of otters on the Rivers Wye and Lugg were provided by the Herefordshire Biological Records Centre. A large number of records from the Lugg Rhea, a tributary of the River Lugg, were also provided. The potential exists for the proposed HRR to affect otter populations associated with the River Wye SAC. Otters have large home ranges, and could be affected by the proposed HRR outside the boundaries of the SAC, particularly where watercourses connecting to the SAC are present, or if holt sites are found in these locations. Otters regularly use above-ground resting sites, such as areas with dense scrub cover or overhanging root plates. Holts are enclosed, usually underground structures. Maternity holts are used by female otters around the time they give birth, and may be located some distance away from the river itself. Otters feed on a variety of fish species in the river, and will also feed on both native and non-native crayfish, amphibians, and on occasion waterfowl and small mammals.

Site clearance and construction activities could result in the loss or damage of holt or lying up sites. No evidence of holts was recorded in habitats in close proximity to the proposed river crossings during surveys undertaken in June and October 2010, but such sites may exist in areas of woodland away from the SAC. Further surveys should be undertaken on any route corridor option taken forward, to confirm the presence or absence of holts and/or above-ground resting sites. The loss of above-ground resting sites, or holts used on an occasional basis, if present, is unlikely to have a significant adverse effect on local otter populations, as abundant suitable habitat is present along the River Wye. However, the loss of any natal holt sites may be more significant, should they be present and it not be possible to avoid them through careful alignment of the road within the corridor. In this situation, is likely that compensation for the loss of any important holt sites, in the form of replacement artificial holts, would be required.

In addition to works around the River Wye, the inner eastern route corridor option would require the culverting or realignment of more than 1km of the Lugg Rhea. Culverting the Lugg Rhea is likely to result in the loss of foraging habitat and above-ground resting sites. Because such a substantial length of the watercourse may be culverted, it is also likely that the movement of otters along the watercourse would be affected. The constraints of the Lugg Meadows to the east and existing housing to the west results in there being very limited scope for realigning the inner eastern route corridor option, or space for local habitat replacement measures. The eastern outer option would require two additional crossings of the River Lugg, and would therefore affect more bank-side habitat than the western options, as well as passing through an extensive area of floodplain grazing meadow adjacent to the River Lugg.

Site clearance and construction activities would also have the potential to disturb otters in the vicinity of the works. It is likely that otters would however quickly become habituated to increased levels of noise and disturbance associated with new bridge crossings of the River Wye/River Lugg. Hyder Consulting have worked on several schemes where otters have been shown to move along river corridors during new bridge construction operations (see screening matrices in Appendix III for more information). Disturbance effects are more likely with the eastern route corridor options, due to the requirement for culverting of the Lugg Rhea (inner eastern route corridor option) or the two additional crossings of the River Lugg (outer eastern route corridor option).

Should the proposed HRR result in reductions in fish densities in the river, this could reduce the availability of prey species for otters. Significant reductions in fish densities as a result of the scheme construction would only be expected to occur in the event of a serious pollution event during construction or operation of the Scheme. As described above, this would be more likely to occur with the eastern options, due to the extensive length of flood-plain affected, and the additional crossings of the River Lugg associated with the eastern outer route corridor option.

Potential changes to other key indicators of conservation value

Construction works in close proximity to the SAC have the potential to alter the surrounding landform and geomorphology. The conservation and reinstatement of semi-natural habitats within and around the river is included as one of the conservation objectives for the site. If construction of the proposed crossing over the River Wye or River Lugg required reinforcement or other engineering works around the margins of the river, this could interfere with the natural movements of the river through the landscape.

The construction and operation of the scheme could potentially result in reductions of water quality in the River Wye SAC. Water quality (EA General Quality Assessments) is one of the measures by which the conservation status of the river is measured. Any reductions in water quality as a result of pollutants or silt entering the river during construction or operation of the HRR could therefore detrimentally affect the conservation status of the SAC. This could also result in changes in aquatic invertebrate assemblages; maintenance of an appropriately diverse fauna is one of the conservation objectives of the SAC.

In common with the qualifying features, the risks would be minimal with the western route corridor options, as following Environment Agency pollution prevention guidelines and developing a suitable drainage design for the scheme would significantly reduce the likelihood of waterborne pollution events. The use of clear-span structures for the River Wye crossing would also help to minimise potential impacts.

It would be much more difficult to avoid or mitigate for pollution events with the proposed eastern route corridor options, due to the extensive lengths of floodplain within the construction footprint. Flooding during construction could lead to large quantities of silt being washed into the River Lugg and downstream into habitats within the River Wye, and also other pollutants if

potential sources could not be removed from site prior to a flood event. As stated previously, providing mitigation to satisfactorily minimise risk for the eastern options is likely to be highly technically challenging.

4.3 In-combination effects

The draft Herefordshire Core Strategy HRA has identified the potential for policies and plans within the strategy to result in likely significant effects upon the River Wye SAC. It is therefore appropriate, in order to be consistent with the requirements of the Habitats Regulations (2010) to consider the potential for the Hereford Relief Road to result in Likely Significant Effects on the SAC in-combination with these other policies and plans.

The draft Core Strategy includes proposals for increased housing around Hereford, Leominster, and other towns which fall within the catchment area of the River Wye SAC and the designated portion of the River Lugg SAC, with up to 6,600 Units proposed in the vicinity of Hereford. This will increase demand for water abstraction from the River Wye/Lugg catchment, and increase the sewage treatment capacity requirement. This may have an effect on both hydrological processes and flow rates within the SAC rivers. Water quality within the River Wye and the River Lugg, could also be negatively affected. Water quality within the SAC is already below or near the minimum requirements in some locations; this is considered to be primarily the result of diffuse agricultural pollution and elevated phosphate levels in sewage treatment works outfalls. Any further decreases in water quality could therefore lead to likely significant effects on the SAC, and this is considered a particular concern by Natural England and the Environment Agency.

The proposed increases in housing may also lead to increases in the recreational use of the River Wye SAC, which could lead to increased disturbance to the species that are qualifying interests. However, the draft Core Strategy HRA does also make reference to a number of proposed policies within the draft Core Strategy designed to control and mitigate recreational activities on and around the river, although the potential for impacts remains.

There is the potential for the impacts associated with the Hereford Relief Road and the proposed developments described above to have increased in-combination effects on the SAC.

Finally, funding for the proposed Hereford Relief Road may be partially obtained from developers contributions for the proposed housing development around Hereford. It is therefore considered particularly important to consider impacts from both the road and the housing in-combination.

4.4 Outcome and conclusions

As stated in Section 1 of this report, the first part of the screening process requires consideration of the project or plan in respect of whether it is directly connected with or necessary for the management of European Sites. ‘Directly’ in this context means solely conceived for the conservation management of a site and ‘management’ in this context refers to the management measures required in order to maintain in favourable condition the features for which the European Site has been designated.

The proposed HRR is neither directly connected with, nor necessary for, the management of any of the Natura 2000 sites identified within 30 km of the proposals, and therefore requires assessment under the Habitat Regulations.

No significant adverse effects on either the Wye Valley Woodlands SAC or the Wye Valley & Forest of Dean Bats Sites SAC are anticipated. More information on how this decision was reached can be found in the screening matrices provided in Appendix III.

A screening matrix has also been produced for the River Wye/Afon Gwy SAC, covering each of the broad route corridor options currently under consideration. The development of the screening matrix has allowed the potential impacts of the eastern and western route corridor options to be compared. This exercise has demonstrated that there is much greater potential for the eastern route corridor options to have significant adverse effects on the integrity of the SAC relative to the western route corridor options. The western route corridor options are therefore preferred due to their reduced potential to negatively affect the integrity of the SAC, with routes utilising links WL1/WI2 the most preferable due to their proximity to Hereford.

The western route corridor options are considered unlikely to result in significant adverse effects on the integrity of the SAC, providing appropriate implementation of the assumed mitigation measures described in Section 4.2.5. However, at this stage in the project it is difficult to conclusively demonstrate this, and this finding can only be supported if in-combination effects with other policies and plans within the wider draft Core Strategy can be satisfactorily mitigated. Development of the preferred route corridor option would require further ecological surveys, air and water quality, and hydrological/hydrogeological surveys to be completed, and more detailed information on design and construction methodologies to be produced.

At this stage, Sufficient Uncertainty remains as to the potential for significant impacts on the qualifying features and conservation objectives of the River Wye SAC. As the project progresses, it may therefore be possible to confirm that there will be no significant adverse effects on the River Wye/Afon Gwy SAC, and to produce a Finding of No Significant Effects Report. Should it not be possible to rule out significant adverse effects through this more detailed screening approach, it would be necessary to proceed to the next stage of the HRA process, i.e. the production of a Statement to Inform an Appropriate Assessment.

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APPENDICES

Appendix I: Background to Habitats Regulations Assessment and Appropriate Assessment

The Natura 2000[1] network is a Europe-wide network of ecologically important sites (SPAs and SACs – also known as 'European Sites') that have been designated for protection under either the EU Birds Directive (Council Directive 79/409/EEC on the Conservation of Wild Birds) or the EU Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna).

The main aim of the Habitats Regulations is "*to contribute towards ensuring biodiversity through the conservation of natural habitats of wild fauna and flora in the European territory of the Member States to which the treaty applies*". Any actions taken must be designed to "*maintain or restore, at a favourable conservation status, natural habitats and species of wild fauna and flora of Community interest*". Under Article 6 of the Habitats Directive, an assessment is required where a plan or project may give rise to significant effects upon a Natura 2000 site.

In addition, it is a matter of law that candidate SACs (cSACs) and Sites of Community Importance (SCI) are considered in this process; furthermore, it is Government policy that sites designated under the 1971 Ramsar Convention for their internationally important wetlands (Ramsar sites) and potential SPAs (pSPAs) are also considered.

Article 6 (paragraphs (3) and (4)) of the Habitats Directive states that:

> (3) Any plan or project not directly connected with or necessary to the management of the site but likely to have significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.
>
> (4) If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted."

The requirements of the Habitats Directive are transposed into UK law by means of the Conservation of Habitats and Species Regulations 2010[2]. These Regulations are referred to as the Habitats Regulations in this report. In England, the statutory agency responsible for the designated areas is Natural England.

[1] The EU Habitats Directive, Article 3.1, states "A Coherent European ecological network of Special Areas of Conservation and Special Protection Areas pursuant to Directive 79/409/EEC shall be set up under the title Natura 2000"

[2] SI 2010/490

Under the Habitats Directive, an Assessment of Implications on European Sites (AIES), also known as Habitats Regulations Assessment (HRA), must be undertaken in order to assess the impacts of any project on the conservation objectives of European sites, including the possible requirements for Appropriate Assessment (AA).

Stages in Habitats Regulations Assessment

European Commission guidance (2001)[3] sets out the principles on how to undertake decision making in applying the Habitats Directive. The requirements of the Habitats Directive comprise four distinct stages:

Stage 1: Screening is the process which initially identifies the likely impacts upon a European site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts may be significant. It is important to note that the burden of evidence is to show, on the basis of objective information, that there will be no significant effect; if the effect may be significant, or is not known, that would trigger the need for an Appropriate Assessment. There is European Court of Justice case law to the effect that unless the likelihood of a significant effect can be ruled out on the basis of objective information, then an Appropriate Assessment must be made.

Stage 2: Appropriate Assessment is the detailed consideration of the impact on the integrity of the European site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's conservation objectives and its structure and function. This is to determine whether or not there will be adverse effects on the integrity of the site. This stage also includes the development of mitigation measures to avoid or reduce any possible impacts.

Stage 3: Assessment of alternative solutions is the process which examines alternative ways of achieving the objectives of the project or plan that would avoid adverse impacts on the integrity of the European site, should avoidance or mitigation measures be unable to cancel out adverse effects.

Stage 4: Assessment where no alternative solutions exist and where adverse impacts remain. At Stage 4 an assessment is made with regard to whether or not the development is necessary for imperative reasons of overriding public interest (IROPI) and, if so, of the compensatory measures needed to maintain the overall coherence of the Natura 2000 network.

Conservation Objectives of European Sites

Under Regulation 35(3) of the Habitats Regulations the appropriate statutory nature conservation body (in this case Natural England) has a duty to communicate the conservation objectives for a European Site to the relevant/competent authority responsible for that site. The information provided under Regulation 35 must also include advice on any operations which may cause deterioration of the features for which the site is designated.

The conservation objectives for a European Site are intended to represent the aims of the Habitats and Birds Directives in relation to that site. To this end, habitats and species of European Community importance should be maintained or restored to 'favourable conservation status' (FCS), as defined in Article 1 of the Habitats Directive below:

The conservation status of a natural habitat will be taken as 'favourable' when:

[3] European Commission (2001) *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6 (3) and (4) of the Habitats Directive 92/43/EEC*

- Its natural range and the area it covers within that range are stable or increasing;
- 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;
- Conservation status of typical species is favourable as defined in Article 1(i).

The conservation status of a species 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;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future;
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Guidance from the European Commission[4] indicates that the Habitats Directive intends FCS to be applied at the level of an individual site, as well as to habitats and species across their European range. Therefore, in order to properly express the aims of the Habitats Directive for an individual site, the conservation objectives for a site are essentially to maintain (or restore) the habitats and species of the site at (or to) FCS.

The European Commission guidance recommends that screening should fulfil the following steps:

1 Determine whether the plan (or policy) is directly connected with or necessary for the management of Natura 2000 sites.

2 Describe the plan and describe and characterise any other plans or projects which, in combination, have the potential for having significant effects on Natura 2000 sites.

3 Identify the potential effects on Natura 2000 sites.

4 Assess the likely significance of any effects on Natura 2000 sites.

Citation Information and Conservation Objectives for the Natura 2000 sites that are considered could be affected by the proposals have been provided by Natural England and are presented in Appendix II.

[4] Managing Natura 2000 sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC. (European Commission 2000)

Appendix II: Citation Information and Conservation Objectives for Natura 2000 sites

River Wye/Afon Gwy Special Area of Conservation

The River Wye forms one of the longest near natural rivers in England and Wales. From its source to its confluence the main channel is 250km long, drains a catchment of 4,136km^2 and has the fourth largest flow of any river in England and Wales.

The River Wye SAC and several of its tributaries represent a large, linear ecosystem which acts as an important wildlife corridor, an essential migration route and a key breeding area for many internationally important species. Its character spans a range of types from an upland base-poor stream to an estuarine, silty lowland river. The river's overall diversity is a product of its underlying geology, soil type, adjacent land-use and near natural fluvio-geomorphological regime.

The designated area of the River Wye is not fixed. The designation follows the river where it meanders. The designation includes all of the water to the river edge but the range beyond this is variable depending on land use and cover at time of designation. The most common is a 10m extension from the bank top in the designated area. However, in other stretches of the river, the designated area is to the bank top, and in others it extends much further to include hydrologically linked habitats.

Qualifying Features of the River Wye SAC

Annex I habitats that are a primary reason for the selection for this site

3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Barachion* vegetation. The Wye is a large river in a geologically mixed catchment, including shales and sandstones. There is a clear transition between the upland reaches, with characteristic bryophyte dominated vegetation, and the lower reaches, with extensive *Ranunculus* beds. There is an exceptional tange of aquatic flora in the catchment including river jelly-lichen *Collema dichotum*. The river channel is largely unmodified and includes some excellent gorges, as well as significant areas of associated woodland.

Annex I habitats present as a qualifying feature, but not a primary reason for selection

7140 Transition mires and quaking bogs.[5]

Annex II species that are a primary reason for the selection for this site

1092 White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*. The Welsh River Wye system is the best known site in Wales for white-clawed crayfish. The tributaries are the main haven for the species.

1095 Sea lamprey *Petromyzon marinus*. The Wye is an extensive river system crossing the border between England and Wales and the sea lamprey population is found in the main stem

[5] These habitats are only found in the Welsh section of the River Wye, in excess of and are therefore not considered further in this assessment.

below Llyswen. The site provides exceptionally good quality habitat for sea lamprey and supports a healthy population.

1096 Brook lamprey *Lampetra planeri*. The brook lamprey population is widely distributed in the River Wye catchment. The river provides exceptionally good quality habitat for brook lamprey and supports a healthy population.

1099 River Lamprey *Lampetra fluviatilis.* The river lamprey population is widely distributed in the River Wye catchment. The river provides exceptionally good quality habitat for river lamprey and supports a healthy population.

1103 Twaite shad *Alosa fallax.* This species has long been abundant in the River Wye. Twaite shad often spawn at or just above the tidal limit, but in the Wye they migrate over 100km upstream, the highest spawning site being at Builth Wells. The river has relatively good water quality, adequate flows through an unobstructed main channel and a wide range of aquatic habitats conducive to supporting this species. In particular, there are a number of deep pools essential for congregation before spawning.

1106 Atlantic salmon *Salmo salar.* Historically the Wye is the most famous and productive river in Wales for Atlantic salmon, with high quality spawning grounds and juvenile habitat in both the main channel and tributaries. The effect of river engineering work on migration and spawning has been limited and water quality is generally favourable. Although in the past non-native salmon may have been released into the system, the impact of this is likely to have been minimal. The Wye salmon population is particularly noted for the very high proportion (around 75%) of multi sea winter fish, a stock component which has declined sharply in recent years throughout the UK. This pattern has also occurred in the Wye, with a consequent marked decline in the population since the 1980's. However, the Wye salmon population is still of considerable importance in UK terms.

1163 Bullhead *Cottus gobio*. The diversity of habitat types in the Wye means that it is likely to represent most of the habitat conditions in which bullhead occurs in the UK, highlighting the conservation importance of this river.

1355 Otter *Lutra lutra*. The Wye holds the densest and most well-established otter population in Wales, representative of otters occurring in lowland freshwater habitats in the borders of Wales. The river has bank-side vegetation cover, abundant food supply, clean water and undisturbed areas of dense scrub suitable for breeding, making it particularly favourable as otter habitat.

Annex II habitats present as a qualifying feature, but not a primary reason for selection

1102 Allis shad *Alosa alosa*

Vulnerability of the River Wye SAC

The following information is taken from the Natura 2000 Standard Data Form[6].

Water quality impacts arising from changing agricultural land-use within the catchment are having direct and indirect effects on the SAC interests through effects of diffuse pollution such as nutrient run-off and increased siltation. Natural England (NE) and the Countryside Council for Wales (CCW) are seeking to address such issues through improved targeting of existing and

[6] River Wye/Afon Gwy Natura 2000 Standard Data Form, produced by JNCC. Version 2.1, 27th October 2003

new agri-environment schemes and through improvements in compliance with agricultural Codes of Practice.

Water quality is also affected by synthetic pyrethroid sheep-dips and by point source discharges within the catchment. The impact of sewage treatment works on the SAC is being addressed through the Asset Management Plan and review under the Habitats Regulations (superseded by the Conservation of Habitats and Species Regulations 2010). Loss of riparian habitat is occurring as a result of changes in agricultural land-use practices and other factors, including riverside development and the loss of alder tree-cover through disease. These impacts and concerns over water quality will be identified and actions recommended within the joint NE/CCW/Environment Agency Conservation Strategy for the river.

Fishing activities are implicated in the decline of the salmon; initiatives such as the Wye Salmon Action Plan will help address this issue.

There is increasing demand for abstraction from the river for agriculture and potable water. The impact of this is still being investigated by the Environment Agency, but maintenance of water levels and flow has been addressed under the review of consents under the Habitats Regulations (superseded by the Conservation of Habitats and Species Regulations 2010).

Demand for increased recreational activities is a source of potential concern for the future.

Conservation Objectives of the River Wye SAC

Conservation Objectives for the River Wye SAC were made available by Natural England.

Conservation Objective for habitat extent: To maintain the designated features in favourable condition, which is defined in part in relation to a balance of habitat extents. On this site favourable condition requires the maintenance of the extent of each habitat type. The SSSI area, including associated terrestrial habitats is 1150.6 ha in England and 245.2 ha in Wales. The river is split into three different River Types: I (Group A1i) naturally eutrophic lowland river with a high base flow but minimal gradients; II (Groups A2ii, A2iii) slow-flowing naturally eutrophic lowland rivers, dominated by clays with minimal gradients and VI (Group B3ii, B4iv) lowland, base-rich mesotrophic.

Site-specific standards defining favourable condition include measurements of water quality, water flow, habitat structure, channel form, plant community species composition and abundance. Negative indicators include alien/introduced species, in-stream barriers and fish introduction.

Conservation Objective for species populations: To maintain the designated species in favourable condition, which is defined in part in relation to their population attributes. On this site favourable condition requires the maintenance of the population of each designated species or assemblage. Site specific standard defining favourable condition include the following:

Invertebrate assemblages: a wide characteristic diversity of invertebrates supported throughout the river length and habitats including associated terrestrial habitats;

White-clawed crayfish: At least moderate abundance according to monitoring category protocols. Determination of unfavourable condition should only be made where low densities are known to be related to an impact of some kind, or where historical survey data suggest that higher densities should be present;

Fish: Fish biomass should stay within natural fluctuations recorded through the Environment Agency, local fishery or SFCC data;

Otter: Presence recorded throughout catchment and the population at least maintained.

Appendix III: Screening Matrices

Wye Valley Woodlands SAC

Project Name:	Hereford Relief Road (North Core Route)	
Natura 2000 Site under Consideration	Wye Valley Woodlands (UK0012727)	
Date:	**Author (Name/Organisation):**	**Verified (Name/Organisation):**
14th December 2010	Matthew Hague/Philip Davidson Hyder Consulting	Elaine Richmond, Hyder Consulting
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)*	There are proposals to construct a Dual All Purpose (D2AP) road within the 200m wide corridor shown on Figure 551497-Stage2-Env-06-1. Links would be required to both the south and north of Hereford. In order to provide a connecting north-south link around Hereford, a further link would be required to either the east or west of the city.	
▪ Land-take	There will be no land take within or in close proximity to the SAC.	
▪ Distance from the European Site or key features of the site *(from edge of the project assessment corridor)*	At its closest point, the HRR is located approximately 20.5km from the Wye Valley woodlands.	
▪ Resource requirements *(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)*	None required.	
▪ Emissions *(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)*	**Surface water:** There is the potential for the scheme to generate water-borne pollution, including suspended solids and particulates, hydrocarbons and other chemicals during both construction and operation of the scheme. These could enter the River Wye if not appropriately controlled, and flow downstream towards the Wye Valley Woodlands, although it is not anticipated that significant levels of pollutants could be transported far enough downstream to potentially affect the Wye Valley Woodlands. **Air quality:** Emissions associated with construction machinery and vehicles using the proposed route corridor would lead to local increases in air pollution. However, given the distances involved no discernible changes in the vicinity of the Wye Valley woodlands are anticipated.	
▪ Excavation requirements *(e.g. impacts on local hydrogeology)*	Excavation works would not be expected to have any discernible impacts on the Wye Valley Woodlands, due to being in excess of 20km from the proposed HRR.	
▪ Transportation requirements	Construction traffic will access the site via the existing road network (predominantly trunk roads) and haul roads built within the proposed land-take. There will be localised haulage of excavated materials to achieve cut and fill balances, and materials will need to be brought on and off site. Site compounds, storage depots and other facilities will be required during construction; however, the location of these facilities has yet to be confirmed. Due to the distances involved, it is not anticipated that transportation requirements could have any adverse impacts on the Wye Valley Woodlands SAC.	

▪ Duration of construction, operation etc	It is anticipated that construction works for the final overall route selected would be phased across a long period, potentially fifteen years or more. Given that a definitive period for the operation of the scheme is not available, at this stage it has been considered that the scheme would have a 120 year operational lifespan.
▪ Other	**In-combination impacts** A plan level Habitats Regulations Assessment is being undertaken for the Local Development Framework and the Local Transport Plan in 2010/2011. This will assess the potential for in-combination effects between the proposed Hereford Relief Road and other plans and projects. Whilst other projects and plans could potentially have an effect on the Wye Valley Woodlands, it is not anticipated that construction and operation of the HRR could have any significant in-combination effects with these, as no impacts as a result of the HRR are expected to occur.
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
▪ Nature of proposals	No impacts on the Wye Valley Woodlands SAC are anticipated, and it has not therefore been considered necessary to include reference to assumed mitigation measures.
▪ Location	N/A
▪ Evidence for effectiveness	N/A
▪ Mechanism for delivery *(legal conditions, restrictions or other legally enforceable obligations)*	N/A
Characteristics of European Site(s) A brief description of the European Site should be produced, including information on:	
▪ Name of European Site and its EU code	Wye Valley Woodlands (UK0012727)
▪ Location and distance of the European Site from the proposed works	The closest constituent unit of the Wye Valley Woodlands is located approximately 20.5km from the proposed HRR at its closest point.
▪ European Site size	916.24 ha (area)
▪ Key features of the European Site including the primary reasons for selection and any other qualifying interests	***Asperulo-Fagetum* beech forests** The Wye Valley contains abundant and near-continuous semi-natural woodland along the gorge. Beech stands occur as part of a mosaic with a wide range of other woodland types, and represent the western range of ***Asperulo-Fagetum* beech forests**. Such a variety of woodland types is rare within the UK. In places Lime *Tilia* sp., Elm *Ulmus* sp. and oak *Quercus* sp. share dominance with the beech. Structurally the woods include old coppice, pollards and high forest types. Lady Park Wood, one of the component sites, is an outstanding example of near-natural old-growth structure in mixed broad-leaved woodland, and has been the subject of detailed long-term monitoring studies.

	9180 *Tilio-Acerion* forests of slopes, screes and ravines The woods of the lower Wye Valley on the border of south Wales and England form one of the most important areas for woodland conservation in the UK and provide the most extensive examples of ***Tilio-Acerion* forest** in the west of its range. A wide range of ecological variation is associated with slope, aspect and landform. The woodland occurs here as a mosaic with other types, including Beech *Fagus sylvatica* and Pedunculate Oak *Quercus robur* stands. Uncommon trees, including Large-leaved Lime *Tilia platyphyllos* and rare Whitebeams such as *Sorbus porrigentiformis* and *S. rupicola* are found here, as well as locally uncommon herbs, including Wood Barley *Hordelymus europaeus*, Stinking Hellebore *Helleborus foetidus*, Narrow-leaved Bitter-cress *Cardamine impatiens* and Wood Fescue *Festuca altissima*. **91J0 *Taxus baccata* woods of the British Isles** The Wye Valley is representative of Yew ***Taxus baccata* woods** in the south-west of the habitat's range. It lies on the southern Carboniferous limestone, and Yew occurs both as an understorey to other woodland trees and as major Yew-dominated groves, particularly on the more stony slopes and crags. **Lesser horseshoe bat *(Rhinolophus hipposideros*)** is present as a qualifying interest, but not as a primary reason for site selection.
▪ Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	**Taken from the Standard Data Natura 2000 form for the SAC.** A significant proportion of the cSAC is already managed sympathetically by Forest Enterprise, the Woodland Trust and county Wildlife Trusts. Principal pressures are from lack of management (particularly traditional management, e.g. coppice) and inappropriate management proposals which would alter the recognised woodland stand types. Felling licence approval and Forestry Commission consultation with English Nature/Countryside Council for Wales are adequate in addressing the latter issue. Positive management is being promoted through management plans (CCW), Site Management Statements (EN) and management agreements, and the Woodland Grant Scheme (including specialised targeting) is being encouraged where possible and appropriate to return some woods to active management.
▪ European Site conservation objectives – where these are readily available	The Conservation Objectives for the site were not available at the time of production of this screening matrix.
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.	
None of the elements of the project are likely to result in impacts on the European Site.	
Initial Assessment The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts. Describe any likely changes to the site arising as a result of:	

▪ Reduction of habitat area	No reduction in the area of the SAC.
▪ Disturbance to key species	Lesser horseshoe bats commonly travel a few kilometres from their roost sites when foraging, and up to five to ten kilometres between summer roosts and hibernation sites. Given that the proposed HRR is located 20.5 km from the Wye Valley Woodlands at its closest point, it is considered highly unlikely that any significant disturbance to bats associated with the SAC could occur.
▪ Habitat or species fragmentation	None anticipated as the proposed HRR is located in excess of 20.5 km from the Wye Valley Woodlands SAC.
▪ Reduction in species density	None anticipated as the proposed HRR is located in excess of 20.5 km from the Wye Valley Woodlands SAC.
▪ Changes in key indicators of conservation value (water quality etc.)	None anticipated as the proposed HRR is located in excess of 20.5 km from the Wye Valley Woodlands SAC.
▪ Climate change	There will be carbon emissions associated with site clearance and construction activities and with the operation of the road following construction. An assessment of the potential interactions of the HRR with climate change would need to be undertaken for any option taken forward, separate to the Habitats Regulations Assessment process. Although anticipated changes in climate may affect the habitats the Wye Valley Woodlands have been designated for, no interaction between these changes and the proposed HRR are anticipated.
▪ Interference with the key relationships that define the structure of the site	None anticipated as the proposed HRR is located in excess of 20.5 km from the Wye Valley Woodlands SAC.
▪ Interference with key relationships that define the function of the site	None anticipated as the proposed HRR is located in excess of 20.5 km from the Wye Valley Woodlands SAC.
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.
▪ Change 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.	
It is considered unlikely that any of the potential impacts described above would adversely affect the integrity of the SAC.	
Outcome of screening stage (delete as appropriate).	~~Significant Effects are Likely/~~ ~~Sufficient Uncertainty Remains/~~ Not Likely to be Significant Effects
Are the appropriate statutory environmental bodies in agreement with this conclusion	Consultations are currently under way with Natural England and Herefordshire Council. This screening report will be

(delete as appropriate and attach relevant correspondence).	updated as appropriate as these consultations progress, and following their review of the first draft of this report.

The Wye Valley/Forest of Dean Bat Sites

Project Name:	Hereford Relief Road	
Natura 2000 Site under Consideration	The Wye Valley/Forest of Dean Bat Sites (UK0014794)	
Date:	**Author (Name/Organisation):**	**Verified (Name/Organisation):**
14th December 2010	Matthew Hague/Philip Davidson Hyder Consulting	Elaine Richmond, Hyder Consulting
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)*	There are proposals to construct a Dual All Purpose (D2AP) road within the 200m wide corridor shown on Figure 551497-Stage2-Env-06-1. Links would be required to both the south and north of Hereford. In order to provide a connecting north-south link around Hereford, a further link would be required to either the east or west of the city.	
▪ Land-take	None	
▪ Distance from the European Site or key features of the site *(from edge of the project assessment corridor)*	At its closest point, the HRR is located approximately 21.5km from the Wye Valley/Forest of Dean Bat Sites SAC.	
▪ Resource requirements *(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)*	None required.	
▪ Emissions *(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)*	**Surface water:** There is the potential for the scheme to generate water-borne pollution, including suspended solids and particulates, hydrocarbons and other chemicals during both construction and operation of the scheme. These would not be expected to result in any significant effects on the habitats within and around the SAC, or on the bat populations for which the SAC has been designated. **Air quality:** Emissions associated with construction machinery and vehicles using the proposed route corridor would lead to local increases in air pollution. No significant changes that could affect the Wye Valley/Forest of Dean Bat Sites SAC would occur as a result of the proposed HRR.	
▪ Excavation requirements *(e.g. impacts on local hydrogeology)*	Excavation works would not be expected to have any impacts on the Wye Valley/Forest of Dean Bat Sites, due to being in excess of 20km from the proposed HRR.	
▪ Transportation requirements	Construction traffic will access the site via the existing road network (predominantly trunk roads) and haul roads built within the proposed land-take. There will be localised haulage of excavated materials to achieve cut and fill balances, and materials will need to be brought on and off site. Site compounds, storage depots and other facilities will be required during construction; however, the location of these facilities has yet to be confirmed. Due to the distances involved, it is not anticipated that transportation requirements could impact on the Wye Valley/Forest of Dean Bat Sites SAC.	
▪ Duration of construction, operation etc	It is anticipated that construction works for the final overall route selected would be phased across a long period, potentially fifteen years or more. It is anticipated that the project would have a design life of approximately 120 years.	

▪ Other	**In-combination impacts** A plan level Habitats Regulations Assessment is being undertaken for the Local Development Framework and the Local Transport Plan in 2010/2011. This will assess the potential for in-combination effects between the proposed Hereford Relief Road and other plans and projects. Whilst other projects and plans could potentially have an effect on the Wye Valley/Forest of Dean Bat Sites SAC, it is not anticipated that construction and operation of the HRR could have any significant in-combination effects with these, as no impacts are expected to result from the construction and operation of the HRR.
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
▪ Nature of proposals	No impacts on the Wye Valley/Forest of Dean Bat Sites SAC are anticipated, and it has not therefore been considered necessary to include reference to assumed mitigation measures in relation to this site.
▪ Location	N/A
▪ Evidence for effectiveness	N/A
▪ Mechanism for delivery *(legal conditions, restrictions or other legally enforceable obligations)*	N/A
Characteristics of European Site(s) A brief description of the European Site should be produced, including information on:	
▪ Name of European Site and its EU code	Wye Valley/Forest of Dean Bat Sites SAC (UK0014794)
▪ Location and distance of the European Site from the proposed works	The closest constituent unit of the Wye Valley/Forest of Dean Bat Sites SAC is located approximately 21.5km from the proposed HRR at its closest point.
▪ European Site size	142.7 ha (area)
▪ Key features of the European Site including the primary reasons for selection and any other qualifying interests (taken from the SAC Citation Information Sheet)	**1303 <u>Lesser horseshoe bat</u> *Rhinolophus hipposideros*** This complex of sites on the border between England and Wales contains by far the greatest concentration of **lesser horseshoe bat *Rhinolophus hipposideros*** in the UK, totalling about 26% of the national population. It has been selected on the grounds of the exceptional breeding population, and the majority of sites within the complex are maternity roosts. The bats are believed to hibernate in the many disused mines in the area. **1304 <u>Greater horseshoe bat</u> *Rhinolophus ferrumequinum*** This complex of sites on the border between England and Wales represents **greater horseshoe bat *Rhinolophus ferrumequinum*** in the northern part of its range, with about 6% of the UK population. The site contains the main maternity roost for bats in this area, which are believed to hibernate in the many disused mines in the Forest.
▪ Vulnerability of the European Site – any information available from the standard data forms on potential effect pathways	**Taken from the Standard Data Natura 2000 form for the SAC.** The site is composed of parts of a number of buildings in everyday use (mainly roof-spaces) used by the bats for breeding and a series of mines used by bats for hibernation. Within the roost the bats are vulnerable to

	disturbance at critical times, structural alteration and changes in the characteristic ventilation patterns. Any proposed changes which are likely to have an impact on the bat populations within the breeding roosts will be discussed with the relevant owners and occupiers. Where appropriate to any populations, potentially damaging works will be addressed through appropriate planning regulation, management agreements and monitoring of individual roosts. Regular liaison takes place with site-owners. The human use of the mine systems (continued mineral working and recreational caving/research) is regulated by Forest Enterprise in consultation with English Nature where appropriate. Site Management Statements have been agreed with the owners of working mines to secure conservation of the populations alongside continued working. In addition, the preparation of Cave Conservation Plans will be promoted to maintain and enhance the underground environment for bats.
▪ European Site conservation objectives – where these are readily available	The Conservation Objectives for the site were not available at the time of production of this screening matrix.

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.

None of the elements of the project are likely to result in impacts on the European Site.

Initial Assessment

The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.
Describe any likely changes to the site arising as a result of:

▪ Reduction of habitat area	No reduction in the area of the SAC.
▪ Disturbance to key species	Lesser and greater horseshoe bats commonly travel a few kilometres from their roost sites when foraging, and up to five to ten km between summer roosts and hibernation sites. Given that the proposed HRR is located 21.5 km from the Wye Valley/Forest of Dean Bat SAC at its closest point, it is considered highly unlikely that any significant disturbance to bats associated with the SAC could occur. Greater horseshoe bats are at the northern edge of their range in the locality, further decreasing the likelihood of significant movement of species from the SAC in the direction of the proposed HRR.
▪ Habitat or species fragmentation	None anticipated as the proposed HRR is located in excess of 21.5 km from the Wye Valley Woodlands SAC.
▪ Reduction in species density	None anticipated as the proposed HRR is located in excess of 21.5 km from the Wye Valley Woodlands SAC.
▪ Changes in key indicators of conservation value (water quality etc.)	None anticipated.
▪ Climate change	There will be carbon emissions associated with site clearance and construction activities and with the operation of the road following construction. An assessment of the potential interactions of the HRR with climate change would need to be undertaken for any option taken forward, separate to the Habitats Regulations Assessment process. No significant impacts as a result of in-combination effects between climate change and the construction and operation of the HRR are anticipated.

▪ Interference with the key relationships that define the structure of the site	None anticipated as the proposed HRR is located in excess of 21.5 km from the Wye Valley/Forest of Dean Bat SAC.
▪ Interference with key relationships that define the function of the site	None anticipated as the proposed HRR is located in excess of 21.5 km from the Wye Valley/ forest of Dean Bat SAC.
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.
▪ Change 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.	
It is considered unlikely that any of the potential impacts described above would adversely affect the integrity of the SAC.	
Outcome of screening stage (delete as appropriate).	~~Significant Effects are Likely/~~ ~~Sufficient Uncertainty Remains/~~ Not Likely to be Significant Effects
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Consultations are currently under way with Natural England and Herefordshire Council. This screening report will be updated as appropriate as these consultations progress, and following their review of the first draft of this report.

River Wye/Afon Gwy SAC

Project Name:		Hereford Relief Road (HRR)
Natura 2000 Site under Consideration		River Wye/Afon Gwy (UK0012642)
Date:	**Author (Name/Organisation):**	**Verified (Name/Organisation):**
19th November 2010	Matthew Hague/Philip Davidson Hyder Consulting	Elaine Richmond, Hyder Consulting
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)*	There are proposals to construct a Dual All Purpose (D2AP) road within the 200m corridor shown on Figure 551497-Stage2-Env-06-1. At present a number of route corridor options are under consideration. Road links would be required to both the north and south of Hereford for any of the route corridor options. The HRR would be completed by linking these northern and southern links to a route to either the west or east of Hereford. The detailed construction methodology is not known at this stage; however it is anticipated that no construction works will take place within the SAC itself.	
▪ Land-take	There will be no land-take from within the boundary of the SAC, although at least one new bridge would be constructed over the River Wye. The route corridor options to the west of Hereford would require the construction of one new bridge, as would the Eastern Inner option. The Outer Eastern Options would require the construction of a new bridge over the River Wye, but would also require the construction of two additional bridge crossings of the River Lugg, a tributary of the River Wye and included within the SAC designation. The northern and southern links are all located in excess of 300m from the SAC, and would not result in any land-take from within the SAC boundary.	
▪ Distance from the European Site or key features of the site *(from edge of the project assessment corridor)*	The Eastern and western route corridor options all cross the river Wye. Although detailed modelling has not yet been undertaken, it is envisaged that a 200m long structure would be required over the River Wye in order to avoid significant modifications to the flow pattern and associated flood risk of the river. Similar length structures would be required to the west of Hereford. The Eastern Inner route corridor option also runs approximately parallel to the River Lugg (part of the SAC), between 230m to 650m to the west, for a distance of 2.2km. The Eastern Outer route corridor options cross the River Wye south-east of Hereford, but also cross the River Lugg twice. The North Core and South Core route corridor options are located 400 m and 1 km from the SAC at their closest points respectively.	
▪ Resource requirements *(from the European Site or from areas in proximity to the site, where of relevance to consideration of impacts)*	None envisaged.	
▪ Emissions *(e.g. polluted surface water runoff – both soluble and insoluble pollutants, atmospheric pollution)*	**Surface water:** There is the potential for the scheme to generate water-borne pollution, including suspended solids and particulates, hydrocarbons and other chemicals during construction and operation of the Scheme. This is briefly assessed for each route corridor option, below.	

	Eastern Inner route corridor option The Eastern Inner route corridor option would be located within over 2.5km of floodplain. Construction of this option would also require the diversion and probable culverting of the Lugg Rhea (a tributary of the River Lugg), for over 1km. Although it is assumed that best practice pollution prevention measures would be followed during construction, the extent of the area within the floodplain and in close proximity to the River Lugg increases the risk of a potentially significant pollution event during construction relative to the route corridor options west of Hereford. *Eastern Outer route corridor option* This route corridor option would be located through between 4 km and 5.5 km of floodplain. Although it is assumed that best practice pollution prevention measures would be followed during construction, the extent of the area within the floodplain and in close proximity to the River Lugg, and the requirement for three new bridge crossings (two for the Lugg and one for the Wye) increases the risk of a potentially significant pollution event during construction relative to the route corridor options west of Hereford. *Western Inner route corridor option* This route corridor option runs within 220m of floodplain. The transverse bridge crossing, with significantly less floodplain affected during construction and operation, significantly reduces the potential for pollution incidents relative to the options east of Hereford. *Western Outer route corridor option* This route corridor option runs within 315m of floodplain. The transverse bridge crossing, with significantly less floodplain affected during construction and operation, significantly reduces the potential for pollution incidents relative to the options east of Hereford. *North core/South Core* These route corridor options are located several hundred metres from the River Wye SAC. Given the distances involved, it is considered unlikely that any significant impacts on the SAC would result from their construction and operation, assuming good construction practices and appropriate pollution prevention measures were instigated. **Air quality:** Emissions associated with construction machinery and vehicles using the proposed eastern and western route corridor options would lead to local increases in air pollution. At this stage, these increases in atmospheric pollution would not be expected to have significant impacts on the River Wye/River Lugg SAC. Detailed air quality assessments have not yet been undertaken and would be required to fully assess the impacts of these route corridor options on the River Wye/Lugg SAC. Given the distance of the North Core and South Core route corridor options from the SAC, it is considered highly unlikely that emissions associated with construction and operation of these route corridor options would lead to any significant changes in air quality in the vicinity of the River Wye/Lugg SAC.
▪ Excavation requirements *(e.g. impacts on local hydrogeology)*	Pile-driving and other earthworks adjacent to the River Wye/River Lugg may cause noise and vibration disturbance during construction. This may affect lamprey and shad species, and otters, all qualifying interests of the SAC. *Eastern Inner and Eastern Outer route corridor options* Embankment construction and/or structures adjacent to the Lugg Meadows will have an effect upon local hydrological and hydrogeological conditions, which may interplay with the hydrology of the River Wye. The full impact of

	these effects cannot be fully assessed at this stage or prior to more detailed design, site investigation and consideration of construction methodologies. Where these route corridor options cross areas of flood plain it is understood they would need to be raised onto embankment or built on pillars; this would have the potential to alter the local hydrogeology, affecting the Lugg Meadows and River Lugg. The construction of bridge piers 100m to the north and south of the River Wye may require the use of boring machinery or pile-driving equipment. The installation of piles and associated structures, and creation of embankments could lead to long-term changes in groundwater movements and surface water flows. Although these would not be expected to significantly affect the flow regime of the River Wye under normal conditions, there could be effects when the river floods, although it is expected significant effects on flow regime would be avoided at the detailed design stage. *Western Inner and Western Outer route corridor options* Construction of bridge piers north and south of the river may require the use of boring or pile-driving equipment. The installation of piles and associated structures, and creation of embankments could lead to long-term changes in groundwater movements and surface water flows. Excavation up to ten metres below existing ground levels is required through hills either side of the proposed crossing, which may also have effects on local hydrological conditions. These would not be expected to significantly affect the flow regime of the river under normal conditions, but there could be more noticeable effects when the river floods. However, it is expected significant effects on flow regime would be avoided through the use of a clear-span structure. The Western route corridor options pass through an order of magnitude less floodplain, relative to the options to the east of Hereford, and potential impacts with the western options are therefore considered to be lower as a result. *North Core and South Core route corridor options* Give the distances of these route corridor options from the SAC, no significant impacts as a result of excavation works would be anticipated.
▪ Transportation requirements	Construction traffic will access the site via the existing road network and haul roads built within the proposed land-take. There will be localised haulage of excavated materials to achieve cut and fill balances, and materials will need to be brought on and off site. Site compounds, storage depots and other facilities will be required during construction; however, the location of these facilities has yet to be confirmed. For the Eastern and Western route corridor options, the construction of the bridges over the River Wye/River Lugg, may require cranes be positioned near to the SAC boundary; however the precise details have yet to be confirmed. This may require the installation of piled foundations within the designated boundary of the SAC, although it is anticipated that works within the river channel itself can be avoided.
▪ Duration of construction, operation etc	It is anticipated that construction works for the final overall route selected would be phased across a long period, potentially fifteen years or more. Construction of Sections in the vicinity of the River Wye SAC, whether east or west of the city would most likely take place across a two to three year period. In order to minimise impacts upon migratory fish species, options for timing construction works outside the key migratory periods will be explored during the detailed design and development of the project programme, for whichever route corridor options are taken forward.

	The Scheme has been considered to have an operational lifespan of 120 years, in accordance with the design life for structures across the scheme.
▪ Other	
Description of avoidance and/or mitigation measures *Describe any assumed (plainly established and uncontroversial) mitigation measures, including information on:*	
▪ Nature of proposals	**Design** The proposed bridge crossings over the River Wye/River Lugg will be clear-span, with no permanent structures in the river. If possible, the bridge will also be designed so there is no requirement for in-channel working during construction. **Construction:** Pollution prevention measures will be used during construction, for example the control of run-off to existing surface drains and the use of silt traps, bunding and the establishment of settling ponds, lagoons and temporary oil interceptors to prevent silt run-off and/or uncontrolled pollution events. Measures should be designed in accordance with Environment Agency/CIRIA Pollution Prevention Guidelines (PPG). However, sufficient space to implement such measures effectively may be restricted along parts of the Inner Eastern Corridor, particularly Section EL1. This is because the corridor width is constrained by existing housing to the west and the Lugg Meadows to the east. Liaison with the wider environment and engineering team that has been engaged in producing the Hereford Relief Road: Study of Options Report (Amey, 2010), has revealed that there may also be significant difficulties implementing effective pollution, flooding, and drainage control during construction through extensive areas of floodplain. For example, installing effective balancing and attenuation ponds within the floodplain may not be possible. Both the Inner and Outer Eastern route corridor options run through several km of floodplain, requiring site clearance and construction operations through these areas. Controlling run-off from these areas during construction, particularly in the event of flooding, would be very challenging technically. Conversely, the lengths of floodplain affected by construction of the Western route corridor options are much less, and construction-phase drainage and pollution control measures implemented and potential pollution incidents would be much easier to mitigate with good drainage design, and following EA and CIRIA PPG which are more achievable compared to the Eastern route corridor options. If at all possible, works associated with the construction of piers and foundations for the proposed bridge(s) would be undertaken outside the key migratory periods for lamprey, shad and salmon. Works should also be avoided between dusk and dawn, when the majority of fish migration activity occurs and when otters are most active. In order to reduce vibration effects any piles required should be bored rather than driven; however, detailed GI works would be required to determine the exact construction methodologies, and subsequently the potential for impacts could be fully assessed. There will be no long term storage of spoil within the floodplain; spoil will be transported off site for reuse or disposal. It is not possible to confirm at this stage, whether there would be a requirement for short to medium-term storage of spoil within the floodplain. Construction compounds and working areas will be located outside the floodplain, and/or will incorporate measures to minimise the risk of

	pollution, including in the event of a flood event. This is likely to include a combination of bunding around site compound areas and fuel storage areas, the use of existing surface water drainage facilities that avoid discharging site run-off into the River Wye, and the use of silt traps and temporary balancing ponds. No construction works will be carried out in the river itself, which will avoid direct impacts on the SAC and the species it supports. Construction works will ideally be timed to avoid dawn and dusk, in order to minimise disturbance to otters, which are likely to be most active at this time. No otter holts or resting sites have been identified in the vicinity of any of the proposed bridge crossings of the Rivers Wye or Lugg. Inspections for otters will be undertaken in advance of and throughout the construction process in order to ensure their continued absence. Acoustic and visual screening may be required to avoid disturbance to any otters utilising the river banks. Access to both banks of the Wye by otters will be maintained throughout the construction phase of the proposed development whichever route corridor options are taken forward. Nocturnal lighting of the River Wye during construction will be avoided as far as possible. However, there may be a requirement, for example for health and safety reasons, to illuminate the bridge during construction. The use of directional lighting to minimise light-spill, and maintain dark corridors to allow continued movement of otters and fish species would be expected to minimise any adverse impacts. This would be explored further during the next stages of the project assessment process. At this stage, it is not possible to determine whether lighting of the river channel during construction can be avoided entirely, and the full effectiveness of such mitigation measures cannot therefore be assumed. **Operation:** Implementation of appropriate pollution controls as part of the surface water drainage strategy will help to ensure that water quality adjacent to the proposed road is protected during its long-term operation. Any lighting incorporated into the bridge(s) will not illuminate the river channel. This will ensure fish, otters, and other nocturnal species using the river, for example white-clawed crayfish, are not affected by lighting proposals. The exact lighting proposals will be finalised during the detailed design of the bridge structure(s). It is anticipated that visual and noise disturbance associated with the operation of the scheme will be minimised through the use of screening measures such as acoustic fences and bunds. However, in the absence of more detailed survey information, and construction details to enable appropriate mitigation measures to be proposed, it is not possible to confirm the absence of potentially significant impacts on the qualifying interests of the SAC.
▪ Location	Associated with works in floodplain and bridge crossings.
▪ Evidence for effectiveness	All mitigation measures to be implemented will follow standard, tried and tested methodologies, in accordance with best practice guidance to ensure pollution risk and disturbance to species using the river is minimised.
▪ Mechanism for delivery *(legal conditions, restrictions or other legally enforceable obligations)*	It is anticipated that more detailed mitigation measures would be developed during the later stages of project assessment and design. Mitigation measures would also form part of any planning application for the Scheme, and would need to be approved by the Local Planning Authority. An approved Construction Environmental Management Plan (CEMP) and

	Construction Method Statements would be prepared and implemented. It is anticipated that these would be subject to scrutiny and approval by the Local Planning Authority, Natural England, and the Environment Agency. Toolbox talks would be given to contractors and other relevant personnel. An Ecological Clerk of Works would be retained on site during site clearance and construction activities.
Characteristics of European Site(s) A brief description of the European Site should be produced, including information on:	
▪ Name of European Site and its EU code	River Wye/Afon Gwy (UK0012642)
▪ Location and distance of the European Site from the proposed works	The proposed Eastern Inner Corridor of the HRR is located over the River Wye at approximate OS GR SO5369 3870. The route corridor option also runs approximately parallel to the River Lugg (part of the SAC), between 230m to 650m to the west, for a distance of 2.2km. The proposed Eastern Outer Corridor of the HRR is located over the River Wye at approximate OS GR SO 536 387. The two proposed bridge crossings over the River Lugg would be located between approximate OS GR SO 532 418 and SO 543 406. The proposed Western Inner Corridor of the HRR is located over the River Wye at approximate OS GR SO5369 3870. The proposed Western Outer Corridor of the HRR is located over the River Wye at approximate OS GR SO480 389.
▪ European Site size	2,234.89 ha (area) 157 km (length)
▪ Key features of the European Site including the primary reasons for selection and any other qualifying interests	**Annex I habitats that are a primary reason for the selection for this site:** Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation **Annex I habitats present as a qualifying feature, but not a primary reason for selection:** Transition mires and quaking bogs (Wales only) **Annex II species that are a primary reason for the selection for this site:** White-clawed crayfish (*Austropotamobius pallipes*). Sea lamprey (*Petromyzon marinus*) Brook lamprey (*Lampetra planeri*) River lamprey (*Lampetra fluviatilis*) Twaite shad (*Alosa fallax*) Atlantic salmon (*Salmo salar*) Bullhead (*Cottus gobio*) Otter (*Lutra lutra*) **Annex II species present as a qualifying feature, but not a primary reason for selection:** Allis shad (*Alosa alosa*) See Appendix II of Screening Report for full details.
▪ Vulnerability of the European Site – any information available from the standard data forms on	**Taken from the Standard Data Natura 2000 form for the SAC.** **Water quality impacts:** Due to agricultural land-use changes, nutrient run-off, increased siltation and point-source discharges. Natural England and

potential effect pathways	the Countryside Council for Wales are seeking to address such issues through improved targeting of existing and new agri-environment schemes and through improvements in compliance with agricultural Codes of Practice. The impact of sewage treatment works on the cSAC is being addressed through the Asset Management Plan process and review under the Habitats Regulations. **Loss of riparian habitats:** Due to changes in agricultural land-use practices and other factors, including riverside development and the loss of alder tree-cover through disease. These impacts and concerns over water quality will be identified and actions recommended within the joint Natural England/Environment Agency/Countryside Council for Wales conservation strategy for the river. **Fishing activities:** Decline of salmon stocks; initiatives such as the Wye Salmon Action Plan will help to address this issue. **Water abstraction for agriculture and potable water:** Maintenance of water levels and flow will be addressed under the review of consents under the Habitat Regulations. **Demand for increased recreational activities:** Regularisation of the functions of the competent authorities, should reduce the risk of damage to the SAC as a result of developments for such activities. Proposals for population growth (with corresponding increases in levels of recreational pressure) are being considered as part of the HRA for the Local Development Framework. See Appendix II of this report for full details.
▪ European Site conservation objectives – where these are readily available	**Habitat Types represented (Biodiversity Action Plan categories)** • Rivers (with associated individual designated interest features) • Transition Mire and Quaking Bog (present only in Wales) See Appendix II of this report for full details of the Conservation Objectives for the River Wye. These are also summarised in the main body of the report.

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.

Site clearance and construction activities could disturb the species which form the qualifying interests of the SAC; could result in habitat loss and fragmentation; and could lead to sedimentation and pollution events in the absence of targeted and carefully designed mitigation measures. Operation of the scheme could result in disturbance to the species which constitute the qualifying interests of the River Wye SAC, through noise and visual disturbance. Point source and diffuse pollution, including pollution events, could also lead to increased sedimentation and reductions in water quality during operation. Changes in hydrological regime could lead to increased sedimentation and/or scour and erosion of the banks of the River Wye/River Lugg. Shading of the river by the new bridge could result in changes to the vegetation communities at the crossing location(s).

As described in earlier sections of this screening matrix, the increased lengths of floodplain affected, and the additional bridge crossing options associated with the Eastern route corridor options mean there is greater potential for these route corridor options to give rise to impacts on the SAC, as detailed below. The North Core and South Core routes are considered unlikely to result in any significant adverse impacts, due to the distance they are located from the SAC.

Eastern Inner route corridor options

A route within this route corridor option would cross, and would require diversions to and culverting of, the

Lugg Rhea SINC. This is a tributary of the River Lugg (part of the river Wye SAC), and a watercourse with high levels of recorded otter activity. This area also contains a network of drainage ditches, the majority of which are likely to be within the catchment of the River Lugg, either directly or indirectly. Lugg Meadows is situated adjacent to the western bank of the River Lugg. The site is characteristically flooded by the River Lugg when this overtops, with hydrological links between the sites, and pollution and hydrological changes to the meadow may also affect the River Lugg.

Impacts on these sites have the potential to impact the qualifying interests of the SAC. For example, otter and white-clawed crayfish, both qualifying interests of the SAC, have been recorded from the Lugg Meadows SWS, the River Lugg and adjacent habitats. Other potential impacts on the designated areas of the SAC include run-off and pollution events, particularly during construction.

This section would require construction within a floodplain for a substantial distance (it would cross or encroach into 2,750m of floodplain). At this stage the construction methodology has not yet been decided. Depending on the results of flood assessment modelling and subsequent environmental assessment work (if this route corridor option is taken forward), the route may be constructed on either embankment or on a series of pillars. Whilst construction on pillars (if used) would reduce operational phase impacts on hydrology and surface water flows, construction phase impacts may still be significant, and in the absence of a detailed drainage design, it is not possible to fully assess the potential for significant impacts as a result of pollution incidents for either embankment or pillar design.

Eastern Outer route corridor options

This route corridor option would require construction within the floodplain for a substantial distance (it would cross or encroach into between 4 km and 5.5 km of floodplain). At this stage the construction methodology has not yet been decided. Depending on the results of flood assessment modelling and subsequent environmental assessment work (if this route corridor option is taken forward), the route may be constructed on either embankment or on a series of pillars. Whilst construction on pillars would reduce operational phase impacts on hydrology and surface water flows, construction phase impacts could still be significant, and in the absence of a detailed drainage design, it is not possible to fully assess the potential for significant impacts as a result of pollution incidents for either embankment or pillar design.

Initial Assessment

The key characteristics of the site and the details of the European Site should be considered in identifying potential impacts.

Describe any likely changes to the site arising as a result of:

▪ Reduction of habitat area	No reduction in the area of the SAC. Currently it is not known what loss of semi-natural habitats, if any, will occur within the vicinity of the potential crossing point of the SAC. There is potential for the loss or degradation of salmonid spawning habitat, lamprey ammocoete nursery beds and river vegetation during the long-term operation of the road as a result of shadowing. Less than 0.001% of the surface area of the SAC would be affected by shadowing, and this is therefore not considered to be significant.
▪ Disturbance to key species	There is the potential for disturbance to otters during construction and operation of the Scheme, along the alignment of the River Wye. Surveys undertaken from the river channel in October 2010 did not detect any potential holt sites, although features potentially suitable for use as above-ground resting sites were present in some locations; however, no confirmed resting sites were identified. The operation of the Scheme has the potential to cause visual and noise disturbance to otters, and could result in increased otter road mortality. However, monitoring during the construction of road bridges across the River Usk SAC in Pembrokeshire for the A40 Penblewin to Slebech Park Upgrade (construction nearing completion), the Glaslyn River for the A487 Porthmadog Bypass (currently under

	construction) and the River Esk SAC for the M6 Guardsmill to Gretna upgrade (completed 2009) found that otters were not deterred from using habitats around the bridge construction works. On the A487 scheme otters have been recorded feeding on temporary bridge pontoons in the river channel. The use of clear-span structures and otter-fencing is also advocated as potential mitigation techniques in The Design Manual For Roads and Bridges (DMRB) Vol. 10, Section 4, Part 4). There is the potential for disturbance to salmon, shad and lamprey species (all of which are primary reasons for the selection of the SAC) during construction either side of the River Wye. However, if works are carried out during daylight hours (the majority of migration takes place at night), and the use of percussive piling techniques can be avoided, the impacts are likely to not be significant. It would also be appropriate to programme potentially disruptive construction activities outside the key migratory periods if at all possible. There is greater potential for disturbance impacts with the Eastern route corridor options. This is because these will involve working along greater lengths of floodplain and watercourses that may be used by foraging otters, and in the case of the Eastern Outer route corridor option, will require two new bridges to be constructed across the River Lugg in addition to the crossing of the River Wye. In the absence of further information on scheme design sufficient uncertainty remains, and construction methodologies and programme would be required to fully assess the likelihood of significant adverse impacts occurring.
▪ Habitat or species fragmentation	None envisaged within the SAC itself, as access to the banks of the River Wye will be maintained at all times. A significant pollution incident could create a barrier to the movement of migratory fish species included within the SAC designation, but such an event is considered unlikely. As described previously, there is considered to be much greater potential for a significant pollution event with the Eastern route corridor options relative to the Western route corridor options. Vibration and noise during construction could cause a partial barrier to the migratory movements and/or spawning of fish species if not appropriately timed and managed. Avoiding the use of percussive piling techniques adjacent to the river would minimise the risk of fragmentation occurring.
▪ Reduction in species density	Further detailed ecological survey and assessment work, and detailed design information would be required to fully assess this. Construction activities adjacent to the river could lead to local reductions in the density of resident fish populations. However, initial surveys and desk study research indicate that key spawning sites are unlikely to be present in the vicinity of the proposed scheme, and scope remains for the road to be realigned within the route corridor as more detailed survey information becomes available during development of the project.

▪ Changes in key indicators of conservation value (water quality etc.)	Without detailed design information and construction methodologies, it is difficult to fully assess the potential for impacts on key indicators of conservation value. The potential exists for impacts to occur, for example pollution incidents or diffuse pollution could affect aquatic invertebrate populations within the River Wye SAC; Natural England have identified biological and chemical water quality as one of the measures by which the condition of the river will be assessed. Other Conservation Objectives include set limits for suspended solids, the levels of which could be raised by run-off during construction of the proposed HRR. Again, there is considered to be greater potential for negative impacts with the Eastern route corridor options relative to the Western route corridor options, due to the increased length of floodplain working with these options.
▪ Climate change	There will be carbon emissions associated with site clearance and construction activities and with the operation of the road following construction. A detailed assessment of the potential effects of the HRR on climate change would need to be undertaken for any option taken forward. Consideration is required at this time of the potential for the effects of climate change to interact with the potential effects of the proposed HRR. Although the exact nature and likely consequences of human-induced climate change remain the subject of lively scientific debate, there is some national and regional consensus on the anticipated effects in the UK. The Potential Impacts of Climate Change in the West Midlands (UK Climate Impacts Programme 2004) report identified potential increases in average annual temperature of between 1.5-4.5^{o}c; up to a 20% increase in winter precipitation and a 30% reduction in summer precipitation; and increased frequency of winter storm events and 'drought' summers by 2080. There is also the potential for sea levels to rise by approximately 50cm by 2080. Changes in hydrological regime could lead to increased flooding of the River Wye in winter, along with increased silt inputs from the catchment into the river. Increased scour in some locations, with increased sedimentation in others is a likely consequence. Reduced summer precipitation may lead to lower flows, with a consequential impact on, for example, riparian vegetation and lamprey nursery silt beds. Reductions in flow may impact spawning success of fish, by reducing the suitability of spawning sites, interfering with the migratory movements of individual fish, lowering oxygen levels, and concentrating organic and inorganic pollutants. In addition to the direct effects of reduced precipitation, the forecast drier summers may result in increased abstraction demands, particularly from agriculture. A potential increase in abstraction demand for irrigation across the West Midlands of up to 24% could occur, according to the UKCIP 2004 study. Rising sea levels could increase the length of the river that receives tidal inputs from the River Severn Estuary. This could change the composition of habitats and vegetation communities in the lower reaches of the Wye that are currently non-tidal, reducing the area of the freshwater habitats.

	These potential impacts could have some in-combination effects with the proposed route corridor option. For example silt and pollution inputs from the road (if they occurred) could have more significant effects during periods of low flow, which may occur more frequently as a result of drier summers. Although a clear-span bridge would be used across the River Wye/Lugg, there remains the potential for otters to be forced further away from the river during flood events; with a potential increase in risk of mortality. However, this can be simply mitigated against through appropriate survey and alignment of wildlife fencing during the detailed design of any route option taken forward.
▪ Interference with the key relationships that define the structure of the site	None
▪ Interference with key relationships that define the function of the site	Potential hydrological and diffuse and point source pollution events could interfere with food webs, breeding success of key species, and the composition of vegetation communities.
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 in the short to medium term, particularly on fish species.
▪ Habitat or species fragmentation	Not likely to be significant.
▪ Loss	Loss of riparian vegetation and spawning sites for fish species could occur as a result of shading, although this is considered likely to be not significant.
▪ Fragmentation	Not significant.
▪ Disruption	Not significant.
▪ Disturbance	Dealt with under disturbance to key species
▪ Change to key elements of the site (*e.g. water quality, hydrological regime etc*)	There is the potential for changes in hydrological processes and negative impacts on water quality, with much greater potential for impacts with the Eastern route corridor options relative to the Western route corridor options. Such a route would pass through a substantial area of floodplain. This could affect conveyance of flood water and flood water storage capacity, and increases the likelihood of a significant pollution event relative to western options that involve transverse crossings of the River Wye only, and cross much shorter lengths of floodplain.
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 the absence of a more detailed understanding of the use of the potentially affected sections of the River Wye by the different qualifying interests, and more detailed design and construction methodologies, It is not possible to discount significant impacts on the River Wye/Lugg SAC and its qualifying interests, at this stage. However, it has been possible to identify that the Eastern route corridor options will pass through significantly more of the River Wye/River Lugg floodplain than the Western route corridor options. Successfully implementing effective mitigation against silt run-off and pollution incidents, particularly during construction, will therefore be considerably more difficult to achieve with the Eastern route corridor options than the Western ones.	
Outcome of screening stage (delete as appropriate).	~~Significant Effects are Likely~~/ Sufficient Uncertainty Remains/

	~~Not Likely to be Significant Effects~~
Are the appropriate statutory environmental bodies in agreement with this conclusion (delete as appropriate and attach relevant correspondence).	Consultations are currently under way with Natural England and Herefordshire Council. This screening report will be updated as appropriate as these consultations progress.

Appendix IV: Figure

Figure 551497-Stage2-ENV-6-01

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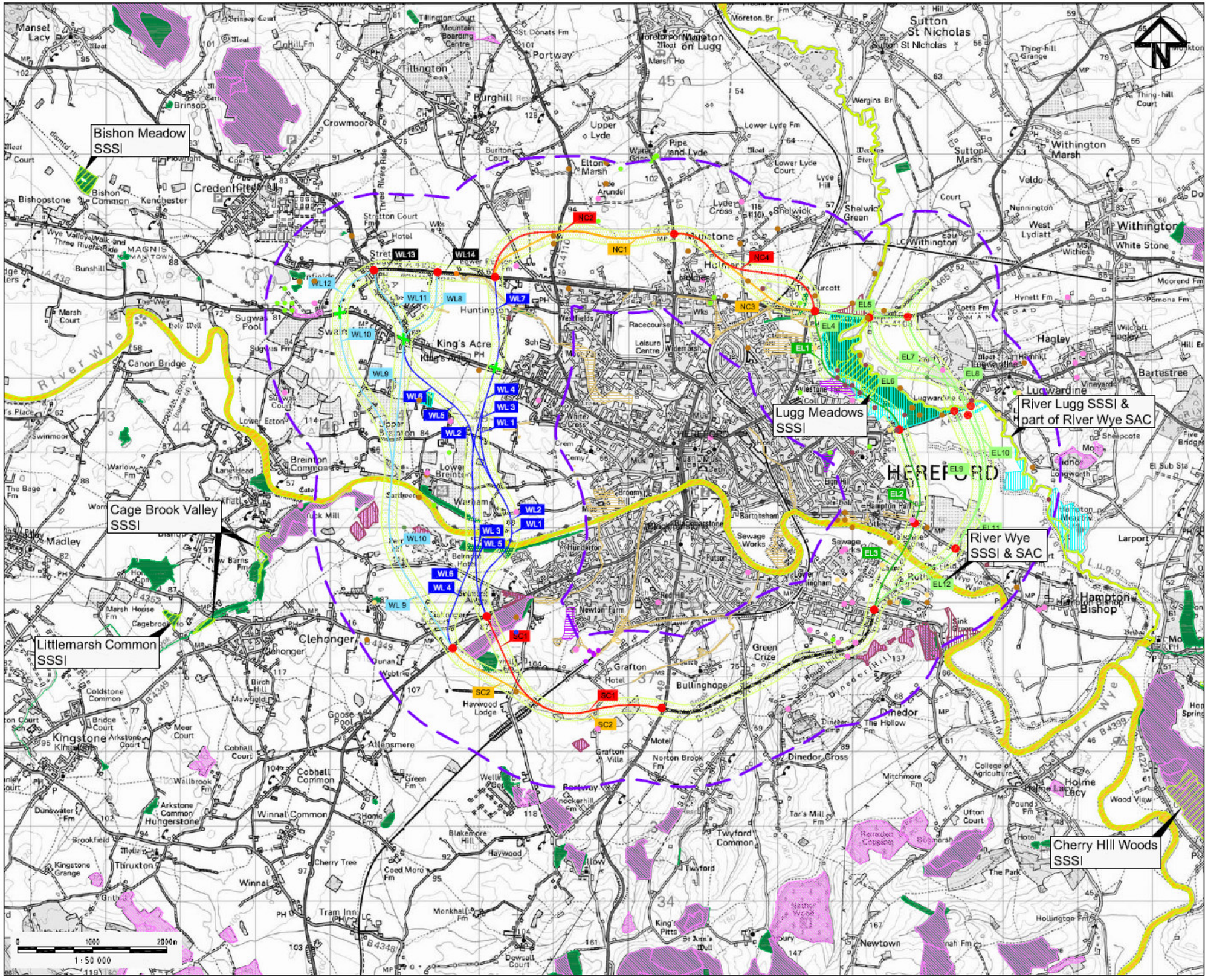
File ref - k:\c1460 - c1479\c1469 hereford relief road\07 maps\mapping\cad data\alignment-overview.dwg



Legend

Alignment Options
- 1km Buffer
- 100m Buffer

North & South Core Routes
- North Core Route 1
- North Core Route 2
- South Core Route 1
- South Core Route 2

Western Corridors

Eastern Corridors

Existing Network
- A4103 Roman Road
- Rotherwas Access Road
- Proposed Roundabouts
- Proposed Signalised Junctions

Constraints
- SSSI
- Ancient Woodland
- SINC
- LNR
- SAC
- SWS
- Potential BAP Priority Habitat
- HNTR
- GCN
- Otter
- Reptile
- Water vole
- Bat Roost
- Dormouse
- Schedule 1 Bird
- White-clawed crayfish
- Hereford BAP Invertebrate

Rev	Revision details	Chkd	Appd	Date

Drawn: P.S / J.J	Preliminary ✓
Design: P.D	For comment
Chkd: .	For tender
Appd:	For construction
Date: .	As constructed

amey

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Project Name
Hereford Relief Road

Drawing Title
ECOLOGY
ALIGNMENT CONSTRAINTS OVERVIEW

Original Drawing Size : A3	
Scale : 1:50000	Dimensions : m

Drawing No	Rev
551497-Stage2-ENV-6-01	01