

Study of Options Environmental Assessment Report

Hereford Relief Road

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B1.1 PURPOSE OF STUDY

- B1.1.1 There are advantages and disadvantages of the broadly defined transport infrastructure improvements identified in the public participation and modelling exercises undertaken by Herefordshire Council to date. A number of broad corridors have been identified for consideration of a relief road.
- B1.1.2 The purpose of this study is to Identify environmental and engineering advantages and disadvantages associated specifically with the introduction of a Relief Road to Hereford along these corridors.

B1.2 BACKGROUND AND STUDY CONTEXT

- B1.2.1 Herefordshire covers a predominantly rural area of 842 square miles. Hereford is the main service centre and largest urban area, with a population of 54,850. The A49 strategic highway passes through the City from north to south and crosses the River Wye at Greyfriars Bridge close to the historic City Centre. The pattern of main roads in the County is focussed on Hereford itself and peak hour congestion is frequently experienced on the City's highway network and river crossing.
- B1.2.2 Hereford is identified as a 'Settlement of Significant Development' in the West Midlands Regional Spatial Strategy (WMRSS) with an allocation of 8,500 houses for the period 2006 to 2026. This allocation is supported by Herefordshire Council, however, adequate infrastructure must be provided to support it, as this level of growth represents an increase in size of over 30% for the City.
- B1.2.3 Herefordshire Council's Development Plan is currently the Unitary Development Plan (UDP) with a plan period to 2011. The Council is now preparing the Local Development Framework (LDF) Core Strategy to cover the same plan period as the WMRSS, i.e. 2006 to 2026.
- B1.2.4 The Core Strategy has been the subject of three formal rounds of public participation; an "Issues Paper" in 2007 and the "Developing Options" Paper in 2008 indicated broad public support for transport infrastructure improvements; a "Place Shaping Paper" consultation was completed in March 2010 to establish the preferred options for the Core Strategy.
- B1.2.5 To inform the Core Strategy the Hereford Multi Modal Study has been completed to assess the broadly defined transport and development strategies and identifying the need for a relief road. However, consideration of a relief road to the east or west of Hereford has a long history presented on Table B1.1.

Table B1.1 Historic Relief Road Considerations

Date	Study	Summary of Outcomes
1987 - 1988	DfT Route Selection Public Consultation	Two routes considered (one east and one west). DfT selected the route to the East.
1990	Funding	Financing options considered.
1991 - 1992	Public Inquiry	For the Eastern Relief Road. Inspectors recommendation that the option is rejected and an alternative Western Route be accepted. The eastern route was then withdrawn.
1993 - 1994	Public Consultation	Route options re-considered and Hereford's transport problems investigated.
1993	Hereford Traffic Conference	Traffic problems investigated and non-road and road options considered including options for Inner Relief Roads. The Inner relief roads had considerable oppositions due to the detrimental impact upon the population.
1996	Entry to Trunk Roads Programme	The Eastern Relief Road was included in the Highways Agency Trunk Road Programme. However, works stopped on the eastern route in 1997.
1998	Regional Planning Conference	Part of the Eastern Relief Road Route from A465 and A438 was protected from development by the newly formed Herefordshire Council in the Unitary Development Plan (UDP)
2001	Hereford Outer Relief Road Business Case	Economic fragility presented as justification for a relief road. Also air quality problems without a relief road presented. Conclusion that congestion will worsen as the population grows.
2001	Regional Planning Guidance and Transport Strategy.	Report to the Regional Transport Group.
2001	Local Transport Plan (LTP1)	Plan to cover 2001/2 – 2005/6 includes recognition of transport provision in Hereford to support growth and identifies an Integrated Transport Strategy focusing on an integrated and sustainable transport system.
2003	Hereford Transport Review	A review of the LTP Strategy through a Local Multi Modal Study including considerations for Growth.
2005	Highways Agency Consultation on A49 Edgar Street	Consideration given to HGV restriction with additional bus and cycle provision on a lane on Edgar Street. Scheme abandoned due to low level of public support.
2006	Local Transport Plan (LTP2)	Identified need for Herefordshire to work closer with the Highways Agency to make best use of the A49 and identifies Hereford as an Air Quality Management Area(AQMA)
2009	Hereford Multi Modal Study	Commissioned jointly by Herefordshire Council and the Highways Agency to consider future network conditions as a result of Regional Spatial Strategy growth.

B1.3 STUDY METHODOLOGY

B1.3.1 It is assumed that the ultimate purpose of the study process is to take the scheme towards having a fully assessed preferred route with a supporting Major Scheme Business Case. All studies therefore need to be carried out to follow the Department for Transport (DfT) Transport Analysis Guidance (WebTAG).

B1.3.2 WebTAG provides guidance on conducting transport studies and on how to:

- set objectives and identify problems;
- develop potential solutions;
- create a transport model for the appraisal of the alternative solutions;
- conduct an appraisal which meets the Department's requirements.

B1.3.3 The overall study delivery stages in chronological order are:

- **Stage 0** – Preliminary Investigatory Works (Complete – Historic Studies, Issue Paper and Developing Options Paper).
- **Stage 1** – Identify environmental, engineering, economic and traffic advantages and disadvantages associated with broadly defined strategies (Complete – Multi Modal Study and Stage 1 Engineering and Environmental Assessments (Complete))
- **Study of Options for the Hereford Relief Road (This Study)** – Identify engineering and environmental advantages and disadvantages of proposed route corridors to inform the planning strategy (This Study).
- **Stage 2** – Further inform a decision on preferred route selection through additional environmental, engineering and traffic and economic assessment (Future Study).
- **Stage 3** – Clearly identify advantages and disadvantage in environmental, engineering, economic and traffic terms of the preferred route or scheme including a full environmental statement (Future Study).
- **Major Scheme Business Case** – Presentation to the Government or funding body encapsulating the evidence of the previous stages.

B1.4 TRANSPORT IMPROVEMENTS

B1.4.1 A transport hub is planned as part of a regeneration project at Hereford Railway Station, providing a more integrated transport service facility for rail and bus passengers, pedestrians and cyclists, taxis and car parking. An option has been set out in the Core Strategy as a preferred proposal, providing a sustainable transport link facility to the city centre and the surrounding urban area.

B1.4.2 Consultation on the existing transport constraints for Hereford has also been undertaken via the 'Developing Options' consultation with a view to support the production of

both the Hereford Transport Plan 3 (2011-2026) and the Hereford Area Plan. Whilst the need for a second river crossing at the River Wye has been established through various studies including the Hereford Multi-Modal Model Forecasting Report (MMM) to relieve the traffic congestion at Hereford. Various options upon which the proposed linkage and other associated sustainable transport solutions will impact on transport usage and demand have also been identified. These options primarily focus on a range of initiatives to increase investment for the promotion of alternatives to car use including improved facilities for pedestrian access and an improved and extended cycle network. The introduction of permanent Park and Ride sites and proposals for Bus Priority measures have all been identified as features of demand management measures which seeks to initiate a significant modal shift within the urban landscape.

B1.4.3 The Hereford Relief Road has been identified as a key strategic transport proposal to both relieve the city of its current congestion levels and to ensure the proposed housing growth can be accommodated.

B1.5 SCHEME OBJECTIVES

B1.5.1 Hereford City serves as the main centre for an extensive rural area providing access to employment, retailing, health and leisure facilities. It also plays an important role in the context of the wider West Midlands Region as it has been identified as one of five sub-regional areas for longer-term development meaning that it will accommodate the majority of the future housing and employment development within the County.

B1.5.2 To facilitate this proposed spatial development and the associated pressures exerted on existing land use and transport facilities, this document will help to establish the Herefordshire Council's Local Development Framework Core Strategy whilst aiming to reflect national and local priorities, including the five key national transport goals:

- Support economic growth
- Reduce carbon emissions
- Promote equality of opportunity
- Contribute to better safety, security and health
- Improve quality of life and a healthy natural environment.

B1.6 CURRENT PROBLEM IDENTIFICATION

B1.6.1 Hereford City's transport problems are largely urban in nature. These are principally congestion, poor air quality and severance caused by traffic resulting in poor access and safety issues for vulnerable road users. These are, to some extent, compounded

by the high levels of car dependence in the surrounding rural areas due to the high spatial concentration and self-containment of employment; 70% of residents travel less than 5km to work. The problems identified through the Hereford Transport Review can be summarised as follows:

- Congestion particularly affecting roads around the city centre
- Poor access to industrial areas which constrain economic development
- Intrusion of traffic into residential areas
- Need for improved road safety for vulnerable road users;
- Poor pedestrian facilities in parts of the city centre;
- Lack of facilities for cyclists; and
- Too many journeys to school by car.

B1.6.2 Hereford Transport Strategy retains significant traffic overloading in the city centre, specifically on the A49(Trunk) Greyfriars Bridge and on the A438 inner relief road of Blueschool Street / Newmarket Street. This overload would become increasingly difficult to accommodate and would reduce public acceptability of sustainable measures which would further reduce capacity such as bus priority, pedestrianisation and on road cycle provision.

B1.7 HIGHWAY INFRASTRUCTURE DEVELOPMENT

B1.7.1 The delivery of the Rotherwas Access Road provided a key component of the overall strategy to tackle congestion and enable the economic development of the County in line with regional and local policy. The development of an extended highway infrastructure is one of Hereford's strategic transport policies with the aim of reducing the city's congestion problems and to provide the necessary highway infrastructure to cater for the proposed regional 'Growth Point'.

B1.7.2 The proposed relief road serves to strengthen this strategy where the development of route corridors provide a key component of Hereford's longer-term transport strategy for the County and will help the City meet its role as a sub-regional centre. In pursuing this objective, Herefordshire Council have identified the need to further assess identified strategic route corridors to ensure a full assessment of its longer-term potential is established. The appraisal of these route corridors will include full consideration of potential environmental and engineering impacts of each route. Their impacts will largely be measured against a set of shared regional priorities with predominant outcomes such as:

-
- Reducing congestion
 - Better access to jobs and services
 - Opportunities to increase use of sustainable modes of transport
 - Improving safety for all road and non-road users
 - Support and enable economic development including proposed housing growth
 - Safeguarding the environment by improving air quality

B1.7.3 Herefordshire Council have confirmed that the final preferred route, once constructed, may be adopted by the Highways Agency and form part of the existing A49 Trunk Road. In light of this, it is essential that both the proposed engineering design standards and the environmental assessment methodology are fully complied with, to ensure health and safety is not compromised, and that the preferred corridor results in a good value for money proposal.

B1.8 SOURCES OF OPTIONS

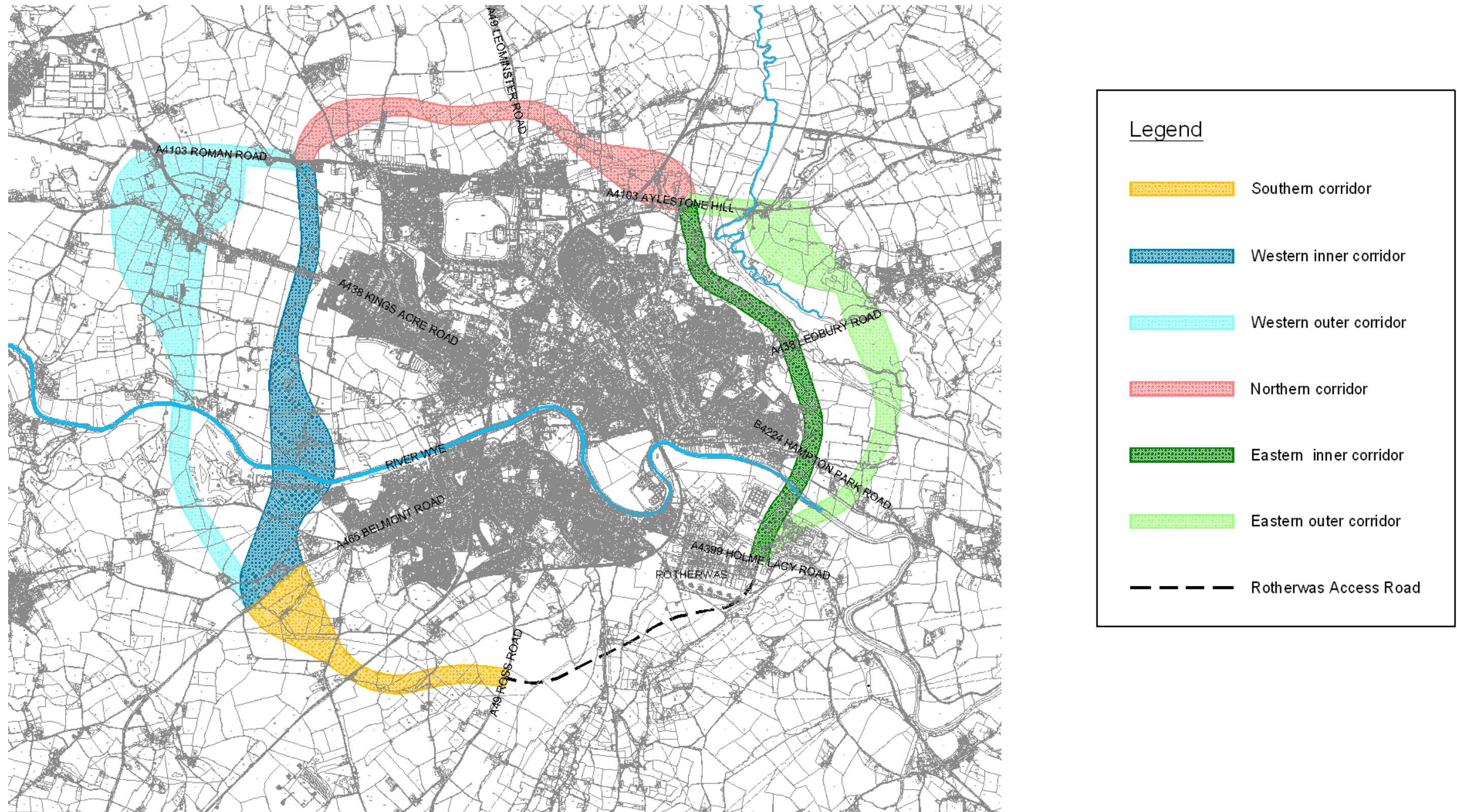
B1.8.1 Wide and broadly defined route corridors were set at the beginning of the Stage 1 Assessment to reflect the work undertaken to date on the Hereford Multi Modal Study. As recommended by the study brief, both East and West corridors were considered. To ensure that the Stage 1, 2 and 3 scheme assessment process identifies the optimum route corridor and then alignment, a wide study area was set for the Stage 1 assessment. Therefore, East and West and inner and outer options were considered. The inner options were corridors as close as is reasonable to the existing developed city limits. The outer options were corridors further away from the existing city but limited by what is considered to be economically sensible. A corridor too far outside of the city would not provide a short enough route to attract traffic use from through traffic or local trips.

B1.8.2 Historically a number of options for a relief road around Hereford have been considered. These options and the outcomes of assessments have been considered during this assessment. However, care was taken to ensure that the assessment took an independent view of options to meet the scheme objectives without being distracted by what has gone before.

B1.8.3 The Stage 1 routes E1, E2, E3 and E4 on the east of the city and W1, W2, W3 and W4 to the west were assessed creating the broad corridors for assessment. Note these were not designed alignments but the lines shown were for the purposes of defining broad corridors only. Also, many sections assessed are common to several routes, for example E3 was an extended version of E2. As such, in the detailed assessments there was a certain amount of repetition with each route being assessed independently.

B1.8.4 At the end of the Stage 1 Assessment the routes and corridors were redefined as shown on Figure B1.1. To avoid the repetition in this assessment the links are described and assessed individually.

Figure B1.1: Routes and Corridors Assessed in the Study into Options





B2 Methodology

- B2.1.1 The purpose of the study is to take the scheme towards having a preferred and fully assessed route to support a Major Scheme Business Case and as such, it is important that all studies, including this particular assessment, leading to the selection of a preferred option, will result in a scheme delivered in accordance with the Department for Transport's, Transport Appraisal Guidance (TAG) or WebTAG. The origins of WebTAG can be traced back to "The Green Book, Appraisal and Evaluation in Central Government". The Green Book places appraisal in the context of policy development, discussing the whole process.
- B2.1.2 The 'Green Book' aims to make the appraisal process throughout Government more consistent and transparent, ensuring that no course of action is adopted without a full assessment based on a coherent set of objectives and sub-objectives. Although the 'Green Book' is used as an appraisal process throughout Government, transport appraisal is always likely to be complex, with interactions at many levels with other policy areas. The Government produced a White Paper "A New Deal for Transport: Better for Everyone" (DETR, 1998), which set in place the policy context for dealing with transport and highlights the complexity of transport problems and the interaction with other policy areas.
- B2.1.3 The White Paper frames the move away from 'predict and provide' solutions to transport problems and puts at its core, an integrated transport policy. Appraisal of problems is key to the efficient delivery of this policy. The decisions made as part of the delivery need to be based on a full range of options and a comprehensive analysis of the impacts using a consistent approach. To this end, the White Paper introduces the New Approach to Appraisal (NATA) to appraise and inform the prioritisation of transport investment proposals.
- B2.1.4 Two years after NATA's original launch in 1998, Guidance on the Methodology for Multi-Modal Studies (GOMMMS) was produced as a primary source of guidance for the development and approval of surface transport.
- B2.1.5 The aim of Multi-Modal Studies (MMS) is to investigate problems on or with all modes of transport and to seek solutions to those problems. The output from the Hereford MMS provides a number of different options aimed at addressing the problems within the study area. The results of the Hereford MMS have been and will be used by the Herefordshire Council in developing and reviewing the Local Transport Strategies for Hereford, which includes the provision for a relief road.
- B2.1.6 In 2003 the advice originally set out in GOMMMS, NATA and their key supporting documents was fully incorporated into the Transport Analysis Guidance website – WebTAG.

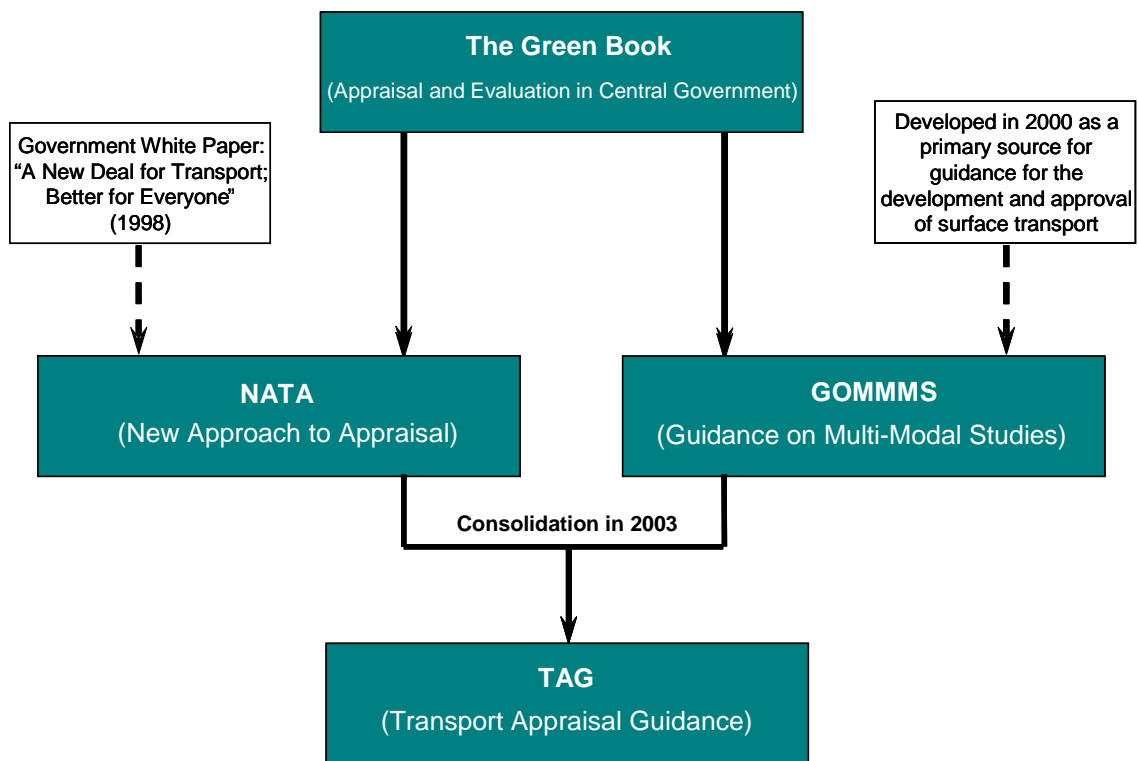


Figure B2.1 The Origins of Transport Appraisal Guidance

B2.2 APPRAISAL PURPOSE AND STRUCTURE

- B2.2.1 An Appraisal Summary Table (AST) displays the degree to which the five Central Government objectives for transport (environment, safety, economy, accessibility and integration) would be achieved. A judgement should be made from the AST about the overall value-for-money for each route corridor in achieving the Government’s objectives. The information provided in the AST and its more detailed supporting documents will enable a consistent view to be taken about the value of the route corridors.
- B2.2.2 The route corridor identification and environmental assessment set out within this report aims to provide an evidence base on land take related environmental impacts which will in supplemented by an assessment of the traffic type impacts at Stage 2. AST and Worksheets will be produced at Stage 2 and provide a sufficient basis in which to preferred routes.
- B2.2.3 The general methodology and guidance for the design and environmental assessment of the scheme is that set out in the DfT’s Transport Appraisal Guidance and the HA’s Design Manual for Roads and Bridges (DMRB), with Volume 11 (‘Environmental Assessment’) of the DMRB providing specific guidance on the preparation of Scoping Reports.

B2.3 PURPOSE OF THE STUDY OF OPTIONS ENVIRONMENTAL ASSESSMENT REPORT

- B2.3.1 The purpose of this report is therefore to provide the appropriate level of environmental assessment for the scheme, which at the Study of Options stage is sufficient assessment to identify the land take related impacts related to the proposed links.
- B2.3.2 Stage 2 is sufficient assessment to identify the factors and effects to be taken into account in choosing the route options and to identify the environmental advantages, disadvantages and constraints associated with those routes. This report identifies the significant environmental constraints with the route corridor and alignment options identified during a desk-based study, allowing a comparison of the proposed route corridor options and the evaluation of alignments. The assessment at Stage 2 includes Scoping of route changes, and Simple or Detailed Assessment as required following selection of preferred routes and route alignment changes.
- B2.3.3 The aim of the Stage 2 Scheme Assessment Report is to safeguard a route for the LDF. This requires submission of the report in time to meet the LDF consultation timeframe. It was evident that the traffic modelling work would not be available in time to meet the constraint of the LDF consultation. It was therefore decided that a **Study of Options** report would be produced to provide the evidence base for land take related impacts, for the safeguarding of a route corridor for the LDF. The Stage 2 report would then be completed when the traffic modelling was available. Production of LTP3 projects in the summer will also allow elements of sustainable transport projects to be incorporated into the design of the proposed relief road. For the Study of Options report not all the chapters are complete, as generally only land take type impacts are known, but will be revised with the traffic type impacts when the final Stage 2 Report is produced.

Table B2.1: Broad Categories of Environmental Impact

Environmental Objective	Land take Type Impact	Traffic Type Impact
Noise	-	✓
Local Air Quality	-	✓
Greenhouse Gases	-	✓
Landscape	✓	✓
Townscape	✓	✓
Biodiversity	✓	✓
Heritage	✓	✓
Water Environment	✓	✓
Physical Fitness	-	✓
Journey Ambience	-	✓

B2.4 DESIGN MANUAL FOR ROADS AND BRIDGES ENVIRONMENTAL ASSESSMENT

B2.4.1 The “Design Manual for Roads and Bridges” (DMRB) was introduced in 1992 in England and Wales, and subsequently in Scotland and Northern Ireland and is updated by the Highways Agency. It provides a comprehensive manual system which accommodates, within a set of loose-leaf volumes, current Standards, Advice Notes and other published documents relating to all works associated with Trunk Roads, including assessment, design, construction, operation, maintenance and demolition, gathered together in a consistent series of volumes within the DMRB to help in meeting the requirements of quality assurance procedures. To this effect, the DMRB shall be used as the basis for the environmental assessment for the Hereford Relief Road.

B2.4.2 The appraisal against the webTAG environmental objectives is informed by environmental assessment methodology in DMRB Volume 11. DMRB Volume 11 specifies a three-stage approach to the selection of route options, as follows:

- Stage 1 – Sufficient assessment to identify the environmental advantages, disadvantages and constraints associated with broadly defined route corridors.
- Stage 2 – sufficient assessment to identify the factors and effects to be taken into account in choosing the route options and to identify the environmental advantages, disadvantages and constraints associated with those routes.
- Stage 3 – Detailed assessment on the environmental effects of the selected route option.

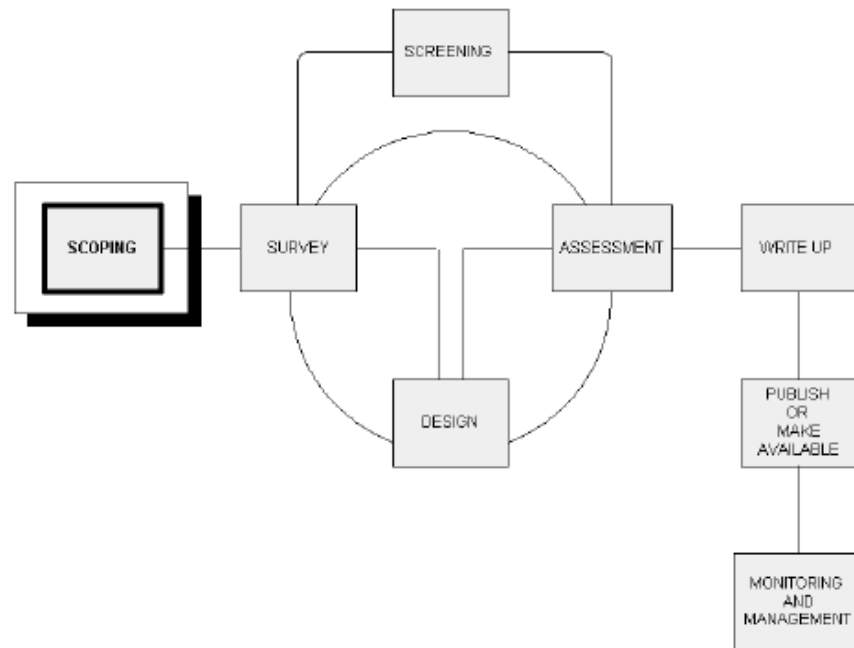


Figure B2-2. The design and environmental assessment process

B2.4.3 For environmental assessment this overall approach has been modified, with the publication of HA201/08. The three levels are 'Scoping', 'Simple' and 'Detailed'. The level of environmental assessment at each stage of the project is determined according to what is appropriate and necessary in order to establish the likely level of environmental effects which may inform a project decision, and that this level of assessment may vary between topics. Volume 11 now uses the terms Simple and Detailed assessments, each of which can take place at various stages of the project. For example, if it is established at an early Stage that a given project will have no effects in terms of ecology, it may not be necessary to carry out further more detailed assessment as the project proceeds, or conversely if it is evident from the outset that significant effects in terms of water quality are likely to occur, then a Detailed Assessment may be appropriate at Stage 2 of the design process. At Stage 2 of assessment, Scoping consists of identification of the baseline conditions within the study area, then each corridor is assessed in turn, and preferred corridors should emerge, based on environmental and other considerations. The Scoping exercise at the start of Stage 2 identifies further assessment to be conducted. This can either be Simple or Detailed dependent on the predicted significance of environmental effects.

B2.4.4 The scheme design is currently at the Study of Options stage, which is the assessment of route options. At both the Study of Options stage and Stage 2 an important objective of the environmental assessment is to provide information on likely environmental effects and feed it back into the scheme design, such that adverse effects can (as far as possible) be designed out in an iterative process.

B2.4.5 Environment assessment at Stage 2 identifies the constraints associated with each of the route corridor options. It also identifies potential impacts associated with the corridors and alignments. For the purpose of this Stage 2 assessment the corridors are considered to be 100 m from the outer alignment in a particular route corridor. Once detailed alignments have been chosen a Stage 3 assessment will be conducted on the preferred route alignments.

B2.4.6 The following sections of Volume 11 are of particular relevance:

- Section 2, Part 4, Scoping of Environmental Impact Assessments (HA 204/08). This guidance sets out the process for determining the appropriate scope for environmental assessment, based on the scale and nature of the project and the sensitivity of the receiving environment.
- Section 2, Part 6, Reporting of Environmental Impact Assessments (HD 48/08). This guidance is concerned with reporting, and contains a section on the methodology for, and presentation of, Scoping Reports

B2.4.7 Volume 11 (HD48/08, Reporting of Environmental Impact Assessments) sets out the coverage for a Scoping Report, and states that for each environmental topic the report should include coverage of:

- The study area.
- Existing and baseline knowledge.
- Value of environmental resources and receptors.
- Potential effects.
- Proposed level and scope of assessment.
- Proposed methodology including significance.

B2.4.8 A Scoping Report therefore sets out the above information for each topic in turn. For each topic, the appropriate level of further assessment (none, Simple or Detailed) is set out. Effects during the construction period (formerly considered in Volume 11 under the heading of 'Disruption Due to Construction') are considered individually for each topic.

B2.4.9 The assessment will focus on the likely significant effects on the environment. While it is necessary to assess all potential effects to some degree in order to determine which of them may be significant, the assessment will identify which of the effects assessed should be regarded as of enough significance to be taken into account in the decision making process. Each of the following sections therefore sets out the criteria under which the significance of the effects for that topic has been assessed. Where possible this is by reference to published

guidance or good practice, and Table 2.2 below is a general guide to how this has been carried out, based on the interaction between the sensitivity of the resource affected and the magnitude of the change to it.

Table B2-2

Magnitude	Sensitivity			
		Low	Medium	High
Low	Insignificant	Slight	Moderate	High
Medium	Slight	Moderate	High	Major
High	Moderate	High	Major	Major

B2.4.10 While the Stage 2 environmental assessment will be undertaken in accordance with the guidance set out in Volume 11 of the DMRB, the appraisal (to facilitate the preparation of the Appraisal Summary Table) and format of the report will be in accordance with the HA's Transport Analysis Guidance (TAG). For some topics, where the current Volume 11 guidance is somewhat out of date, some aspects of the TAG guidance will also be followed for the assessment, and for each topic the TAG data requirements will be reviewed to ensure that the outputs of the assessment are in accordance with TAG.

B2.4.11 Both the Study of Options and Stage 2 assessment will focus on the likely significant effects on the environment. While it is necessary to assess all potential effects to some degree in order to determine which of them may be significant, the assessment will identify which of the effects assessed should be regarded as of enough significance to be taken into account in the decision making process. Each of the following sections therefore sets out the criteria under which the significance of the effects for that topic has been assessed.

B2.4.12 Effects during the construction period (formerly considered in Volume 11 of DMRB under the heading of 'Disruption Due to Construction') are considered individually for each topic along with impacts on plans and policies. Land Use and Geology and Soils have been considered in the Study of Options Engineering Assessment to avoid repetition.

B2.4.13 A number of sources of information were used to carry out the study. These include the Herefordshire Council LDF Evidence Base, Green Infrastructure GIS database, online MAgiC maps, Natural England's 'Nature on the Map' website, the Multi Modal Study, the Environment Agency website and national, regional and local policies and plans.

B2.5 TAG APPRAISAL ENVIRONMENT OBJECTIVE

B2.5.1 The Environment Objective 3.3 aims to protect the built and natural environment. This includes reducing the direct and indirect impacts of transport facilities and their use on the environment of both users and non-users. The environment impacts of concern include noise, atmospheric pollution of differing kinds, vibration, formal intrusion, severance, and impacts on the countryside and wildlife, ancient monuments and historic buildings and so on. While some of these can be readily quantified, others such as severance are much more difficult to define and analyse. More recently, the Environment Objective has been defined more widely to include reduction of the impact of transport on the global environment, particularly through emission of carbon dioxide, but also by consumption of scarce and non-renewable resources.

B2.6 TAG APPRAISAL ENVIRONMENT SUB-OBJECTIVES

B2.6.1 The Environment Objective has 10 sub-objectives that reflect the various impacts of concern:

- to reduce noise; The Noise Sub-Objective
- to improve local air quality; The Air Quality Sub-Objective
- to reduce greenhouse gases, The Greenhouse Gases Sub-Objective
- to protect and enhance the landscape; The Landscape Sub-Objective
- to protect and enhance the townscape; The Townscape Sub-Objective
- to protect the heritage of historic resources; The Heritage of Historic Resources Sub-Objective
- to support biodiversity and geodiversity; The Biodiversity Sub-Objective
- to protect the water environment ; The Water Environment Sub-Objective
- to encourage physical fitness; The Physical Fitness Sub-Objective
- to improve journey ambience; The Journey Ambience Sub-Objective

B2.7 CONSULTATIONS

B2.7.1 The following will be consulted for information and potential issues associated with the proposed route corridor options following completion of the Study of Options Environmental Assessment Report:

- The Environment Agency (EA)

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- Natural England
 - English Heritage
 - The Herefordshire Biodiversity Recording and Monitoring Centre (BRMC)
 - The National Monuments Record (NMR)
 - The Herefordshire County Council Historic Environment Record (HER)
 - Herefordshire County Council's Archaeology Team
 - Herefordshire County Council's Ecology Team
 - Herefordshire County Council's Landscape Team
 - Herefordshire County Council's Environmental Health Team.

B2.7.2 Further consultation during Stage 2 of the scheme design and assessment will take place based on the Stage 1 reports, Study of Options report, and Scoping reports for the Stage 2 Assessment Report.

B2.7.3 Once the Study of Options has been approved by Herefordshire Council, it will be circulated to the statutory environmental bodies (The Environment Agency, Natural England and English Heritage) for information and comment on the proposed scope of assessment – The comments will be incorporated into the final Stage 2 report.

B3 The Noise Sub-Objective

B3.1 INTRODUCTION

B3.1.1 This chapter assesses the potential impacts of the route options on noise and vibration. DMRB HA213/08 and TAG unit 3.3.2 The Noise Sub-Objective set out the procedure for assessing impact of noise and vibration from highway schemes.

B3.2 METHODOLOGY

B3.2.1 DMRB requires an assessment at Stage 2, which is decided on the result of the Scoping Assessment. HA213/08 states that where significant impacts are likely to occur at any sensitive receptor as a result of the project, then it may be appropriate to recommend a move directly to a Detailed Assessment. However, caution should be applied to such an approach as at the scoping stage sufficient data may not always be available to make this decision. Hence, guidance should always be sought from the Overseeing Organisation before making such a recommendation. The objective of a Simple Assessment is to undertake sufficient assessment to identify the noise and vibration impacts associated with the project. Both Simple and Detailed Assessments require traffic data and detailed alignments that are not available for this Study of Options. The Study of Options is assessing links and corridors in order to develop routes to be assessed at Stage 2.

B3.3 SCREENING

B3.3.1 A Screening Assessment has been conducted in order to determine whether the project has the potential to cause a change to the receiving environment which could result in noise and vibration impacts. The Screening Criteria are:

- i) Does the project change the line or level of the carriageway?
- ii) Will the project cause a change in traffic flow?
- iii) Will the project cause a change in traffic speed?
- iv) Are there other changes to infrastructure that may cause a change in noise level?

B3.3.2 If any of these criteria are met a Scoping Assessment will need to be conducted. These criteria are met by the proposed scheme so a Scoping Assessment was conducted.

B3.4 SCOPING

B3.4.1 *Study Area*

B3.4.2 The initial study area for a Scoping assessment as set out in the DMRB is within 2km of a road scheme, to determine whether there are any noise sensitive receptors which could be subject to an adverse or beneficial change in noise or vibration. For a Simple Assessment, the DMRB recommends quantitative assessment of noise changes for each dwelling and other sensitive receptor (such as community facilities or public rights of way) within 600m of the centre line of an affected route using CRTN methodology. Affected routes are defined as those existing or new roads where noise levels are predicted to change by more than 1 db(A) as a result of the scheme on opening, or where traffic volumes are predicted to increase by 25% or decrease by 20%. A Detailed Assessment is primarily concerned with the impact at dwellings, with the assessment from the simple stage for other sensitive receptors being updated if necessary. If a project has moved directly from scoping to detailed, an assessment of the noise impact at other sensitive receptors will need to be undertaken. This should now be undertaken to the level required for a Simple Assessment, but included in the report for a Detailed Assessment.

B3.4.3 The Study of Options is assessing links in order to produce routes for assessment. Scoping Assessment of the links only would not conform to DMRB guidance. The 2 km noise buffer would mean that there would invariably be a large amount of double counting of receptors leading to the erroneous assessment that the route of the proposed scheme would potentially affect more receptors than there are people in Hereford. It was therefore decided that Scoping would be conducted at Stage 2 when the full routes for assessment are available and when the traffic modelling is available as this would allow for affected roads to be scoped.

B3.4.4 In practice noise effects would tend to be limited to the houses closest to the scheme, and noise changes would not be felt by houses which are further away, where they are shielded by intervening properties, in particular in the Hereford urban area. It should also be noted that the outer corridor routes though having a lesser impact on dwellings, as there are fewer, would have a greater impact on the tranquillity of the countryside around Hereford as the proposal would introduce noise into an otherwise quiet and tranquil area. The Stage 1 Assessment identified that there would be residential properties, schools, community facilities and designated sites within 2 km of the links.

B3.4.5 Scoping requires the identification of sensitive receptors, consultation with the Environmental Health Officer and identification of the likelihood of significant effects. It is appropriate to assess the noise and vibration impacts of construction at a later date when more detailed construction methodologies and detailed route alignments are known.

B3.5 BASELINE CONDITIONS

- B3.5.1 The study area currently experiences low levels of background noise, being dominated by agricultural land and villages around the outskirts of Hereford.

B3.6 CONSULTATION AND CONSTRAINTS

- B3.6.1 Herefordshire County Council's Environmental Health department will be consulted for their comments and information on constraints in the area relating to noise, including sensitive land uses at Stage 2. The consultation on the Stage 1 assessment stated that they are not aware of any existing sources of noise or complaints about traffic noise in the area of the proposed route corridors. The reply also considered that there will be numerous noise sensitive receptors and that a full assessment will need to be carried out prior to development.

Herefordshire Council UDP- Policy DR13 Noise

- B3.6.2 Development with the potential for generating significant levels of noise or for exposing a noise sensitive use to an existing noise source will be required to include appropriate measures within the proposal to mitigate the noise impact to an acceptable level. Development which, after taking account of mitigation measures proposed, would still have an unacceptable noise impact or result in unacceptable exposure to noise will not be permitted. Development which would adversely affect the quiet enjoyment or the special interest of designated areas will not be permitted. The quiet enjoyment and tranquillity of the wider countryside, landscape and wildlife areas and historic features will also be considered. The UDP also states that noisy development near a SSSI will need special consideration.

DMRB Volume 11 Section 3 HA 213/08

- B3.6.3 HA 213/08 provides the procedure for assessing the impact of noise from road schemes. HA213/08 states 'In recent years, evidence has also been accumulating from surveys before and after sudden changes in noise exposure. It indicates that people are more sensitive to abrupt changes in traffic noise associated with new road schemes than would be predicted from the steady state evidence. In the period following a change in traffic flow, people may find benefits or disbenefits when the noise changes are as small as 1 dB(A) - equivalent to an increase in traffic flow of 25% or a decrease in traffic flow of 20%. These effects last over a number of years'.

Planning Policy Guidance 24 – Planning and Noise

- B3.6.4 PPG 24 gives guidance to local authorities in England on the use of planning powers to minimise the impact of noise. PPG 24 states that a change of 3dB(A) is the minimum perceptible under normal conditions and a change of 10dB(A) corresponds roughly to the halving or doubling the loudness of a sound. From this it can be considered that the

perceived benefit or disbenefit arising from a 1dB(A) change is dependent on non-acoustic factors such as a visible change in traffic flow. Paragraph 10 states “*Much of the development which is necessary for the creation of jobs and the construction and improvement of essential infrastructure will generate noise. The planning system should not place unjustifiable obstacles in the way of such development. Nevertheless, local planning authorities must ensure that development does not cause an unacceptable degree of disturbance. They should also bear in mind that a subsequent intensification or change of use may result in greater intrusion and they may wish to consider the use of appropriate conditions*”.

World Health Organisation Guidelines

- B3.6.5 WHO guidelines state “general daytime outdoor noise levels of less than LAeq 55dB are desirable to prevent any significant community annoyance”. An aspirational target was also set for dwellings of LAeq 50dB for day and LAeq 45dB for night.

Land Compensation Act 1973

- B3.6.6 Part I of the Land Compensation Act provides a means by which compensation can be paid to owners of land or property which has experienced a loss in value caused by the use of public works, such as new or improved roads. Noise and vibration are two of the factors which would be considered in any claims for compensation, but the claim must consider all changes and effects, including betterment. Claims can be made under Part I of the Act from 1 to 7 years after the opening of a road project. However, consideration of the likely extent of claims may be made during detailed design following the completion of statutory processes.

The Noise Insulation Regulations 1975 (as amended 1988)

- B3.6.7 The Noise Insulation Regulations were made under Part II of the Land Compensation Act 1973. Regulation 3 imposes a duty on authorities to provide, or make a grant towards the installation of, noise insulation at eligible buildings. This is subject to meeting certain criteria given in the relevant Regulations. Regulation 4 provides authorities with discretionary powers to provide noise insulation at other buildings, in situations where existing carriageways are altered, such as additional lanes provided. Advice on the use of this discretionary power should be sought from the Overseeing Organisation.

The Highways Noise Payments and Movable Homes (England) Regulations 2000

- B3.6.8 These regulations provide highway authorities with a discretionary power to provide a noise payment where new roads are to be constructed or existing ones altered. The relevant regulations set out the criteria which should be applied in assessing eligibility for making such payments. Advice on the use of this discretionary power should be sought from the Overseeing Organisation.

The Control of Pollution Act 1974

B3.6.9 Sections 60 and 61 of the Control of Pollution Act generally relate to construction and demolition work, road works and maintenance works and are often used in conjunction with other standards such as BS 5228 (see below). These sections relate to control of noise on construction sites and prior consent for work on construction sites respectively.

Environmental Protection Act 1990

B3.6.10 Under Part III of the Environmental Protection Act 1990 local authorities have a duty to investigate noise complaints from premises (land and buildings) and vehicles, machinery or equipment in the street. It does not apply to road traffic noise but may be applicable to some construction activities. The Noise and Statutory Nuisance Act 1993 amended Part III of the Environmental Protection Act 1990 by placing additional definitions in the list of statutory nuisances in Section 79 of the Environmental Protection Act. The definitions relate to nuisance caused by vehicles, machinery and equipment in the road. If a local authority's Environmental Health Officer is satisfied that a complaint amounts to a statutory nuisance then the authority must serve an abatement notice on the person responsible or in certain cases the owner or occupier of the property. The notice could require that the noise or nuisance must be stopped altogether or limited to certain times of the day.

B3.6.11 **BS 5228:2009 Code of practice for noise and vibration control on construction and open sites** (Part 1: Noise, Part 2: Vibration, and Part 4: Code of practice for noise and vibration control applicable to piling operations). BS5228:2009 describes a method for predicting noise levels from construction activities. It provides typical source noise levels and takes account of the different types of activity that can occur in predicting the consequential noise level. The method takes account of the distance between sources and receptors, the durations of activities, and the effect of natural or purpose-built barriers and screens.

B3.7 SENSITIVE RECEPTORS

B3.7.1 The Scoping assessment calls for the number of residential and other sensitive receptors located within two km of each route that may be subject to an adverse or beneficial change in noise or vibration to be identified. Sensitive receptors will be counted using OS mapping and GIS analysis, in line with DMRB Volume HA213/08. Building counts and the assumption of residential use are based on OS mapping and may be subject to revision when site visits are carried out at a later date. At Stage 2 a full assessment of the noise impacts will be conducted using CRTN methodology to establish entitlement to noise insulation treatment under the Noise Insulation Regulations 1975 and 1988 amendment. The largest noise impacts will be within 300 m and at further stages quantitative assessment can only be conducted up to 600 m; beyond this qualitative assessment will be conducted. The majority of the properties within the 2 km buffer are within Hereford itself and the noise from the proposed relief road is unlikely to be heard over current road and urban noise in the city.

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- B3.7.2 Other noise sensitive receptors identified within 2 km include schools, hospitals, nursing homes, youth centres, doctors surgeries, educational accommodation, village halls, libraries, places of worship, graveyards, day nurseries for children, listed buildings and ancient monuments. These will be investigated further at Stage 2. Other sensitive receptors such as community facilities and Rights of Way were identified for the Physical Fitness Sub-Objective and will be investigated further at Stage 2.
- B3.7.3 In terms of designated sites the Wye Valley SSSI and SAC is crossed by all the potential routes, the Lugg SSSI and SAC by all the easterly routes (with the exception of routes using EL1), the Lugg Meadows SSSI is skirted by route EL1 and the Cage Brook Valley SSSI is within 2000 m of the outer western corridor. The impact of noise on these ecological sites is investigated under the Biodiversity Sub-Objective chapter at Stage 2. There are Scheduled Ancient Monuments within 2000 m of the proposed route corridors and the impact of noise on these sites will be considered further at Stage 2.
- B3.7.4 Vibration sensitive receptors are likely to be within 40 m of the route options and vibration sensitive receptors will be considered further with the refinement of route options. Heritage sites, archaeological sites and ecological sites can be adversely affected by vibration and particular attention will need to be given to the location of the route. Ideally no sites that can be adversely affected by vibration should be within 40 m of the relief road options. At Stage 2 when detailed route alignments are produced the potential impact of vibration will be investigated.

B3.8 NOISE IMPACTS

- B3.8.1 Both the corridors and route options within them mainly go through an area where currently background noise levels are low. At the Study of Options Stage AAWT, 18hr and annual average speed data is not available and the routes are indicative so no calculations of noise levels at sensitive receptors can be undertaken but qualitative assessment can be made. Consequently 'large adverse' impacts for noise and vibration may be expected for properties within the corridors. Large adverse impacts would be expected for the proposed new housing estates situated near to the route corridors. However, noise and vibration are likely to reduce slightly in Hereford City Centre, due to the diversion of a proportion of traffic along the new route.
- B3.8.2 However, as discussed in the Air Quality chapter, new areas of housing are proposed in Hereford, but these have not been quantitatively assessed for the Study of Options as the exact location of the housing is not known. The potential noise and vibration effects on residential properties within 2km of the route options will therefore require further assessment as the project progresses at Stage 2 and preferred routes are identified.

B3.9 NOISE AND VIBRATION EFFECTS DURING CONSTRUCTION

B3.9.1 The effects of construction activities and related traffic on noise and vibration cannot be assessed in detail at this stage as the route layout has not yet been designed in detail, or construction methods chosen. However, noise and vibration is likely to affect the local community during construction, for example due to earthworks and vehicle movements. This may be reduced through noise reduction measures and designated construction traffic routes which avoid residential areas. Construction noise will be assessed using HA213/08 and BS5228 methodology.

B3.10 MITIGATION

B3.10.1 The following mitigation techniques can be used to minimise the noise and vibration impact:

- Horizontal Alignment of the proposed route away from residential areas and other sensitive receptors.
- Vertical Alignment of the proposed route keeping low within the natural topography to exploit any natural screening and enhancing this by the use of cuttings.
- Environmental barriers including earth mounding and acoustic fencing can be used to limit the level of noise. The visual impact of any environmental barriers used needs to be considered in the landscape assessment.
- Low noise surfaces reduce the mid and high frequency noise and offer other benefits such as durability and skid resistance.
- Speed and volume restrictions can reduce noise and vibration. Above 40kmh⁻¹ noise level increases with the speed of the vehicle. Limiting of the speed limit can reduce the level of noise.

B3.11 FURTHER WORK

B3.11.1 DMRB HA213/08 requires either a Simple or a Detailed Assessment of noise and vibration effects following the Scoping Assessment. If it is not clear whether the scheme will result in significant noise and vibration impacts the assessment process proceeds to the Simple Assessment. However, where 'it is clearly evident that the project will result in significant noise and vibration impacts' the process proceeds straight to the Detailed Assessment. If the Simple Assessment were to be undertaken initially, it would lead to a requirement for a Detailed Assessment for all options still being considered, if (amongst other matters) the project is found to cause either an increase in noise level of 1 dB(A) or more at any dwelling in the baseline year, or an increase of 3 dB(A) or more during the 15 year design period.

B3.11.2 When the scheme enters Stage 2 and route options are chosen for assessment the potential routes will undergo a Scoping Assessment based on these routes and since the current indications are that significant noise effects are likely, and that they will cause noise increases greater than 1 dB(A) in the baseline year with the scheme. The Stage 2 assessments should be undertaken in accordance with the DMRB requirements for Detailed Assessments, which are summarised below. Many of those matters covered by the Detailed Assessment are also required in any event by a Simple Assessment, and the principal differences relate to the assessment years/comparisons and the reporting of the noise effects. The information produced by the Detailed Assessment for noise and vibration can be used to form the basis for mitigation methods and establish entitlement to noise insulation under the Noise Insulation Regulations (1975).

B3.12 CONCLUSIONS

B3.12.1 The community near to the proposed corridors is likely to be adversely affected local to the scheme due to noise and vibration created by vehicles using the new route, however noise and vibration may reduce slightly in other areas of Hereford, particularly along the A49 and in Hereford City Centre, due to the diversion of a proportion of traffic along the new route. On balance the proposal is likely to be large adverse owing to the current low noise levels in the rural and suburban areas of the route corridors.

B3.12.2 The inner corridors are likely to have the largest adverse effect as they have the greatest number of properties within 300 m. Further assessment will be required as the project progresses and routes are identified for assessment at Stage 2.

B4 The Air Quality Sub-Objective

B4.1 INTRODUCTION

B4.1.1 This chapter assesses the potential impacts of the route corridor options on air quality. Effects on air quality can be either negative or beneficial. Negative effects are likely to occur if a new road takes traffic closer to properties and/or an existing road is subject to increased traffic flows. Beneficial effects can occur if a new road takes traffic away from properties and/or reduces traffic along an existing road, or reduces existing congestion. The pollutants of key concern are NO₂, NO_x and particulate matter less than 10 microns (PM10).

B4.2 METHODOLOGY

B4.2.1 A scoping exercise for air quality will be carried out on the selected route options for Stage 2 in line with the requirements of DMRB Volume 11, Section 3 HA207/07. At the scoping stage, this assessment involves identifying properties and designated sites within 200m of roads affected by the project. Affected roads are those for which any of the following criteria will apply:

- Road alignment will change by 5m or more
- Daily traffic flows will change by 1,000 AADT or more
- Heavy duty vehicle flows will change by 200 AADT or more
- Daily average speed will change by 10km/hour or more
- Peak hour speed will change by 20km/hour or more

B4.2.2 In terms of properties, particular attention is paid to locations of the young, the elderly, or other susceptible populations, such as schools and hospitals. Areas likely to experience higher than average air pollution concentrations, such as roundabouts and junctions, should be identified. The designated sites that should be considered for this assessment are those which are sensitive to air pollution. Sites designated for geological purposes need not be assessed.

B4.2.3 Air quality is likely to be adversely affected local to the scheme due to vehicle emissions, the pollutants of concern from road sources are nitrogen oxides (NO_x, in particular NO₂) and particulate matter less than 10 microns (µ). At the Study of Options Stage detailed routes are not defined and the traffic modelling is not developed enough to allow identification of affected roads. Affected roads will be identified at Stage 2, when there will be a detailed traffic model, and it is likely that there will be an improvement in air quality in the city centre and AQMA and a deterioration of air quality along the route of the Hereford Relief Road. DMRB HA207/07 requires the identification of possible locations alongside affected roads and new roads where there may be exceedances of the Air Quality Strategy objectives or limit values.

B4.2.4 The proposed routes are not likely to cause exceedance of the air quality objectives at any location along the route. When the affected roads are established in Stage 2 there may be a reduction in the area of exceedance of the nitrogen dioxide objective along the roads in Hereford, in particular the A49 and this could lead to a reduction in the area of the AQMA. This is in part a result of diversion of vehicles from the A49 to the relief road. Reduced congestion also allows vehicles to operate more efficiently so improving air quality further. At Stage 2 when AADT and more developed route options are available a Simple Assessment will be carried out using the DMRB air quality screening spreadsheet at a wide range of properties including those likely to have the highest concentrations, the largest changes in concentration, those that are representative of large populations and those that house the young, elderly and other sensitive receptors. To establish the extent of the likely beneficial impact on the AQMA Detailed Assessment will be necessary and this is likely to be carried out using dispersion modelling at Stage 3 of the scheme assessment process.

B4.3 PROPERTY COUNTS, SENSITIVE RECEPTORS AND DESIGNATED SITES

B4.3.1 The number of residential properties located within 200m of each of the Stage 2 detailed routes will be counted using OS mapping in line with DMRB Volume 11 (Section 3, HA207/07). The property counts will be conducted using MapInfo. Herefordshire Council will identify areas of proposed housing. The location of Air Quality Management Areas (AQMA) in the area was confirmed with Herefordshire County Council. The AQMA is in the process of being extended along the A438 as a result of continuing exceedances. The proposed areas of housing are shown in the Landscape constraints maps in Engineering Assessment Appendix A-A Booklet. Building counts and the assumption of residential use will be based on mapping and may be subject to revision when site visits are carried out at a later date.

B4.3.2 The hay meadow habitats at Lugg Meadows SSSI are sensitive to nitrogen deposition and therefore will need to be assessed further at Stage 2. The impact on other Designated Sites will also be investigated at Stage 2. Dust soiling from construction will be considered further under construction effects at Stage 3.

B4.4 CONSULTATION WITH HEREFORDSHIRE COUNCIL

B4.4.1 Herefordshire Council state the key area of concern is the AQMA. Herefordshire Council reported that the AQMA will be extended in the near future.

B4.5 AIR QUALITY POLICES AND PLANS

B4.5.1 **EU Air Quality Directive (Directive 2008/50/EC)** - came into force in June 2008, which will be transposed into legislation in England, Wales, Scotland and Northern Ireland by June 2010. This consolidates existing air quality legislation (apart from the 4th Daughter Directive¹³) and provides a new regulatory framework for PM_{2.5}. It also makes provision for

Member States to postpone attainment deadlines. The obligation to meet the requirements of the Directive falls primarily upon the Secretary of State for the Environment in England, and appropriate Ministers in the Devolved Administrations, who are designated as the appropriate “competent authority”.

B4.5.2 National Air Quality Strategy - The first National Air Quality Strategy was published in 1997. The Strategy was last updated in 2007 and continues to provide the framework for local government to assess ambient air quality in their locality against specific health-based standards for nine pollutants (nitrogen dioxide, PM10, sulphur dioxide, benzene, lead, 1,3-butadiene, carbon monoxide, PAH and ozone). Seven of which (excluding ozone and PAH) are regulated through the Air Quality Regulations 1997 (HM Government 1998), 2000 (HM Government 2000), Air Quality (England) (Amendment) Regulations 2002 (HM Government 2002) and 2007 (OPSI 2007). The National Objectives are shown in Table B4.1.

B4.5.3 Local Air Quality Management: Technical Guidance 09 (LAQM.TG09) is designed to support local authorities in carrying out their duties under the Environment Act 1995. These duties require local authorities to review and assess air quality in their area. These Review and Assessments form the cornerstone of the system of Local Air Quality Management (LAQM). LAQM itself forms a key part in the UK Government’s strategies to achieve the air quality objectives. TG09 states:

B4.5.4 Where the DMRB assessment indicates that exceedances of the objectives are likely, a more detailed study may then be required. This may include the use of more complex dispersion models, and/or the use of local monitoring. However, where a good agreement between the DMRB model results and monitoring (at relevant locations) is demonstrated, then the results of the DMRB model should, in many instances, be sufficient to determine the area of exceedance of the objective. In circumstances where complex road layouts, such as large junctions or complex street canyons are being assessed, then more detailed modelling is recommended.

B4.5.5 Herefordshire and Worcestershire Air Quality Planning Protocol- Ensuring that air quality is considered as a material planning consideration within development control planning processes of the Councils, through the implementation of the Supplementary Planning Document for Herefordshire and Worcestershire. Where deteriorations in air quality due to a development (or developments) are predicted, to ensure measures to mitigate the effects are put in place;

- Require modelling and/ or monitoring to be undertaken to accurately assess the impacts of proposed development on local air quality;
- Ensuring that air quality is properly considered within planning policy processes, in particular within the LDF process, with the inclusion of a specific air quality policy where applicable.

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- B4.5.6 **Herefordshire and Worcestershire Air Quality Strategy 2009** - supports the achievement of air quality objectives and aims to raise air quality as an issue for consideration within a wide range of local government and regional planning frameworks.
- B4.5.7 **PPS 23 and Annex 1 of PPS23** – PPS 23 Annex 1 states that any air quality consideration that relates to land-use and its development is capable of being a material planning consideration. The impact on ambient air quality is likely to be particularly important:
- Where the development is proposed inside, or adjacent to, an Air Quality Management Area (AQMA) designated under Part IV of the Environment Act 1995;
 - Where the development could in itself result in the designation of an AQMA; and
 - Where to grant planning permission would conflict with, or render unworkable, elements of a local authority's air quality action plan.
- B4.5.8 **Herefordshire Air Quality Action Plan** - Hereford City Air Quality was released at the beginning of 2008 and proposes and models 15 actions which are designed to improve air quality in the city. Action numbers 4 and 5 of the AQAP relate to the provision of a relief road around Hereford.
- B4.5.9 **Herefordshire Local Transport Plan**- Air Quality target (LTP8) is to reduce concentrations within AQMAs to below 40 µg/m³ by 2010/11.
- B4.5.10 **UDP Policy DR9**- Development proposals which could contribute to the deterioration of air quality below acceptable levels, either locally or on a more widespread basis, will not be permitted unless adequate air quality enhancements or mitigation measures can be accommodated and demonstrated as part of the development. In assessing schemes regard will be had to both their operational impacts and to associated traffic generation. Where developments are sensitive to air quality are proposed, regard will be had to local air quality as a material consideration.
- B4.5.11 **Development Control: Planning for Air Quality EPUK 2010** – This guidance aims to ensure that air quality is properly accounted for in the Development Control and Local Development Framework processes. The guidance clarifies when an air quality assessment is required and what it should contain. It sets out how impacts should be described and assessed. Importantly it sets out a recommended approach that can be used to assess the significance of the air quality impacts, taking account of the advice issued by the Institute of Air Quality Management. An important focus of this guidance is on minimising the air quality impacts of all developments
- B4.5.12 This guidance defines a number of criteria that can trigger the requirement for an air quality assessment;

- Proposals that will generate or increase traffic congestion, where ‘congestion’ manifests itself as an increase in periods with stop start driving;
- Proposals that will give rise to a significant change in either traffic volumes, typically a change in annual average daily traffic (AADT) or peak traffic flows of greater than $\pm 5\%$ or $\pm 10\%$, depending on local circumstances (a change of $\pm 5\%$ will be appropriate for traffic flows within an AQMA), or in vehicle speed (typically of more than ± 10 kph), or both, usually on a road with more than 10,000 AADT (5,000 if ‘narrow and congested’)

Pollutant	Time Period	Objective	To be achieved by
Benzene	Running annual mean	16.25 $\mu\text{g}/\text{m}^3$	2003
	Annual mean	5 $\mu\text{g}/\text{m}^3$	2010
1,3-Butadiene	Running annual mean	2.25 $\mu\text{g}/\text{m}^3$	2003
Carbon Monoxide	Maximum daily running 8-hour mean	10 mg/m^3	2003
Lead	Annual mean	0.5 $\mu\text{g}/\text{m}^3$	2004
	Annual mean	0.25 $\mu\text{g}/\text{m}^3$	2008
Nitrogen dioxide	1-hour mean	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	2005
	Annual mean	40 $\mu\text{g}/\text{m}^3$	2005
Sulphur Dioxide	1-hour mean	350 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 24 times a year	2004
	24-hour mean	125 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 3 times a year	2004
	15-minute mean	266 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times a year	2005
Fine particles (PM ₁₀)	24-hour mean	50 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times a year	2004
	Annual mean	40 $\mu\text{g}/\text{m}^3$	2004

Table B4.1 National Air Quality Objectives

B4.6 BASELINE AIR QUALITY MONITORING

B4.6.1 Hereford has a continuous monitor station within the AQMA, on Edgar Street, and diffusion tube monitoring throughout the City (Figure B4.1) none of these are along the routes of the proposed relief road. NO₂ diffusion tube site 5 is located around 200 m to the west of the Eastern Inner Corridor route option EL1 and the NO₂ concentration was measured as

13.9 $\mu\text{g}\text{m}^{-3}$ in 2008. The Air Quality Archive shows background NO_2 concentrations to be between 5 and 15 $\mu\text{g}\text{m}^{-3}$ over the extent of the corridors.

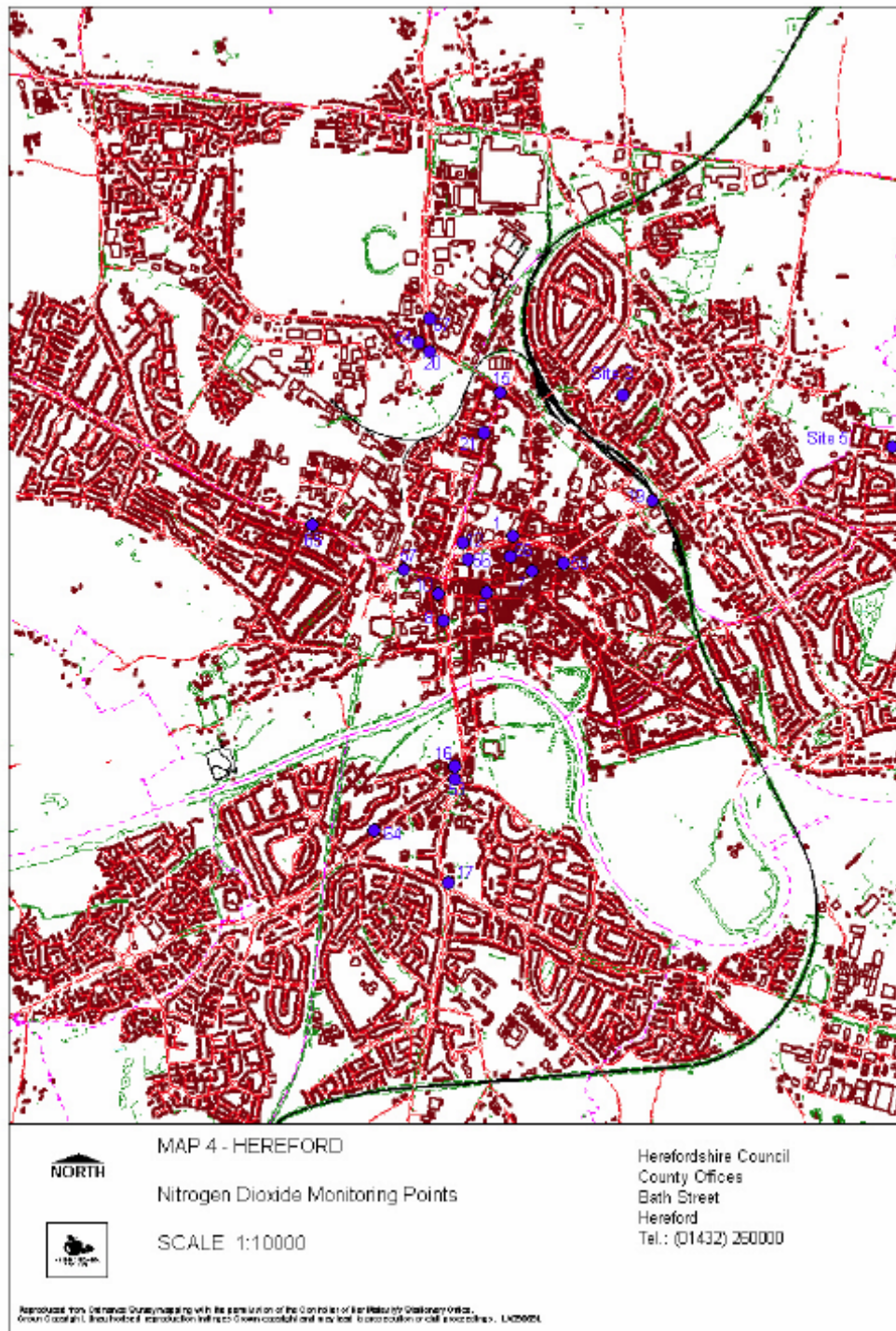


Figure B4.1 Nitrogen Dioxide Monitoring Points in Hereford

B4.6.2 Additional monitoring is planned by Herefordshire in the near future along the proposed route options when detailed alignments are established and chosen corridors have been put forward for Stage 2 assessment. In order to establish an accurate baseline and verify the

predictions of the air pollution models, produced later in the assessment process, measured concentrations of pollutants are needed.

B4.7 BRIEF FOR FURTHER MONITORING

B4.7.1 DMRB HA207/07 recommends that NO₂ diffusion tube monitoring is conducted as a minimum. Given that there is insufficient monitoring for the establishment of a baseline along the route and for verification of modelling NO₂ diffusion tube surveys are proposed. The NO₂ diffusion tube surveys should take place once the route options have been refined at Stage 2 in order to validate the modelling for Stage 3. NO₂ diffusion tubes should be sited at a background site, along affected roads and near the junctions of proposed links identified at the end of Stage 2. Triplicate exposure against the continuous monitoring site will be required. The diffusion tube survey will need to conform to guidance in TG09.

B4.8 CALCULATION OF LEVELS OF POLLUTION

B4.8.1 No AADT or vehicular speed data for the proposed route options is available at the Study of Options stage so no calculations of the levels of local air pollutants or greenhouse gases can be made at this stage. The potential air quality effects on residential properties within 200m of the route options will therefore require further assessment as the project progresses at Stage 2. Given the low background levels of pollution along the route corridors it is considered unlikely that exceedance of National Objectives will occur along any of the proposed route corridors and there is likely to be a reduction of levels of pollution within the city centre area along the route of the A49 through the city. Particular attention will need to be paid to junctions and roundabouts as this is where exceedances of the NO₂ annual mean objective would be most likely to occur.

B4.9 AIR QUALITY EFFECTS DURING CONSTRUCTION

B4.9.1 The effects of construction activities and related traffic on air quality cannot be accurately assessed in the Study of Options stage as the detailed route options for assessment have not yet been put forward, or construction methods proposed. Air quality will be adversely affected during construction due to dust created by earthworks and emissions caused by vehicle movements. This may be reduced through dust prevention measures and designated construction traffic routes which avoid residential areas. Particular attention will need to be paid to where construction takes place near designated sites and agricultural land as soiling of leaves by dust can affect plant health and productivity. It is envisaged that during construction there will be an adverse effect on air quality near to the construction sites. This can be reduced through dust prevention measures and designated construction traffic routes which avoid residential areas. The construction will use methods recommended in The GLA Air Quality: Best Practice Guidance - The Control of Dust & Emissions from Construction and Demolition.

B4.10 IMPACT ON HEREFORD AIR QUALITY MANAGEMENT AREA

- B4.10.1 No air quality management areas have been designated within any of the route corridors. However, Hereford City AQMA has been designated within the City of Hereford, covering the A49 from Blackmarstone to Widemarsh and part of the A438 joining the A49. The AQMA is linked to road traffic emissions and is for exceedance of the annual mean NO₂ objective. The area of the AQMA is shown in Figure B4.2, though Herefordshire Council report that the AQMA is likely to be extended soon as a result of diffusion tube monitoring showing exceedance of the annual mean NO₂ objective along the A438. The A49 is likely to be an affected road when the affected roads are identified at Stage 2. The AQMA has been designated as an area likely to exceed the National Air Quality Standards and Objectives for Nitrogen Dioxide (NO₂) of an annual average limit of 40µgm⁻³. The AQMA is located approximately 3000 m west of the Eastern Inner Corridor route options and 2500 m east of the Western Inner Corridor route options. An Air Quality Action Plan has been produced and measures in the plan include actions for the relief road to help alleviate congestion and air pollution along the A49 in the city centre. Hereford has only one road crossing of the River Wye and this causes congestion from through traffic.
- B4.10.2 The proposed route options are unlikely to adversely affect air quality in the AQMA due to their distance from the designated area. They are instead, likely to improve air quality in the AQMA due to the diversion of a proportion of the traffic currently using this route to the new route. This will improve air quality in Hereford city centre through reduced traffic emissions in areas of high population density, which in turn will contribute to improved health of the population, from a reduction of the area of exceedance and the number of people living within the area of exceedance. Detailed Assessment at a later stage of assessment can establish the effect of the proposed scheme on the area and level of exceedance within the AQMA.

B4.11 FURTHER WORK

- B4.11.1 DMRB HA207/07 requires a Simple Assessment of air quality effects following the Scoping Assessment if there are relevant properties of Designated Sites nearby unless calculations show the air quality objectives are likely to be exceeded and then a Detailed Assessment is required. The scheme will under go a Scoping Assessment based on the route options proposed for Stage 2. Since there are relevant properties and designated sites, but exceedance of the National Objectives is not predicted, it is likely a Simple Assessment will be required and calculations of air pollution levels will be made using the DMRB air quality spreadsheet. At Stage 3 a Detailed Assessment of the air quality can be made using dispersion modelling to show the impact of the scheme, which is likely to be beneficial, of the proposed route on the AQMA.



Figure B4.2 Hereford AQMA (OS Licence Number 10024168 (2008))

B4.12 REGIONAL IMPACT ASSESSMENT

B4.12.1 Affected roads have not yet been identified and will be identified and assessed at Stage 2 when the traffic model is available. Qualitative assessment indicates that the scheme could cause a marginal deterioration as a result of the extra distance travelled resulting in extra emissions, though this may be more than offset by the reduction in congestion and idling.

B4.13 MITIGATION

B4.13.1 The properties within 200 m of the proposed route would experience an increase in levels of air pollution but concentrations are expected to remain well below objective levels. Therefore no specific mitigation measures would be required. Nevertheless, subject to safe road engineering design criteria, the proposed relief road would be aligned away from properties as far as possible and junctions will be designed to avoid changes in speed and queuing. Simple Assessment at Stage 2 could potentially identify exceedances and mitigation will be considered further at that stage. The relief road itself is a mitigation measure outlined in the AQAP to reduce NO₂ concentrations within the AQMA.

B4.14 CONCLUSIONS AND RECOMMENDATIONS

B4.14.1 Air quality is likely to be adversely affected local to the scheme due to vehicle emissions. However, it is likely to improve in other areas of Hereford, particularly along the A49 and in the AQMA, due to the diversion of a proportion of traffic along the new route. Some adverse impacts on air quality from construction dust and disruption are envisaged during the construction phase.

B4.14.2 The outer corridors are likely to have the lowest air quality impacts on the population, as the routes have the least number of nearby sensitive receptors. Link EL1 is less than 50 m from the Lugg Meadows SSSI. Lugg Meadows is lowland hay meadow which is now a particularly rare habitat type (Lowland Meadow is a Priority Habitat in the UKBAP), and the Lugg Meadows are one of the most significant areas of this habitat in the West Midlands region. Lowland hay meadows are nitrogen sensitive so this option will need an investigation of nitrogen deposition on ecology grounds. Although only part of the wider Lugg Meadows site has been designated a SSSI, much of the remainder of the site has been designated as a Special Wildlife Site by Herefordshire Council, and the habitats are contiguous. The air quality assessment at Stage 2 will include an assessment on the impact on designated sites using the assessment method of Annex F of HA207/07.

B4.14.3 Air pollutant levels would be expected to rise at properties along the potential routes, however all traffic-related pollutants would be expected to remain well within air quality objectives for all years. Pollution levels would be expected to decline in the Hereford City area and in particular in the AQMA as a result of the diversion of traffic.

B5 The Greenhouse Gases Sub-Objective

B5.1 INTRODUCTION

B5.1.1 The Climate Change Act 2008 creates a new approach to managing and responding to climate change in the UK. At the heart of the Act is a legally binding target to reduce the UK's greenhouse gas emissions to at least 80 per cent below 1990 levels by 2050, to be achieved through action at home and abroad. To drive progress towards this target, the Act introduces five year "carbon budgets", which define the emissions pathway to the 2050 target by limiting the total greenhouse gas emissions allowed in each five year period, beginning in 2008. The first three carbon budgets were announced in April 2009, covering the periods 2008–12, 2013–17 and 2018–22. They require emissions reductions of just over 22 per cent, 28 per cent and 34 per cent respectively below 1990 levels, and are in line with the recommendations of the Committee on Climate Change. The impact of a proposed road scheme needs to be incorporated within the cost benefit analysis of the greenhouse gas emissions in a consistent and transparent way, through the WebTAG assessment.

B5.2 Study Area

B5.2.1 Greenhouse gases are a transboundary pollutant. The study is confined to the emissions of the roads modelled in the Multi-Modal Model and the traffic model that will be produced for the Stage 2 assessment.

B5.3 Proposed Level and Scope of Assessment

B5.3.1 The approach adopted for the consideration of climate change issues of the Study of Options assessment work has followed the relevant aspects of the methodology set out under DMRB Volume 11 (Section 3, Part 1; HA 207/07) Air Quality for regional impacts and climate change impacts through webTAG unit 3.3.4). With the absence of a traffic model for the routes the information is based on the Multi-Modal Model.

B5.3.2 The approach adopted for the consideration of greenhouse gases involved a desktop, qualitative review of the Multi-Modal Model and analysis of relevant local and national policy and guidance on climate change. The magnitude of the greenhouse gas impact of each corridor will be broadly similar as vehicular demand is expected to be relatively consistent for all the corridors under consideration but dependent on the length of the route as the greenhouse gas emissions are dependent on vehicle kilometres travelled and therefore the greater the length of a route the greater the greenhouse gas emissions. It is also possible that there could be a reduction in greenhouse gas emissions as a result of the scheme proposals, due to vehicles travelling at optimum speeds and reduced congestion. The location of developments satisfying Herefordshire housing allocation requirements will have an impact on the levels of greenhouse gas emitted by the proposed routes. The levels of

greenhouse gas emission resulting from the transport associated with the housing allocation will be minimised with the corridor option nearest the housing allocation.

B5.4 REGULATORY/POLICY FRAMEWORK

Herefordshire Local Area Agreement

B5.4.1 Herefordshire and Worcestershire include in their current Local Area Agreements a reduction in climate change gas emissions, however, there are no targets relating to air quality directly. In Worcestershire the target is to reduce Climate Change gas emissions across the County by a minimum of 10% from 2005 levels by 2011 and 20% by 2020. In Herefordshire, the Change Strategy includes a target to reduce greenhouse gas emissions in line with the UK's Energy White Paper: a 60% reduction in CO₂ emissions from 1990 levels by 2050. These are also used as indicators for this strategy in the two counties.

Herefordshire Council Carbon Management Action Plan 2005/6 to 2011/12

B5.4.2 The aim of this document is to define the steps that Herefordshire Council will take to secure its contribution to the carbon dioxide reduction targets as part of the Herefordshire Partnership Climate Change Strategy. This document commits Herefordshire Council to achieve a 12.5% reduction in the 2002 carbon dioxide equivalent emissions by 2012, with a commitment to reduce emissions by 20% by 2020.

Climate Change Background Paper

B5.4.3 This background paper was developed to assist the consideration of climate change in the Core Strategy of the LDF.

Herefordshire Community Strategy

B5.4.4 The Herefordshire Community Strategy sets out aspirations for the County for 2020 and how they might be achieved. The Herefordshire Community Strategy also acts as Herefordshire's Local Agenda 21 Plan and Regeneration Strategy and is closely integrated with the emerging LDF. Guiding principles include "integrate sustainability into all actions" and "Protect and improve Herefordshire's distinct environment". Actions relevant to both the air quality and climate change objectives include actions to "Reduce traffic congestion through access to better integrated transport provision" and "protecting the environment".

Planning and Climate Change: PPS 1 Supplement Planning and Climate Change

B5.4.5 Planning and Climate Change (ODPM 2008) sets out how spatial planning should contribute to reducing emissions and stabilising climate change (mitigation) and take into account the unavoidable consequences (adaptation).

Climate Change Act (2008)

B5.4.6 Through the Department of Energy and Climate Change (DECC) - responsible for all aspects of UK energy policy, and for tackling global climate change - the UK passed legislation on the 26th of November 2008, which introduces the world's first long term legally binding framework to tackle the dangers of climate change. It includes provision for a legally binding emissions reduction of between 26% and 32% against a 1990 baseline by 2020, 5-year rolling targets and the establishment of a new independent body to oversee progress. Councils will now be able to legally impose obligations for energy use and efficiency in local plans with the approval of the Planning and Energy Act (2008), and this means that councils can set requirements in development plan documents for a quota of energy used in their area to be renewably sourced or low carbon.

Local Government White Paper - Strong and Prosperous Communities

B5.4.7 The White Paper highlights the important role of local authorities in coordinating reductions in CO₂ emissions in their communities, and calls for Local Area Agreements to set out climate change targets - supported by Sustainable Community Strategies. In 2008 a set of 198 national performance indicators were included, which for the first time included several on climate change:

- NI 185 - CO₂ reduction from local authority operations
- NI 186* - Per capita CO₂ reduction in the local authority area
- NI 187 - Tackling fuel poverty
- NI 188 - Adaptation to climate change
- NI 189 - Flood and coastal erosion risk management
- NI 194 - Level of air quality: reduction in NO_x and primary PM₁₀ emissions in local authority estate and operations
- NI 197 - Improved Biodiversity - active management of local sites

B5.4.8 NI 186 is included as a priority in Herefordshire's Local Area Agreement, where a target to reduce CO₂ emissions in the county by 13.1% per capita by 2010/11, has been set.

B5.5 GREENHOUSE GAS ASSESSMENT

B5.5.1 The Multi-Modal Model uses morning and evening peak 1 hour traffic to assess flow, congestion and green house gas emissions for different scenarios based around an

indicative west route for the relief road and an indicative east route for the relief road with various housing allocation scenarios as shown in Table 5.1.

Evening Peak (17:00-18:00) Kg CO₂ Emissions					
Scheme	DM	DS1	DS2	DS3	DS4
No Relief Road	7,724	9,119	9,275	8,925	9,208
West Relief Road	7,928	9,582	10,173	9,295	9,601
East Relief Road	8,055	9,771	9,880	9,433	9,896

Table 5.1 Evening Peak CO₂ emissions

- B5.5.2 The model scenarios in the multi modal model show that there will be up to around a 7.5% increase in Evening Peak CO₂ emissions with the introduction of the relief road, depending on the particular Do Something Scenarios. The Do Something scenarios take into account different levels and locations of proposed housing allocations. The locations of the housing allocations have an influence on the vehicular flow of the road and to minimise congestion and vehicle kilometres travelled and thus carbon emissions. The relief road and the proposed housing allocations should be located in proximity to each other to reduce the number of vehicle kilometres travelled.
- B5.5.3 Generally the longer the route the greater the carbon emissions will be because of the extra distance travelled. This means the Western Outer Corridor and Eastern Outer Corridor based routes are likely to have a greater greenhouse impact than routes based on the Western Inner Corridor and Eastern Inner Corridor.
- B5.5.4 At this Study of Options stage there is not enough scheme detail to quantify the greenhouse gas emissions in TAG.

B5.6 Further work required for Stage 2 Assessment

- B5.6.1 The road scheme will be appraised using the COBA program and for road and multi-modal schemes using the TUBA program. The net present value of the change in carbon emissions from road-based fuel consumption, that is in the non-traded sector, will be presented as an automatic output of the program (in the Department's standard base year prices and values for the whole appraisal period).
- B5.6.2 Having calculated the carbon (Ce) emission levels for each year, the change between the 'with scheme' and 'without scheme' scenarios for each year can be calculated. The estimated level of carbon (Ce) emissions for each of the years in the appraisal period is used

for the monetary valuation exercise, where a net present value (NPV) of the change in carbon (Ce) emissions over the appraisal period is derived. This process of deriving the NPV from carbon emissions will be described in the following section.

B5.6.3 Stage 2 an estimate of the greenhouse gases will be made from the output of the traffic model and at Stage 3 the full greenhouse gas assessment will be conducted based on the traffic model TUBA. For the most part transport fuel is currently in the non-traded sector. As the carbon emission impacts would affect the UK's net carbon account there is a requirement for the carbon impact to be reported. The monetary assessment of the carbon impact will be conducted as part of the TAG assessment at Stage 3 of the route assessment procedure.

B5.7 MITIGATION

B5.7.1 Mitigation can be through encouraging more sustainable modes of transport and through alleviation of congestion and idling the carbon impact of the proposed routes may be mitigated. Mitigation will be considered further at Stage 2 when estimates of emissions of greenhouse gas will be made.

B6 The Landscape Sub-Objective

B6.1 INTRODUCTION

- B6.1.1 This chapter has been prepared by Jon Etchells Consulting (JEC) for Amey, on behalf of Herefordshire Council, in connection with the proposed Hereford Relief Road. JEC is a practice registered with the Landscape Institute, with extensive experience of the landscape assessment of highways schemes.
- B6.1.2 A number of corridors with indicative links are under consideration for the proposed route of the Hereford Relief Road, to both the east and west of the city, as well as different options for links within those corridors. The various links and corridors can be combined in a variety of ways to make up actual route options for the relief road as a whole, and the links are not at this stage fixed or designed in detail and the traffic model is not yet available. It is therefore not possible to carry out a full and detailed Stage 2 Assessment for all of the links and potential combinations of links at this time. Instead, this chapter sets out the results of a Study of Options assessment of the likely landscape effects of the potential route which are based on land take type impacts. Traffic related impacts will need to be considered further at Stage 2.
- B6.1.3 This chapter also highlights the principal landscape constraints associated with the various route corridors, so that the routes can be refined and adapted so as to avoid (or minimise effects upon) those constraints wherever possible.

B6.2 METHODOLOGY

- B6.2.1 The assessment for this report has been based on the methodology set out in the Highways Agency's Design Manual for Roads and Bridges (DMRB) Volume 11, Environmental Assessment. The DMRB landscape chapter has not been updated since 1994, and has in some respects been superseded by the Department for Transport's 'Transport Analysis Guidance' (TAG), also referred to as WebTAG, as it is available via its own web site. The TAG landscape assessment guidance ('The Landscape Sub-Objective, TAG Unit 3.3.7) was updated in December 2004, and provides guidance on the completion of a TAG worksheet, which in turn provides the inputs for the landscape section of the overall project Appraisal Summary Table (AST).
- B6.2.2 The more general methodology set out in the 'Guidelines for Landscape and Visual Impact Assessment', produced jointly by the Institute of Environmental Management and Assessment and the Landscape Institute ('the GLVIA', 1995, revised 2002) was also followed where appropriate. The document 'Landscape Character Assessment, Guidance for England and Scotland, 2002' (The Countryside Agency and Scottish Natural Heritage) is

also relevant, and stresses the need for a holistic assessment of landscape character, including physical, biological and social factors.

B6.2.3 Although the assessment set out in this report does not constitute a full or detailed landscape and visual impact assessment, the relevant parts of the detailed methodology set out in Appendix B-C were followed where appropriate.

B6.2.4 The site visits for the assessment were undertaken in February, May and June 2010, and it has therefore been possible to make a judgement about how the landscape and visual effects of the route options may vary between summer and winter.

B6.3 LANDSCAPE CHARACTER

National Landscape Character

B6.3.1 In terms of wider landscape character, Hereford lies within an area identified as the 'Herefordshire Lowlands' in the Countryside Agency's (now Natural England) 'Countryside Character Volume 5: West Midlands' (this is a national assessment of landscape character, published as a series of regional volumes). This is an extensive area, stretching from Ludlow in the north to Hereford in the south. Key characteristics are noted as including the wide river valleys, steep wooded hills, frequent orchards and hop yards and large farmsteads and frequent hamlets.

B6.3.2 A further character area, 'South Herefordshire and Over Severn', lies just to the south of Hereford, and the existing Rotherwas Access Road runs along the edge of this area

County Landscape Character

B6.3.3 The Herefordshire Landscape Character Assessment (2004, updated in 2009) was prepared by Herefordshire Council (HC) and forms Supplementary Planning Guidance (SPG) to the Unitary Development Plan (UDP). It categorises the landscape into different Landscape Types (which can be found at different locations) and also Sub-regional Character Areas, which are individual and unique areas with their own distinct character.

B6.3.4 The route options fall within the 'Central Herefordshire' Sub-regional Character Area, which has a similar extent to the Herefordshire Lowlands national character area noted above. Landscape Types around Hereford in the areas traversed by the various routes are:

- Principal Settled Farmlands - this type extends around much of the area to the east and north of the city, other than within the river valleys of the Wye and Lugg. The Herefordshire Landscape Character Assessment (HLCA) describes this Landscape Type as:

'The rolling, lowland area of Central Herefordshire is dominated by this Landscape Type. These are settled agricultural landscapes of dispersed, scattered farms, relic commons and small villages and hamlets. The mixed farming land use reflects the good soils on which they are typically found. Networks of small winding lanes nestling within a matrix of hedged fields are characteristic. Tree cover is largely restricted to thinly scattered hedgerow trees, groups of trees around dwellings and trees along stream sides and other watercourses. The composition of the hedgerow tree cover differs from that of Timbered Farmlands in its lower density and lack of oak dominance. This is a landscape with a notably domestic character, defined chiefly by the scale of its field pattern, the nature and density of its settlement and its traditional land uses. Hop fields, orchards, grazed pastures and arable fields, together make up the rich patchwork which is typical of Principal Settled Farmlands.'

- **Riverside Meadows** - this type runs alongside the rivers noted above. Flat, seasonally waterlogged meadows running alongside the rivers are characteristic of the Wye and the Lugg, often (especially for the Wye) bounded by steeper, sometimes wooded, river cliffs. The HLCA describes this Landscape Type as:

'These are linear, riverine landscapes associated with a flat, generally well defined, alluvial floodplain, in places framed by steeply rising ground. They are secluded pastoral landscapes, characterised by meandering tree lined rivers, flanked by riverside meadows which are defined by hedge and ditch boundaries. Settlement is typically absent. Throughout these landscapes, the presence of extensive areas of seasonally grazed waterside meadows has in the past provided a strong sense of visual and ecological unity. These are landscapes that accommodate a degree of annual flooding, a factor which has been reflected in the traditional patterns of land use, the lack of settlement and development (except for the occasional water mill), and the representation of species and habitats tolerant of such waterlogged conditions. The natural fertility of Riverside Meadows has often been maximised by employing devices such as sluices to control and direct the silt laden flood waters. The unique Lammas Meadows bordering the River Lugg at Hereford are an excellent example of traditionally managed riverside meadows where the historic pattern of cutting and grazing has been continued for centuries. Tree cover is a notable element of Riverside Meadows, usually in a linear pattern along the hedge and ditch lines and to the banks of watercourses.'

- **Wooded Estate-lands** - a broad swathe of this type extends around the city to the south and west. This Landscape Type is described in the HLCA as follows:

'These are wooded agricultural landscapes of isolated farmsteads, clusters of wayside dwellings and occasional small estate villages. Mixed farming is the dominant land use, with woodland comprising about 30-40% of the land cover. This Landscape Type relies heavily upon its woodland component as the critical element in defining its character. The size, shape and composition of the woodlands are all important, being generally large, discrete woods of ancient semi-natural character and irregular or semi-regular outline. They frame the views and are often prominently situated on low crests. The prominent hedgerows are also important in defining the scale and providing the structure to the landscape. Ornamental grounds and parkland associated with large

estates can be a noticeable feature in these landscapes. Groups of mature ornamental trees planted in parks or gardens are often significant visual landmarks.'

- Principal Timbered Farmlands - the western route options cross a narrow band of this type around Breinton. The HLCA describes this Landscape Type as:

'Principal Timbered Farmlands are rolling lowland landscapes with occasional steep sided hills and low escarpments. They have a small scale, wooded, agricultural appearance characterised by filtered views through densely scattered hedgerow trees. These are complex, in places intimate, landscapes made up of a mosaic of small to medium sized fields, irregularly shaped woodlands and winding lanes. The key element of these landscapes is the strong unifying presence of tree cover in the guise of woodlands, hedgerow trees, and linear tree cover associated with streams and watercourses. The combined presence of these tree cover components creates the fundamental sense of scale and enclosure, together with the filtered views that are distinctive in this landscape.'

- Wet Pasture Meadows - there is a narrow band of this type to the north east of Stretton Sugwas. The HLCA describes this Landscape Type as:

'These are flat, low lying and largely uninhabited landscapes. They are found where the land form has naturally created poorly drained, low lying basins collecting water from the surrounding low hills or scarps. These are landscapes which, in the past, have been protected from change by the difficulty of cultivating soils with such poor drainage. They have consequently been avoided as sites for settlement and roads, and have often not been considered economically viable for agricultural improvement. This, together with the widespread pastoral land use, and associated traditional methods of management, has favoured the retention of wetland habitats of considerable wildlife interest and a certain wilderness quality. These are secluded, pastoral landscapes characterised by a regular pattern of hedged fields and ditches fringed by lines of willow and alder. Pollarded willows are often a distinctive feature.'

Existing Light Sources

- B6.3.5 The main light sources within the wider area around the city are the existing street lighting within the urban area and also lights on and within the buildings which together make up the city. Most areas beyond the built up area are generally unlit, with low key rural street lighting only in the villages, and also lighting of some road junctions (such as the roundabout at the junction of the A49 with the B4399 Rotherwas Access Road). The main roads into the city are unlit, other than where (as for the A438 west of the city as far to the west as Swainshill) development extends alongside them.

B6.4 LANDSCAPE QUALITY, SENSITIVITY AND VALUE

Landscape Quality

- B6.4.1 There are no national designations for landscape quality in the area around the city, though the Wye Valley Area of Outstanding Natural Beauty (AONB) extends to within around 3km of the eastern route options near Holme Lacey.
- B6.4.2 The Herefordshire Unitary Development Plan (UDP) also contains no local designations for landscape quality - in line with more recent Government policy and guidance on the landscape, the emphasis in the UDP is on protection of the landscape as an overall resource, based on landscape character, rather than on the use of local designations for landscape quality. However, the UDP does note (in section 9.48) that the county has '*a quality of landscape that is nationally acclaimed*', and also that it '*encompasses an exceptional diversity of landscape beauty*'.
- B6.4.3 Although there are no extant local designations for landscape quality, it is evident from the assessment carried out for this study that the majority of the landscape around the city is of medium or high quality, and that some local areas (especially alongside the River Wye) are of very high quality. However, it should also be noted that while the landscape is of generally high quality, this quality is in part due to its undulating and partially wooded nature, which makes the landscape quite dense and intricate, and potentially capable of absorbing some types of new development to a greater extent than would be possible in a flatter, more open landscape.

Landscape Sensitivity

- B6.4.4 Landscape sensitivity (see Appendix B-C for a full definition and explanation) relates to the ability of the landscape to accommodate change of the type and scale proposed without adverse effects on its character. Sensitivity therefore varies to some degree with the nature of development proposed, and is defined in the glossary of the GLVIA as:

'The extent to which a landscape can accept change of a particular type and scale without unacceptable adverse effects on its character.'

- B6.4.5 As part of the preparation for the Local Development Framework (LDF), HC have produced an assessment of the sensitivity of the landscape around Hereford and other towns, in the 'Urban Fringe Sensitivity Analysis: Hereford and the Market Towns' (January 2010). The assessment of sensitivity was intended to inform the Strategic Housing Land Availability Assessment (SHLAA), and is therefore of the sensitivity of the landscape to housing development rather than a potential new road, but nevertheless still has some relevance to the Hereford Relief Road assessment.

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- B6.4.6 The Urban Fringe Sensitivity Analysis notes the presence within and around the city of relevant designations such as Conservation Areas, Historic Parks and Gardens and Scheduled Ancient Monuments (SAMs).
- B6.4.7 It also contains a figure (Map 3.1) showing the landscape sensitivity of the urban fringe on a 5 point scale from high to low. The usefulness of this categorisation to the current assessment is limited by the purpose for which it was drawn up - as the original assessment was for potential housing development, the majority of the river valleys are not graded for sensitivity, and are simply coloured blue (presumably on the basis that they are prone to flooding and therefore unsuitable in any case for housing development). However the text of the document does refer to the 'River Wye Corridor' as being of high landscape sensitivity. A further limitation is that the categorisation of sensitivity does not extend to the far side of the Lugg valley, so the land around Lugwardine is uncategorised.
- B6.4.8 Based on Map 3.1 of the Urban Fringe Sensitivity Analysis, it can be seen that the western route corridors pass through areas of medium to low sensitivity between the A4103 and the A438, and then high to medium or high sensitivity for the remainder of the corridors to the south of the A438. The North Core corridor passes through the edge of an area of high sensitivity between Holmer and Shelwick, then crosses an area of medium to low sensitivity to the north of the A4103. The Lugg Meadows are uncategorised for the reasons noted above, and the eastern corridors then cross a narrow band of high or high to medium sensitivity landscape to the north of the River Wye.
- B6.4.9 It may be that the sensitivity of some of these areas to a new road will be different to that of their sensitivity to potential new housing developments - while a road is in some ways potentially more intrusive (on account of its moving traffic, noise, possible lighting etc), as a relatively narrow, linear feature it may be more capable of being effectively screened and integrated.
- B6.4.10 HC have produced a consultation draft of a 'Place Shaping Paper', which sets out a preferred strategy and further options for the emerging Core Strategy, as part of the LDF process. This paper notes the need for a relief road for Hereford, and summarises the broad environmental sensitivities to the west and east of the city on pages 33 and 34. In broad terms, this summary states that western options would pass through areas of higher landscape quality than those to the east of the city, but that the eastern options would pass through areas with a greater number and level of importance of ecological constraints.

Landscape Value

- B6.4.11 The concept of landscape value is also relevant to this assessment - this should be considered in association with landscape character in order to avoid consideration only of

how scenically attractive an area may be, and thus to avoid undervaluing areas of strong character and perhaps significant local importance, but limited scenic beauty. It is defined in the glossary of the GLVIA as:

'The relative value or importance attached to a landscape (often as a basis for designation or recognition), which expresses national or local consensus, because of its quality, special qualities including perceptual aspects such as scenic beauty, tranquillity or wildness, cultural associations or other conservation issues.'

B6.4.12 A landscape may have a high value if it is well used and appreciated by local people, if it has a network of rights of way permitting access, if it has other attributes such as heritage or biodiversity value, or (and perhaps especially) if it has a combination of many or all of these.

Historic Landscape Character

B6.4.13 An assessment of potential effects on cultural heritage assets is made in the heritage chapter of the EAR, and potential effects on the settings of designated assets are also noted in this landscape chapter. However, there is some overlap between heritage and landscape matters in terms of historic landscape character. A historic landscape character assessment has been carried out by HC, and this identifies a series of Historic Landscape Character Types, which are based on the pattern of field enclosures. There are also some extensive historic landscape features such as the Roman Road to the north of the city (now partially followed by the A4103). A detailed assessment of potential effects on historic landscape character is beyond the scope of this landscape chapter, and is perhaps not appropriate for the broad-brush assessment of a large number of alternative route links and corridors which is currently being undertaken. No attempt has therefore been made in this chapter to differentiate between the route links or corridors in terms of their potential effects on historic landscape character.

Landscape Constraints

B6.4.14 Drawing Numbers HA551497-H-P-01 through 16 (found in the Study of Options Engineering Assessment Report) are long sections that show the main landscape constraints in the areas around the route corridors. These are:

- The River Wye and riverside meadows - parts of the river corridor, especially to the west of the city where it flows through a tranquil pastoral landscape of meadows enclosed by steeply sloping wooded ground, are of very high landscape quality, and the river as a whole is designated as a Special Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI). The long distance Wye Valley Walk follows the course of the river.

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- The River Lugg and associated meadows are of slightly lower landscape quality than the River Wye to the west of the city, as the landscape around them is flatter and more open, but the river and meadows are of significant historical and nature conservation interest, and are a valuable recreational resource, as well as being important to the eastern setting of the city. UDP Policy LA3 covers the setting of settlements, and states that *'important visual approaches into settlements ... and surrounding valued open countryside will be particularly protected'*. Parts of the Meadows are an SSSI and also a Special Wildlife Site (SWS), and the river (as for the Wye) is a SAC and SSSI. The Lugg Meadows are the largest surviving example of Lammas Meadows, areas of common grazing dating back to medieval times.
 - Related heritage based designations, such as Conservation Areas, Historic Parks and Gardens and Scheduled Ancient Monuments. UDP Policy LA4 notes that registered parks and gardens will be protected from harmful development, and also that *'Unregistered parks and gardens recognised and identified by the Council as currently of local importance will be afforded similar protection.'* Figures 1 and 2 show the locations of such unregistered parks and gardens.
 - National landscape character areas and local Landscape Character Types.
 - Related biodiversity designations, such as SSSIs and SWSs.
 - Distinctive or relevant land uses, such as golf courses or nurseries.
 - Public rights of way, and in particular long distance routes such as the Wye Valley Walk.
 - Woodland, especially where locally designated as a Special Wildlife Site (SWS), or Ancient Woodland.

B6.5 THE ROUTE CORRIDORS

Highway Design

- B6.5.1 Some broad principles of highway design are discussed below, as they will have significant effects on the eventual detailed design of the road, and hence on its visibility within the landscape.
- B6.5.2 The relief road is proposed as a dual carriageway all purpose road (D2AP). This will generate greater adverse landscape effects than the previous proposal for a single carriageway road, assessed at Stage 1, and there will be significant earthworks where the new road passes over or beneath minor roads.

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- B6.5.3 There will be constraints on the vertical alignment of the new road, which will vary to some extent with the design speed of the section of the new road in question. In simple terms, the gradients will need to be quite shallow, and steep slopes will need to be avoided. This is of particular relevance where the western route corridors cross the River Wye in an area where the low lying riverside meadows are bounded by steep, wooded slopes. It will not be possible for the road to run down these short, steep slopes at grade, so it is likely that the new road will need to run through the slopes in a potentially deep cutting, and also pass across the river and its adjoining flood plain on a long, relatively high level structure. While being inevitably prominent, such a high level structure would have some advantages in terms of leaving the immediate riverside corridor open and not obstructing views alongside the river.
- B6.5.4 The other main situation in which vertical alignment will be important will be in the crossing of the river floodplains, where the road will need to be elevated (either on a solid embankment, or possibly - in order to permit the passage of flood flows - on a long structure) above maximum flood levels, and may therefore be prominent in the generally flat riverside landscapes.
- B6.5.5 It is currently proposed that the junctions would be lit, for reasons of safety, but that the links between them would not be lit. However, highway design requirements dictate that the approaches to a junction should also be lit, with the distance over which the lighting should extend away from the junction varying with the design speed of the road. The design guidance also states that short, unlit sections between areas with lighting should be avoided. It may therefore be that sections of the relief road with frequent junctions or where a new junction is close to an existing lit junction will need a greater extent of continuous lighting.

Screening

- B6.5.6 The generally undulating landscape around the city is, as noted above, of mostly high landscape quality and also relatively high landscape sensitivity. However, the undulating and partly wooded nature of the landscape does mean that it will, in places, have a higher capacity to absorb and screen the new road than would (for example) a much more open, flat landscape with less vegetation within it. The enclosed, folded nature of much of the local landscape means that, in principle, the new road may appear locally prominent and potentially discordant, but that expansive views over long lengths of the road are unlikely.
- B6.5.7 Sensitive design of the horizontal and vertical alignment of the road, coupled with appropriate new planting, should be able to achieve a reasonably good degree of integration of the new road with the surrounding landscape over time.

Design of Structures

- B6.5.8 It will not be possible to screen the bridge over the River Wye (which will be required for either the western or eastern corridors) and the potential bridge(s) over the River Lugg for

the eastern corridors, so it will be important for the bridge designs to be attractive and appropriate to the sensitivity of their surroundings.

Route Corridors

- B6.5.9 The six route corridors are described in section B6.6 below in terms of their alignment, and also their landscape character and sensitivity, together with an assessment of the likely landscape and (where appropriate) visual effects within them.

B6.6 LANDSCAPE AND VISUAL EFFECTS

General

- B6.6.1 The following assessment are in the form of broad, in-principle levels of landscape effects which would be likely to result from each of the route corridors, with notes where relevant on whether any specific links within the corridors may lead to greater or lesser effects.
- B6.6.2 The main assessment in each case is of landscape effects, and no attempt is made to predict visual effects for individual receptors such as houses or public rights of way. However, where it seems likely that especially sensitive receptors (such as long distance routes) or groups of receptors (rows or groups of houses with clear views to the route corridor) may be affected, a note is made to that effect.
- B6.6.3 It should be noted that the effects considered are those on the landscape - effects on biodiversity or the local heritage resource are considered elsewhere, but where such factors contribute to landscape value or character, then they become relevant to the assessment of landscape effects. For example, a buried archaeological site or the presence of a rare bat would probably have little relevance to landscape value or landscape effects, but a listed church on a hilltop or a species-rich riverside meadow would contribute to local landscape value and character, and effects upon them would be included within this assessment.
- B6.6.4 The assessment in each case is based on the existing situation - HC are at the moment considering potential options for areas for housing and employment growth around the city, some of which are close to the areas traversed by the route options. If some of those potential housing and employment allocations were to go ahead, then the local landscape character could be altered, and the in-principle effects of one or more of the route options may change.

South Core Corridor

- B6.6.5 The South Core Corridor runs from the existing roundabout on the A49, at the western end of the Rotherwas Access Road, to the A465 to the south west of Belmont Abbey. It would run across attractive, rolling countryside from the A49, to cross the railway line near Haywood Lodge with a section of high embankment to either side (see Photograph 6.1), and

would then pass beneath the existing minor road leading south from the A465 in a deep cutting.

B6.6.6 There are two variations at the western end of the corridor - Link SC2 runs to the south of Hayleasow Wood (an area of Ancient Woodland and a SWS); Link SC1 crosses a narrow neck of the woodland, and also the Newton Brook, on a long structure, which would be visually intrusive but which would enable greater continuity of woodland habitat beneath it (see Photograph 6.2).

The most significant landscape effects for the South Core Corridor would arise from the railway line crossing and also from the structure across the woodland for Link SC1.



Photograph 6.1 View south west from just to the south of Grafton - Links SC1 and SC2 pass through the high ground in the distance in cutting, and then cross the railway line towards the left of the view. (Taken February 2010)



Photograph 6.2 View east from the A465 - Link SC1 runs through the narrow part of the woodland in the centre of the view. (Taken February 2010)

Western Inner Corridor

- B6.6.7 The Western Inner Corridor runs northwards from the A465 to the south west of Belmont Abbey, crossing the River Wye and continuing via a signalised junction with the A438 to a roundabout on the A4103 Roman Road. (See photographs 6.3-6.5)
- B6.6.8 There are a number of variations within the corridor - Links WL1 and WL2 run closer to Belmont Abbey, crossing first the playing fields to the school, and then the attractive valley to the north west of the abbey on a high embankment with an underbridge crossing of the minor road (see Photograph 6.3). Immediately to the south of the river corridor the routes cross an area of parkland, with scattered mature trees - this is shown in the HC Urban Fringe Sensitivity Analysis as the unregistered historic park and garden of Belmont House. They then cross the River Wye just to the east of the Belmont Golf Course, on a high level bridge which spans the river itself and also the low lying flood meadows to either side. This is a high value landscape, and there would be adverse visual effects for users of the long distance Wye Valley Walk, which runs along the north bank of the river at this point (see Photograph 6.4). The links then continue to the north, with a length of embankment and an underbridge (i.e. the new road passing over the side road) crossing of the minor road just to the west of Warham Farm.



Photograph 6.3 View south west from the golf course access towards Belmont Abbey - Links WL1/2 and WL3/5 cross the minor road on embankment roughly at the dip in the road and continue across the parkland to the left of the view. (Taken June 2010)



Photograph 6.4. View east to the point at which Link WL1/2 crosses the River Wye - the road would pass through the trees on the right of the view, across the river to the near side of the small pumping station building and across the flood meadows. (Taken June 2010)

B6.6.9 Links WL3 and WL5 are similar as far as the minor road to the north west of the abbey, from which point they take a more direct line across the area of parkland noted above, through the golf course to cross the river at a point where the immediate river corridor is wider and where the structure required to cross it would be longer (see Photograph 6.5). At this point the flat riverside meadows are enclosed by steep wooded slopes to both north and south. The woodlands on these slopes are SWSs, and the river itself is an SSSI and a SAC (as is the case for the alternative crossing point to the east). The Wye Valley Walk runs along the north bank of the river at this point, and part of the Belmont Golf Course is on the south bank, between the river and the steeper, wooded river cliffs. This is a high value landscape, and there would again be adverse visual effects for users of the Wye Valley Walk and the golf course. The links then continue to the north, with an overbridge crossing (i.e. the new road passing beneath the side road) of the minor road to the west of Warham Farm.

B6.6.10 Links WL4 and WL6 run from a roundabout further to the west on the A465, avoiding the school playing fields, and running further away from the abbey, to cross the river at the same point as Links WL3 and WL5.



Photograph 6.5. View south to the point at which Link WL3/5 crosses the River Wye - the road would pass through the trees on the far side of the river, across the river on a high level bridge and pass just to the right of the viewpoint. (Taken February 2010)

B6.6.11 All of the links would pass beneath the minor road to the south of the A438 in cutting, and Links WL1, WL3 and WL4 then continue directly towards the A438 and a signalised junction at a point where it seems likely that some houses would need to be removed on the south side of the road (there is an existing agricultural access, but this may not be wide enough for the new road). There is also one isolated property on the north side of the A438 at this point. Links WL2, WL5 and WL6 diverge to the west to meet the A438 at the same point as the Western Outer Corridor. There would be adverse visual effects for the properties along the A438.

B6.6.12 North of the A438, Link WL7 runs just to the east of Huntington. This is a Conservation Area, and there are also a number of mature trees alongside the Yazor Brook, which is crossed by this link.

The most significant landscape effects for the Western Inner corridor would arise from the crossing of the attractive valley which forms part of the setting for Belmont Abbey and from the River Wye crossing (with effects greater for Links WL3 and WL5 than for WL1 and WL2).

Western Outer Corridor

B6.6.13 The Western Outer Corridor (links WL9, WL10, WL13 and WL14) runs from the same roundabout on the A465 as Links WL4 and WL6, and then runs across a broad, shallow valley on embankment before entering a deep cutting through Perry Hill. It runs to the west of the Belmont Golf Course and crosses the River Wye and the adjoining flood meadows between Upper and Lower Breinton, on a long structure. At this point the landscape is enclosed and tranquil, but there is no woodland on the south side of the river, and the riverside slopes are less steep than for the alternative crossing points to the east (see Photograph 6.6). There is an area of (undesigned) riverside woodland on the north side of the river, and also an area shown in the HC Urban Fringe Sensitivity Analysis as the unregistered historic park and garden of Wyecliffe. The Wye Valley Walk runs just to the north of the river at this point, and there would be adverse visual effects for users of this route at the point where it is crossed by the corridor.



Photograph 6.6 View north west to the point at which Link WL10 crosses the River Wye - the road would pass across the view from left to right, crossing the river and running through the trees on the far side of the river. (Taken May 2010)

B6.6.14 From this point the links diverge, with WL9 running directly towards the A438 across an area of orchards to the east of Upper Breinton, and Link WL10 running to the west to cross the A438 to the west of Swainshill and continue as WL12 to connect with the A4103 at the existing Stretton Sugwas roundabout. WL12 runs across attractive, relatively tranquil area of landscape and would affect the setting of the listed church of St Mary Magdalene, with its distinctive half-timbered tower (see Photograph 6.7). It would also lead to adverse visual effects on properties in Stretton Sugwas, to the west of the existing roundabout. Between the A438 and the A4103, Link WL8 runs to the east, partially through an area of nurseries and garden centres to the A438, while Link WL11 is an online improvement to the existing A480. Links WL13 and WL14 are online improvements to the A4103, as far as the starting point of the North Core Corridor.



Photograph 6.7 View north west to Stretton Sugwas church from the A438 - Link WL12 runs between the viewpoint and the church, and curves around to the right of the view. (Taken May 2010)

The most significant landscape effects for the Western Outer corridor would arise from the River Wye crossing, which is in a very tranquil location but where relatively little riverside woodland would be affected, and from effects on the setting of the listed church at Stretton Sugwas (for Link WL12).

North Core Corridor

B6.6.15 The North Core Corridor passes through the open, rolling landscape to the north of the city, from the A4103 just to the west of the Bovington Caravan Park, passing over Tillington Road on an embankment across an enclosed, attractive valley (see photograph 6.8), and under the A4110 Canon Pyon Road just to the north of a row of houses on the east side of the road, to a roundabout on the A49. To the east of the A49, the corridor runs to the south east, passing between the small settlements of Holmer and Munstone with an underbridge crossing of the minor road and a section of high embankment (see photograph 6.9). This is a small scale, partially settled landscape, with some higher quality elements around the settlement of Holmer and the river valley extending to the east, but also some urban fringe, lower quality elements (and also an area allocated for housing development in the UDP) closer to the A4103 Roman Road. The corridor crosses the railway line to the east of Munstone with a railway underbridge, and ends at the existing A4103/A465 roundabout.



Photograph 6.8 View north along Tillington Road towards Burghill Hospital - Links NC1 and NC2 cross the road on embankment roughly at the dip in the road (NC2 slightly further away). (Taken June 2010)

B6.6.16 There are some variations within the corridor - Link NC2 runs slightly further to the north, crossing an area shown in the HC Urban Fringe Sensitivity Analysis as the unregistered historic park and garden of Burghill Hospital. To the east of the A49, Link NC4 runs further to the north, while NC3 runs to the south, with a short on line section along the A4103.

There would be adverse visual effects for properties along the A4110 and in Holmer and Munstone.



Photograph 6.9 View south from the minor road between Holmer and Munstone - Links NC3 and NC4 cross the road to the right of the view and run across the foreground of the view on embankment, from right to left. (Taken February 2010)

The most significant landscape effects for the North Core corridor would arise from the crossing of Tillington Road , the minor road between Holmer and Munstone and also the railway line.

Eastern Inner Corridor

B6.6.17 The Eastern Inner Corridor runs to the south east from the A4103, between the edge of the Lugg Meadows and the higher ground which marks the edge of the city (see Photograph 6.10). The northern and southern parts of the corridor would be on embankment, with the central section cut into the hillside with a cutting slope to the west and an embankment slope to the east. Parts of the meadows are an SSSI or SWS, and parts are managed as a nature reserve by the Herefordshire Nature Trust. Public access is possible to much of the meadows, and they form an important part of the eastern setting of the city, and are a

generally high value landscape (see Photograph 6.11). The route crosses the A438 at Tupsley Bridge, and turns to the south to run through an area of orchards before crossing the B4224 and then the River Wye. The river at this point is less sensitive in landscape terms than at the crossing points for the western route corridors, with flat farmland on the north bank (see Photograph 6.12), and a sewage treatment works and the Rotherwas Industrial Estate on the south side of the river (though both of these are reasonably well screened from the river). The river is again at this point both a SAC and SSSI, and the Wye Valley Walk runs along its northern bank, with a public footpath along the south bank - there would be adverse visual effects for users of these routes. South of the river, the route runs just to the west of Rotherwas House and Chapel - this area is a SAM, and the chapel is a Grade II* listed building (see Photograph 6.13). There would be no direct effects on the designated areas, but there would be some effects on the setting of the SAM and listed building, though that setting has already been compromised to some extent by industrial development. The corridor connects with the existing Rotherwas Access Road at the roundabout on the B4399.



Photograph 6.10 View west towards the urban edge from the A438 just to the west of the existing River Lugg crossing - Link EL1 runs along the foot of the slope, between the city and the Lugg Meadows, which can be seen in the foreground. (Taken February 2010)



Photograph 6.11. View north west along the line of Link EL1 - the new road would run just to the right of the woodland, along the foot of the slope. (Taken June 2010)



Photograph 6.12. View south east along the north bank of the River Wye to the crossing point for Link EL3 - the new road would run across the middle ground of the view. (Taken February 2010)



Photograph 6.13. View north to Rotherwas House and Chapel - Link EL3 passes to the left of the buildings in this view, and Link EL12 just to the right (Taken February 2010)

The most significant landscape effects for the Eastern Inner corridor would arise from the severance of the historic link between the city and the Lugg Meadows, the effects on the eastern setting of the city and from the River Wye crossing (though effects of the river crossing would be less than those for the western corridors). There would also be some effects on the setting of the Rotherwas Chapel SAM.

Eastern Outer Corridor

B6.6.18 The Eastern Outer Corridor takes a wider line around the city, with an initial online section along the A4103 as far as the existing River Lugg crossing, and then runs to the east of the River Lugg as far as the A438, where the corridor crosses the river again (see Photograph 6.14) and runs to the south across the southern part of the Lugg Meadows to a roundabout on the B4224. From the B4224 it runs across open, riverside fields to a crossing point of the River Wye further east than that for the Eastern Inner Corridor (see photograph 6.15), and passes to the east of Rotherwas House and Chapel, where there would again be some effects on the setting of the SAM and listed building.



Photograph 6.14. View west along the River Lugg from the existing A438 bridge - Links EL6/7/8 would involve new crossings of the river, with that for Link EL6 being in the middle ground of this view. (Taken June 2010)



Photograph 6.15. View north west along the north side of the River Wye towards the point at which Link EL12 crosses the river. (Taken May 2010)

B6.6.19 There is some variation within the corridor, with Link EL6 running furthest to the west, along the edge of the Lugg Meadows, and the other links running further east across an undulating landscape to the south western edge of Lugwardine, and Lugwardine Bridge, where the links run very close together. Here there are three options for roundabout locations on the A438 - one on the existing alignment of the A438 (for EL7/EL9), and two to the south (see photograph 6.16). Any of these locations would have some adverse effects on the open, flat landscape alongside the A438, which is relatively unspoilt and tranquil, despite the presence of the existing road. There would also be some adverse visual effects for properties on the western edge of Lugwardine.



Photograph 6.16. View south west from the south side of the A438 - Links EL9/10/11 run across the meadows from the A438 (behind the hedge on the right of the view). Links EL10 and 11 would involve a roundabout within the meadows to the left of the view. (Taken June 2010)

The most significant landscape effects for the Eastern Outer corridor would arise from the two crossing points of the River Lugg, the crossing of the Lugg Meadows and from the River Wye crossing (though effects of the river crossing would be less than those for the western corridors). There would also be some effects on the setting of the Rotherwas Chapel SAM.

Overall Summary of Significant Effects

- B6.6.20 The South Core and North Core Corridors will generate some adverse effects, but with no especially sensitive areas affected, and in any case these corridors are common to the options.
- B6.6.21 The main differences are between the Western and Eastern corridors, and in particular the crossing of the River Wye, which is probably the single most sensitive landscape feature around the city.

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- B6.6.22 The Western Outer Corridor crosses the river at a tranquil, rural location where it would create significant adverse effects. The Western Inner Corridor would have even greater effects, due to the local topography and the need to bridge the river at a high level and also cut into the steep slopes bordering the river, with losses of woodland. The WL3/WL6 Link runs through the Belmont Golf Course. The new WL1/2 link crosses the river to the east of the golf course at a point where the riverside meadows are narrower and which is also closer to the existing urban edge, but would still lead to significant adverse effects. The Western Inner Corridor would also have significant effects on the attractive parkland landscape to the north west of Belmont Abbey.
- B6.6.23 The Eastern corridor options are significantly better in terms of the River Wye crossing, as the topography here is flatter, and the landscape is far less attractive and tranquil, being already affected by the industrial area to the south of the river. There is therefore a strong case to be made in landscape terms for adopting an Eastern corridor on this basis alone.
- B6.6.24 However, away from the River Wye, the Eastern Inner Corridor would create significant effects in terms of severing the city from the River Lugg meadows, and the Eastern Outer Corridor would have direct effects on the meadows and involve crossings of the River Lugg. The roundabouts would also be intrusive in the flat, relatively tranquil landscape, and there would be some effects on the setting of the SAM and listed building at Rotherwas.
- B6.6.25 It is important to note that all of the above effects could be mitigated to some extent by careful design - the detailed horizontal and vertical alignment of the new road should be designed to integrate it with the existing landscape as far as possible, the side road crossings (and the new road itself) could be screened and integrated by new planting, and by use of false cuttings and other earthworks methods where appropriate, the severance effects of the Eastern Inner Corridor could be reduced by careful design and provision of crossing points, and structures which cannot be screened, such as the new bridge over the River Wye, could be individually designed to be attractive features in their own right.
- B6.6.26 However, the landscape around Hereford is of such high quality and sensitivity, and contains so many valued and sensitive features, that whichever route is finally adopted would inevitably lead to some significant adverse landscape effects. These adverse effects would then need to be balanced against the beneficial townscape effects within the city as a result of traffic reductions, and also the economic and other benefits of reduced congestion.

B7 The Townscape Sub-Objective

B7.1 INTRODUCTION

B7.1.1 This report has been prepared by Jon Etchells Consulting (JEC) for Amey, on behalf of Herefordshire Council, in connection with the proposed Hereford Relief Road. JEC is a practice registered with the Landscape Institute, with extensive experience of the landscape and townscape assessment of highways schemes.

B7.1.2 A number of corridors are under consideration for the Hereford Relief Road, to both the east and west of the city, as well as different options for links within those corridors. The various links and corridors can be combined in a variety of ways to make up actual route options for the relief road as a whole, and the links are not at this stage fixed or designed in detail. However, whichever corridor is adopted for the new road, its principal purpose would be to relieve traffic flows and congestion in the city centre, and this would in principle lead to some townscape benefits in the areas relieved of traffic.

B7.2 METHODOLOGY

B7.2.1 The assessment for this report has been based on the methodology for landscape assessment set out in the Highways Agency's Design Manual for Roads and Bridges (DMRB) Volume 11, Environmental Assessment; this can also be applied to townscape assessment. The DMRB landscape chapter has not been updated since 1994, and has in some respects been superseded by the Department for Transport's 'Transport Analysis Guidance' (TAG), also referred to as WebTAG, as it is available via its own web site. The TAG townscape assessment guidance ('The Townscape Sub-Objective, TAG Unit 3.3.8) was updated in December 2004, and provides guidance on the completion of a TAG worksheet, which in turn provides the inputs for the townscape section of the overall project Appraisal Summary Table (AST).

B7.3 TOWNSCAPE CHARACTER

B7.3.1 The historic core of the city is contained within the inner ring road (the A49 as it crosses the River Wye and the loop around to the north of the cathedral), which in turn follows the line of the city walls, parts of which can still be seen. An assessment of townscape character has been made in the publication 'A Characterisation of the Historic Townscape of Central Hereford', produced in February 2010 by English Heritage and HC. The summary to this publication states:

'It is a commonplace of writing on historic towns to claim an exceptional state of preservation and significance for the place in question. However, Hereford is exceptionally well preserved, and it is a historic town of

exceptional significance - and both assertions can be justified and shown to be based on quantifiable evidence, much of which is contained in or implicit in this characterisation.

The plan-form of the city has been compromised by Victorian and 20th-century development to a smaller degree than any of the neighbouring cathedral cities or shire towns. No city street - bar one - has been inserted into the city; all originate in the medieval period, or earlier.

The fine detail of the city plan - the townscape grain - remains almost as uncompromised as the street plan, with a clear differentiation between the city and the extramural suburbs, and subtle variations in the character of the townscape grain still evident that can be traced back to the initial urbanisation process, or even to the underlying agricultural landscape. Distinct medieval neighbourhoods can still be traced within the city walls.

The Cathedral Close retains its integrity as an enclosed sacred space and its immediate surroundings retain an exceptionally rare, early medieval settlement pattern associated with it.

The present land-use geography of the city and the fundamental distinction between the Cathedral City and the Commercial City can be shown to be rooted in the remote past, much of it derived from the years following the Norman Conquest, aspects of it even earlier.

Excavations, particularly the pioneering digs of the late 1960s and 70s on the west side of the city, revealed that Hereford possesses one of the earliest, continuously built-up areas in the country.

Much concern is currently expressed about the superficial appearance of the city, its viability as a business centre, its ability to compete with neighbouring cities and its long-term future. The long view of this is that the city centre is in fact structurally very sound and extraordinarily resilient in terms of its urban functions - as a place of business, culture, daily life and administration.'

B7.4 TOWNSCAPE QUALITY, SENSITIVITY AND VALUE

B7.4.1 The quality, value and sensitivity of the city centre townscape are reflected in the range of designations which apply to the area within the ring road - the city walls are a Scheduled Ancient Monument (SAM), the entire city centre is a Conservation Area, and there are many individual listed buildings. In overall terms, the city centre is of very high townscape quality and value, and is highly sensitive.

B7.4.2 However, it should be noted that the more attractive and historic elements of the city centre tend to be set back from the main through routes (some of them are pedestrianised) and would therefore not be directly affected by relief of traffic flows and congestion (Photograph 7.1).

B7.5 TOWNSCAPE EFFECTS

- B7.5.1 A detailed assessment of the likely townscape benefits in the parts of the city which would experience relief from traffic congestion cannot be made at this stage. As the proposals proceed, and as detailed predictions of future traffic flows within the city centre are made, it should be possible to make an assessment of the level of benefits which would be likely to result from the opening of the relief road. This would depend in detail on the relief road option adopted and whether any traffic calming measures are proposed within the city to limit through traffic after the opening of the relief road.
- B7.5.2 There may also be some indirect beneficial effects in that the relief road would assist with the proposed redevelopment of parts of the city centre, which should again lead to long term beneficial townscape effects.
- B7.5.3 For the purposes of the current Study of Options assessment, a general statement can be made to the effect that the opening of the relief road would be likely to have beneficial townscape effects on the city centre, parts of which are of very high townscape quality and value.



Photograph 7.1. View of the cathedral within the historic core of the city - through traffic is directed around the historic core, and the areas around the cathedral have relatively low levels of traffic. (Taken February 2010)

B8 The Heritage of Historic Resources Sub-Objective

B8.1 INTRODUCTION

- B8.1.1 This report has been prepared by RPS Planning and Development on behalf of Amey. It presents the results of a cultural heritage assessment of a number of route options for the proposed Hereford Relief Road.
- B8.1.2 Guidelines for the treatment of environmental issues in the preparation of new road schemes are presented in Volume 11 of the Design Manual for Roads and Bridges (DMRB). This was initially produced in 1993 by the Department of Transport and is now owned and maintained by the Highways Agency.
- B8.1.3 DMRB outlined a staged approach with regard to the assessment of route options:
- Stage 1* Sufficient assessment to identify the environmental advantages, disadvantages and constraints associated with broadly defined route corridors.
 - Stage 2* Sufficient assessment to identify the factors and effects to be taken into account in choosing the route options and to identify the environmental advantages, disadvantages and constraints associated with those routes.
 - Stage 3* Detailed assessment on the environmental effects of the selected route option.
- B8.1.4 For each environmental topic DMRB provides guidelines on the work that should be undertaken at each stage of the assessment and on the outputs that should result from that work. The Stage 1 assessment of cultural heritage issues was included within the Hereford Relief Road Stage 1 Environmental Assessment Report produced by Amey in April 2010.
- B8.1.5 More recent updating of DMRB Volume 11 on a topic by topic basis has moved away from the staged approach towards a less prescriptive process of 'Simple Assessments' and 'Detailed Assessments'. Cultural heritage is one of the revised DMRB topics and the current guidance was produced in 2007 as DMRB Volume 11 Section 3 Part 2 - Highways Agency Advice Note 208/07.
- B8.1.6 This report constitutes a Study of Options assessment which is broadly similar to a Stage 2 Simple Assessment of the cultural heritage issues associated with the route options. The work undertaken is in line with that required for Stage 2 as defined in DMRB 1993, but incorporating methodologies of the Simple Assessment described in the 2007 update. Further elements need to be completed for the Stage 2 assessment such as the walkovers and consideration of traffic related impact such as noise.
- B8.1.7 The DMRB Cultural Heritage Topic encompasses three defined sub-topics: Archaeological Remains; Historic Buildings and Historic Landscapes. Each of these sub-topics should be

examined separately, even though it is acknowledged that there will be considerable overlap between each of them (and possibly with other DMRB topics such as Townscape), and then the results should be combined into an overall Cultural Heritage Assessment.

- B8.1.8 The preparation of this report has required the examination of data from a number of sources in order to provide a summary of known historic environment resources in the vicinity. It is accompanied by a gazetteer of non-designated historic environment resources (Appendix B-A) and supporting graphical data (**Figures B8.1-6**).

Route Options

- B8.1.9 Following the publication of the *Stage 1 Environmental Assessment Report* (AMEC 2010), a number of route options are to be appraised at the Study of Options Stage. For ease of reference these have been placed into a total of six route 'corridors' (**Figure B8.1**). Any preferred route would require the use of at least two of these corridors. The DMRB Stage 2 reporting will address those six route corridors rather than any more specific options.

Southern Corridor

- B8.1.10 This corridor connects to the A49 (Ross Road) within the valley of the Norton Brook, at the junction with the new B4399 Rotherwas Road. At this point the land is at about 70m above Ordnance Datum (aOD). The corridor then extends westwards across land that is gradually rising to cross the railway line at almost 90m aOD.

- B8.1.11 The corridor then turns to the north-west and the land continues to rise more steeply to a high point of just over 100m aOD before falling gently into a shallow valley within which a stream flows to the north-east. From the base of the valley the land within the corridor rises gently to about 90m aOD as the corridor ends at the A465 (Belmont Road) close to its junction with the B4349.

Western Inner Corridor

- B8.1.12 This corridor runs north from the A465 where the land is at about 90m aOD. The land falls away slightly and then rises gently to a low ridge overlooking the river Wye.

- B8.1.13 The land then dips down steeply as the corridor crosses the river Wye and then rises steadily to a low ridge at c. 90m aOD. As the corridor continues north to King's Acre the land gradually falls away with the final section between the A438 (King's Acre Road) and the A4103 (Roman Road) being fairly level.

Western Outer Corridor

- B8.1.14 This corridor runs north-west from the A465 at about 90m aOD. The land falls away slightly before the corridor turns to the north and the land gradually rises to over 100m aOD at Perry Hill.

B8.1.15 From here the land descends an increasingly steeper slope before the corridor crosses the River Wye. North of the river the corridor crosses a small valley within which a stream flows south-east into the river.

B8.1.16 The land within the corridor then rises slightly before falling away gently to the level ground between the A438 (King's Acre Road) and the A4103 (Roman Road). The western edge of the corridor in this area crosses land that is more undulating. The final part of the corridor follows the A4103 (Roman Road) eastwards across level ground.

Northern Corridor

B8.1.17 This corridor leaves the A438 (King's Acre Road) to the west of Lower Burlton Farm and then turns eastwards to cross the A4110 (Canon Pyon Road). Within this section the land rises from about 65m aOD to just over 90m aOD.

B8.1.18 The corridor continues eastwards across the higher ground, crossing the A49 (Holmer Road), before turning to the south-east and descending from more than 90m aOD to about 50m aOD before connecting with the A4103 (Roman Road) close to the roundabout junction with the A465.

Eastern Inner Corridor

B8.1.19 This corridor extends south from the A4103 (Roman Road) and remains in the western floodplain west of the River Lugg at c. 50-60m aOD. It crosses the A438 (Ledbury Road) and the land then rises slightly to the east of Hampton Park.

B8.1.20 The corridor then crosses the B4224 (Hampton Park Road) and the River Wye before joining with the new B4399 Rotherwas Road at Rotherwas.

Eastern Outer Corridor

B8.1.21 This corridor extends along the A4103 (Roman Road) to cross the River Lugg at Lugg Bridge and then extend to the south-east to cross a shallow valley at New Court. It then turns south and remains within the eastern floodplain of the River Lugg before crossing the river and the A438 (Ledbury Road) to the west of Lugwardine Bridge.

B8.1.22 The corridor is then within the wide floodplain south of the River Lugg at less than 50m aOD before the land rises over a low ridge and descends into the valley of the River Wye. Here it crosses the B4224 (Hampton Park Road) and the River Wye before joining with the new B4399 Rotherwas Road at Rotherwas.

B8.2 NATIONAL LEGISLATION AND GUIDANCE

B8.2.1 Legislative frameworks provide protection to the historic environment while planning policy guidance provides advice concerning how the historic environment should be addressed within the planning process.

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- B8.2.2 Statutory protection for archaeology is principally enshrined in the Ancient Monuments and Archaeological Areas Act (1979) amended by the National Heritage Act (1983) and National Heritage Act (2002). Nationally important archaeological sites are listed in a Schedule of Monuments and are accorded statutory protection. The city of Hereford is one of only five cities in England in which an Area of Archaeological Importance has been designated under the terms of the 1979 Act.
- B8.2.3 For other components of the historic environment, the Planning (Listed Buildings and Conservation Areas) Act (1990) and the Town and Country Planning Act (1971) provide statutory protection to listed buildings and their settings and present measures to designate and preserve the character and appearance of Conservation Areas.
- B8.2.4 The *Hedgerow Regulations* (1997) includes guidelines that aim to protect hedgerows that have been assessed as important in terms of criteria that incorporate historical components. One of the criteria relates to the documented date of a hedgerow. A hedgerow can be deemed 'important' if it can be shown to be of pre-enclosure date, which for the purposes of the Regulations is currently taken (by case law precedent) to mean pre-AD 1845 (the earliest *Act of Inclosure* recorded in the *Small Titles Act* (1896)).
- B8.2.5 Proposed amendments to the Regulations (DEFRA 2003) stated that 'hedgerows should be regarded as important if they mark a boundary of pre-1850 historic administrative unit (parish, township, hundred, wapentake, cantref or maerdref) or pre-1600 manorial estate, ecclesiastical estate, or the outer limits of a field system, park, wood or common land'. However these amendments have not yet been agreed as statute law.
- B8.2.6 Planning Policy Statement 5: Planning for the Historic Environment (PPS5; March 2010) provides advice concerning the safeguarding of the historic environment within the planning process. It states that those parts of the historic environment that have significance because of their historic, archaeological, architectural or artistic interest should be called heritage assets, and goes on to recognise that heritage assets are a non-renewable resource.
- B8.2.7 Policy HE6.1 of PPS5 directs local planning authorities to 'require applicants to provide a description of the significance of the heritage assets affected and the contribution of their setting to that significance.....Where an application site includes, or is considered to have the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where desk-based research is insufficient to properly assess the interest, a field evaluation.'

B8.3 LOCAL PLANNING POLICY

- B8.3.1 The following policies are laid out in the *Herefordshire Unitary Development Plan* (adopted March 2007) and may be relevant:

LA2 Landscape character and areas least resilient to change

Proposals for new development that would adversely affect either the overall character of the landscape, as defined by the Landscape Character Assessment and the Historic Landscape Characterisation or its key attributes or features, will not be permitted.

Proposals should demonstrate that landscape character has influenced their design, scale, nature and site selection. Where appropriate, developers will be encouraged to restore degraded or despoiled landscapes to their inherent character.

LA4 Protection of historic parks and gardens

Development which would destroy, damage or otherwise adversely affect the historic structure, character, appearance, features or setting (including the designed visual envelope) of a registered park or garden will not be permitted.

Development proposals that would affect an historic park or garden should be accompanied by an historic landscape appraisal report and a restoration scheme, which may include or comprise a management plan, commensurate to the scale of the proposal that affects them.

Unregistered parks and gardens recognised and identified by the Council as currently of local importance will be afforded similar protection.

HBA4 Setting of listed buildings

Development proposals which would adversely affect the setting of a listed building will not be permitted. The impact of the proposal will be judged in terms of scale, massing, location, detailed design and the effects of its uses and operations.

HBA8 Locally important buildings

Development proposals which would adversely affect the appearance or setting of locally important buildings of architectural or historic interest, or buildings that make a valuable contribution to the character and appearance of the area, will not be permitted.

ARCH1 Archaeological assessments and field evaluations

Prior to the determination of applications for development on sites where there is reason to believe there are remains of archaeological importance, an archaeological field evaluation may be required. In addition where proposals are put forward within Archaeologically Important Urban Areas that may affect the integrity of the historic character of such settlements a historic landscape appraisal will be expected.

ARCH3 Scheduled Ancient Monuments

Development proposals and works which may adversely affect the integrity, character or setting of Scheduled Ancient Monuments will not be permitted.

ARCH4 Other Sites of National or Regional Importance

Planning permission for development which would destroy or seriously damage unscheduled, nationally important remains or sites of regional importance, or their character or setting, will not be permitted.

ARCH5 Sites of Lesser Regional or Local Importance

Development proposals which adversely affect a site of lesser regional or local importance that is unlikely to merit full preservation in situ will be permitted where the impact on the archaeological interest of the site can be shown to have been adequately mitigated.

ARCH6 Recording of archaeological remains

Where preservation in situ is not feasible, conditions on planning permissions will be imposed to ensure that, where appropriate, sites of archaeological interest including standing structures are excavated and/or recorded before alteration, demolition, site clearance or development commences, or are alternatively subject to a limited recording action project during development. The results of any recording project or excavation should be made available to the public.

ARCH8 Enhancement and improved access to archaeological sites

Proposals affecting sites of archaeological interest will be required to show how the interest will be protected and where feasible, can be enhanced. Favourable consideration will be given to development schemes which emphasise the original form and function of the sites and where appropriate improve public access to them. Such measures will be secured by use of conditions, planning agreements and management plans.

B8.3.2 A draft Supplementary Planning Document on *Archaeology and Development* was published in June 2008 but has not yet been approved.

B8.4 GENERAL METHODOLOGY

B8.4.1 The methodology for the assessment of potential impacts on the known and potential cultural heritage assets has been to collate all available information for the six corridors in order to examine the extent of the potential effects of each option. The importance of each identified asset has been assessed and the degree of impact upon them has been considered using recognised methodologies where such exist. An assessment of resources has been prepared for each scheme option showing the known and potential cultural heritage assets and the effects upon them.

Importance of the Assets

B8.4.2 The methodologies that have been used for assessing the importance of cultural heritage assets, and hence the scale of potential impacts on these assets that may result from the implementation of each of the scheme options, are based on the procedures set out in the *Design Manual for Roads and Bridges, Volume 11, Environmental Assessment* (DMRB, DoT, June 1993, as updated) and *Guidance on the New Approach to Appraisal* (NATA, DETR, July 1998).

Assessment of Resource Importance (Value) - Archaeological Remains

B8.4.3 There are no national government guidelines for evaluating the importance or significance (and hence the 'value') of all types of heritage asset. For archaeological remains, English Heritage has proposed a series of recommended (i.e. non-statutory) criteria for use in the determination of national importance when scheduling ancient monuments and these are expressed in Scheduled Monuments - Identifying, protecting, conserving and investigating nationally important archaeological sites under the Ancient Monuments and Archaeological Areas Act 1979 (DCMS March 2010). The criteria include period, rarity, documentation, group value, survival / condition, fragility / vulnerability, diversity and potential, and can be used as a basis for the assessment of the importance of historic remains and archaeological sites. However the document also states that 'these criteria should not be regarded as definitive rather they are indicators which contribute to a wider judgement based on the individual circumstances of a case.'

B8.4.4 The criteria described above could be used as a basis for the assessment of the importance of archaeological remains of less than national significance. However the categories of regional and district / local importance are less clearly established than that of national, and implicitly relate to local, district and regional priorities which themselves will be varied within and between regions. Local, district and regional research agenda may be available and local or structure plans may also help.

B8.4.5 Clearly a high degree of professional judgement is necessary, guided by acknowledged standards, designations and priorities. It is also important to understand that buried archaeological remains may not be well-understood at the time of assessment, and can therefore be of uncertain value.

B8.4.6 For archaeological remains the *DMRB* Vol. 11 (Section 3, Part 2, HA 208/07 Table 5.1) identifies six levels of value shown in Table B8.1:

Table B8.1: Guide for establishing the value of archaeological assets

Very High	<ul style="list-style-type: none">• World Heritage Sites• Assets of acknowledged international importance• Assets that can contribute significantly to acknowledged international research objectives
High	<ul style="list-style-type: none">• Scheduled Monuments• Undesignated assets of schedulable quality and importance• Assets that can contribute significantly to acknowledged national research objectives
Medium	<ul style="list-style-type: none">• Designated or undesignated assets that contribute to regional research objectives
Low	<ul style="list-style-type: none">• Undesignated assets of local importance• Assets compromised by poor preservation and/or poor survival of contextual associations• Assets of limited value, but with potential to contribute to local research objectives
Negligible	<ul style="list-style-type: none">• Assets with very little or no surviving archaeological interest
Unknown	<ul style="list-style-type: none">• The importance of the resource cannot be ascertained

Assessment of Resource Importance (Value) - Historic Buildings

B8.4.7 For historic buildings assessment of importance is usually based on the designations used in the Listed Building process. However where historic buildings are not listed, or where the listing grade may be in need of updating, professional judgement will be required.

B8.4.8 The criteria used in establishing the value of historic buildings within the listing procedure are set out in *'Principles of Selection for Listing Buildings - General principles applied by the Secretary of State when deciding whether a building is of special architectural or historic interest and should be added to the list of buildings compiled under the Planning (Listed Buildings and Conservation Areas) Act 1990* (DCMS March 2010). They include architectural interest, historic interest, close historic association (with nationally important people or events), and group value. Age and rarity are also taken into account; in general (where surviving in original or near-original condition) all buildings of pre-1700 date are listed, most of 1700-1840 date are listed, those of 1840-1914 date are more selectively listed, and thereafter even more selectively. Specific criteria have been developed for buildings of 20th century date.

B8.4.9 At a local level, buildings may be valued for their association with local events and people or for their role in the community. Guidance Note 208/07 provides the following table as a guide for evaluating the value of historic buildings:

Table B8.2: Guide for establishing the value of historic buildings

Very High	<ul style="list-style-type: none">• Standing buildings inscribed as of universal importance as World Heritage Sites• Other buildings of recognised international importance
High	<ul style="list-style-type: none">• Scheduled Monuments with standing remains• Grade I and II* Listed buildings• Other listed buildings that can be shown to have exceptional qualities in their fabric or historical association not adequately reflected in the listing grade• Conservation Areas containing very important buildings• Undesignated structures of clear national importance
Medium	<ul style="list-style-type: none">• Grade II Listed Buildings• Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical association• Conservation Areas containing important buildings• Historic Townscape or built-up areas with historic integrity in their buildings, or built settings (e.g. including street furniture and other structures)
Low	<ul style="list-style-type: none">• 'Locally listed' buildings• Historic (unlisted) buildings of modest quality in their fabric or historical association• Historic Townscape or built-up areas of limited historic integrity in their buildings, or built settings (e.g. including street furniture and other structures)
Negligible	<ul style="list-style-type: none">• Buildings of no architectural or historic note; buildings of an intrusive character
Unknown	<ul style="list-style-type: none">• Buildings with some hidden (i.e. inaccessible) potential for historic significance

Assessment of Resource Importance (Value) - Historic Landscapes

B8.4.10 The sub-topic of Historic Landscape is recognised as having significant overlaps with other topics such as Landscape and Townscape, and a multi-disciplinary approach to assessment is required. This is partially to avoid double-counting, and also to avoid duplication of effort. There are also significant overlaps with the other Cultural Heritage sub-topics; Archaeological Remains and Historic Buildings. The elements that are considered within those two sub-topics can make significant contributions to the historic landscape, and this latter subtopic should concentrate on the overall historic landscape character and its value rather than the individual elements within it.

B8.4.11 All landscapes have some level of historic significance, as all of the present appearance of the urban and rural parts of England is the result of human or human-influenced activities overlain on the physical parameters of climate, geography and geology.

B8.4.12 There are number of designations that can apply to historic landscapes, including World Heritage Sites (inscribed for their historic landscape value), Registered Parks and Gardens of Special Historic Interest, Registered Historic Battlefields, and Conservation Areas. Some local plans include locally designated Historic Landscape Areas, and Historic Parks and Gardens (or similar).

B8.4.13 A model has been produced by the Council for British Archaeology whereby the historic landscape can be divided up into units that are scaled, from smallest to largest, as follows:

- Elements** - individual features such as earthworks, structures, hedges, woods etc
- Parcels** - elements combined to produce, for example farmsteads or fields
- Components** - larger agglomerations of parcels, such as dispersed settlements or straight-sided field systems
- Types** - distinctive and repeated combinations of components defining generic historic landscapes such as ancient woodlands or parliamentary enclosure
- Zones** - characteristic combinations of types, such as Anciently Enclosed Land or Moorland and Rough Grazing
- Sub-regions** - distinguished on the basis of their unique combination of interrelated components, types and zones
- Regions** - areas sharing an overall consistency over large geographical tracts

B8.4.14 The model described above can be used as the principal part of the overall assessment usually known as Historic Landscape Characterisation (HLC). However, although HLC has been undertaken for much of England, there is no significant guidance or advice regarding the attribution of significance or value to identified historic landscape units.

B8.4.15 Guidance Note 208/07 provides the following table (Table B8.3) as a guide for evaluating the value of historic landscape units:

Table B8.3: Guide for evaluating Historic Landscape Character Units

Very High	<ul style="list-style-type: none"> • World Heritage Sites inscribed for their historic landscape qualities • Historic landscape of international sensitivity, whether designated or not • Extremely well-preserved historic landscapes with exceptional coherence, time-depth, or other critical factor(s)
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High	<ul style="list-style-type: none"> • Designated historic landscapes of outstanding interest • Undesignated landscapes of outstanding interest • Undesignated landscapes of high quality and importance, and of demonstrable national sensitivity • Well-preserved historic landscapes exhibiting exceptional coherence, time-depth, or other critical factor(s)
Medium	<ul style="list-style-type: none"> • Designated special historic landscapes • Undesignated historic landscapes that would justify special historic landscape designation, landscapes of regional sensitivity • Averagely well-preserved historic landscapes with reasonable coherence, time-depth, or other critical factor(s)
Low	<ul style="list-style-type: none"> • Robust undesignated historic landscapes • Historic landscapes with specific and substantial importance to local interest groups, but with limited sensitivity • Historic landscapes whose sensitivity is limited by poor preservation and/or poor survival of contextual associations
Negligible	<ul style="list-style-type: none"> • Landscapes with little or no significant historical interest

B8.4.16 None of the links and corridor options considered in this report would impact on any World Heritage Sites, parks and gardens registered on English Heritage's Register of Parks and Gardens of Special Historic Interest, or battlefields registered on English Heritage's Register of Historic Battlefields.

B8.4.17 There is no national historic landscape designation in England, and no formal government policy advice available to assist in assessing the importance of historic landscapes. Additional guidance specifically regarding the potential affects of highway design on the historic landscape is provided in *Assessing the Effect of Road Schemes on Historic Landscape Character* (Highways Agency 2007). This document was prepared as supplementary guidance to support the approach set out in the revised DMRB Guidance Note 208/07 on cultural heritage.

B8.4.18 General methodologies have been developed for characterising historic landscapes and Herefordshire has been fully surveyed as part of the national Historic Landscape Characterisation (HLC) project.

B8.4.19 The Herefordshire Unitary Development Plan (adopted March 2007) identifies historic parks and gardens that are not included on English Heritage's Register of Parks and Gardens of Special Historic Interest as *Unregistered Parks and Gardens*.

B8.4.20 *Impacts*

B8.4.21 The methodologies that have been used for assessing the magnitude of impacts on cultural heritage assets are based on the procedures set out in the *Design Manual for Roads and Bridges, Volume 11, Environmental Assessment* (DMRB, DoT, June 1993, as updated HA208/07)

Assessment of Impact Magnitude – Archaeological Remains

B8.4.22 The magnitude of impact is assessed without regard to the value of the heritage asset. In terms of the judgement of the magnitude of impact, this is based on the principle (established in PPS5) that preservation of the asset and its setting is preferred, and that total physical loss of the asset and/or comprehensive changes to its setting is the least preferred.

B8.4.23 It is not always possible to assess the physical impact in terms of percentage loss, and therefore it can be important in such cases to try to assess the capacity of the heritage asset to retain its character following any impact.

B8.4.24 Impact scales are defined thus:

Major	Change to most or all key archaeological elements, such that the asset is totally altered Comprehensive changes to setting
Moderate	Changes to many key archaeological elements, such that the asset is clearly modified. Considerable changes to setting
Minor	Changes to key archaeological elements, such that the asset is slightly altered. Slight changes to setting
Negligible	Very minor changes to elements or setting.
No change	No change.

Assessment of Impact Magnitude – Historic Buildings

B8.4.25 The magnitude of impact is assessed without regard to the value of the asset, so the total destruction of an insignificant building has the same degree of impact magnitude as the total loss of a high value building. In terms of the judgement of the magnitude of impact, this is based on the principle that preservation of the asset and its setting is preferred, and that total physical loss of the asset and/or total change to its setting is the least preferred.

B8.4.26 Impacts on the setting of historic buildings may include vibration, noise and lighting issues as well as visual impacts, and may be reversible.

B8.4.27 Impact scales are defined thus:

Major	Change to key historic building elements, such that the asset is totally altered
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	Total change to the setting
Moderate	Change to many key historic building elements, such that the asset is significantly modified. Changes to the setting of an historic building, such that it is significantly modified
Minor	Changes to key historic building elements, such that the asset is slightly different. Change to setting of an historic building, such that it is noticeably changed.
Negligible	Slight changes to historic buildings elements or setting that hardly affect it.
No change	No change to fabric or setting.

Assessment of Impact Magnitude – Historic Landscapes

B8.4.28 Historic landscapes cannot be destroyed or damaged but impacts on them can change their character. Impacts should be assessed using evaluated historic landscape character units, not the elements/parcels/components that contribute towards the character (see above). There may be impacts on the setting of identified units, especially with regard to designated historic landscapes.

B8.4.29 Impact scales are defined thus:

Major	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit.
Moderate	Changes to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape character.
Minor	Changes to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; limited changes to noise levels or sound quality; slight changes to use or access; resulting in limited changes to historic landscape character.
Negligible	Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.
No change	No change to elements, parcels or components; no visual or audible changes; no changes arising from amenity or community factors

B8.4.30 *Level of Effects*

B8.4.31 The level of effects is a combination of the value of the heritage asset and the magnitude of impact on that asset. Effects can be adverse or beneficial. Beneficial effects are those that mitigate existing impacts and help to restore or enhance heritage assets, therefore allowing for greater understanding and appreciation. In line with Guidance Note 208/07 the following matrix is used for all three sub-topics.

Table B8.4: Cultural Heritage: Level of Effects Matrix

VALUE / SENSITIVITY					
Very High	Neutral	Minor	Moderate/ Large	Large or Very Large	Very Large
High	Neutral	Minor	Moderate/ Minor	Moderate/ Large	Large/ Very Large
Medium	Neutral	Neutral/ Minor	Minor	Moderate	Moderate/ Large
Low	Neutral	Neutral/ Minor	Neutral/ Minor	Minor	Minor/ Moderate
Negligible	Neutral	Neutral	Neutral/ Minor	Neutral/ Minor	Minor
	No Change	Negligible	Minor	Moderate	Major
	MAGNITUDE OF IMPACT				

B8.4.32 Where the matrix provides a split in the level of effects, e.g. Moderate/Minor, the assessor will exercise professional judgement in determining which of the levels is more appropriate.

B8.4.33 Moderate or greater effects are generally considered to be significant in EIA terms.

B8.4.34 *Summary of General Methodology*

B8.4.35 The cultural heritage assets within the study areas for each of the corridor options are in line with the criteria established in the DMRB. Each corridor option is assessed separately and these detailed assessments are then used to produce WebTAG worksheets for each corridor option.

B8.4.36 The impact assessment takes into account the value of the cultural heritage receptors (where known), and the likely impact upon them, to arrive at a judgement of the effect of each option. For non-designated receptors and / or receptor groups, the application of the defined terms of value and impact magnitude result from judgements made by the assessment team.

B8.5 BASELINE DATA

Stage 1 data sources

B8.5.1 The *Stage 1 Environmental Assessment Report* (Amey 2010) describes the extent of data collection for the route options under consideration at that time. The primary data source was the Herefordshire Sites and Monuments Record (HSMR).

Additional data obtained for Study of Options

B8.5.2 The study area for each of the corridor options was defined as being the corridor and land immediately adjacent. Each corridor is itself a buffer zone established around a number of actual road options. Data relating to designated heritage assets of **High** value (e.g. Scheduled Monuments, Grade I and II* listed buildings) was obtained for a greater area around each corridor if it was considered that significant effects on the settings of such assets could result from the proposed link.

B8.5.3 Within the defined study areas the following additional data were obtained:

- World Heritage Sites, Registered Parks and Gardens of Special Historic Interest, Registered Battlefields and Scheduled Monuments – locational information was retrieved from the Multi-Agency Geographic Information for the Countryside (MAGIC) website.
- Scheduled Monuments – the detailed descriptions of all relevant Scheduled Monuments was obtained from the National Monuments Record;
- Listed Buildings – the full short listing information for all relevant listed buildings was obtained from English Heritage's Images of England database;
- Conservation Areas – location plans for each of the relevant Conservation Areas was obtained from the Herefordshire County Council website;
- Historic Landscape Characterisation (HLC) information was provided by Herefordshire County Council, including the appendices that describe the numbers of each area type within the county and the total percentage of the county covered by those areas;
- Sites and Monuments Record - the Herefordshire Sites and Monuments Record (HSMR) provided an up to date GIS plot of data so that and entries subsequent to the Stage 1 data search could be added and assessed; and
- Unpublished information – a number of unpublished documents relating to previous archaeological and historical studies were examined.

Preliminary Walkover Survey

B8.5.4 A preliminary walkover survey has yet to be undertaken. A walkover will be undertaken for the Stage 2 Assessment

Limitations and Assumptions

B8.5.5 With regard to the potential effects of the scheme on the settings of designated heritage assets of **High Value** located beyond the defined study areas, this will need to be assessed during the walkover survey.

B8.5.6 With regard to listed buildings, the following limitations and assumptions apply:

- The grades and descriptions recorded on English Heritage's Images of England database are correct.

B8.5.7 With regard to the information on buried archaeological remains, the following limitations and assumptions apply:

- The available information is skewed as it is primarily the result of previous investigations targeted at specific sites and linear corridors. The resulting distribution, extent and nature of known archaeological remains cannot be taken as a direct and accurate representation of the location and / or total amount of buried archaeological remains within any of the route corridors. Further archaeological sites are likely to be identified as a result of further data collection and fieldwork.

General Comment

B8.5.8 Examination of the data acquired for the Study of Options Stage indicated that there are no World Heritage Sites, Registered Parks and Gardens of Special Historic Interest or Registered Battlefields within or directly adjacent to any of the route corridors.

B8.5.9 **Southern Core Corridor**

Designated Cultural Heritage Features

Listed Buildings

B8.5.10 The western part of this corridor, in particular link SC1, passes just to the south of the Grade II listed Merryhill Farmhouse and the adjacent stables which are listed separately at Grade II. In the same area the corridor, in particular link SC2 passes just to the north of a small group of listed buildings centred around the Grade II* listed Heywood Lodge. The other listed buildings here comprise the gates, railings and garden wall east of the Lodge (Grade II), the cider house, stable and hopkiln west of the Lodge (Grade II) and the pig sties to the north-west of the Lodge (Grade II). Just to the south of the corridor at the junction with the A465 (Belmont Road) is a Grade II listed milestone of late 18th or 19th century date. The Grade II* listed Heywood Lodge is of **high value**, whereas all of the Grade II listed structures are of **medium value**. See Figure B8.3 in Appendix B-A, and Appendix B-D for Sites and Monuments Gazetteer.

Unregistered Historic Park and Gardens

B8.5.11 The corridor (link SC1) passes through the southern end of the Unregistered Historic Park and Garden of Belmont House, which also contains Belmont Abbey. This Unregistered Historic Park and Garden is of **low value**.

Non-Designated Cultural Heritage Features

B8.5.12 Pieces of worked flint have been found at four locations within or adjacent to the corridor. At two locations (MHE3716; MHE4088) single pieces were identified during archaeological work (fieldwalking) undertaken in 1990 with regard to a previous study for a road scheme. A flint knife had previously been found near to Haywood Lodge (MHE2348). At a fourth location adjacent to the A49 (Ross Road) a proposed development site was close to an area where worked flints had previously been found (MHE8397).

B8.5.13 These limited findings may indicate a general low level of prehistoric activity in this area, but it could also be the result of the lack of any more detailed archaeological survey here. For example an archaeological investigation evaluation of a proposed development site at Bullinghope (to the east of the A49) found ten pieces of worked flint as well as pottery of Roman, medieval and post-medieval date. A large enclosure of probable prehistoric date has been identified at Portway, not very far to the south of the corridor. An overall unknown value should be applied to archaeological remains of prehistoric date.

B8.5.14 The fieldwalking undertaken in 1990 also identified single sherds of Roman pottery in two locations (MHE3722; MHE4104). As with the prehistoric material described above, the paucity of evidence for activity along this corridor during the Roman period may reflect a genuine absence of any remains from this period, but it could also be the result of the lack of detailed archaeological survey here. An overall **unknown value** should be applied to archaeological remains of Roman date.

B8.5.15 Single sherds of medieval pottery was also found in the same locations as the Roman material during the fieldwalking in 1990 (MHE4105; MHE4089), whilst the HSMR entry regarding the proposed development adjacent to the A49 (Ross Road) also refers to areas of possible medieval and post-medieval activity (MHE8397). Given the absence of any documentary evidence for settlement along this corridor, an overall negligible value should be assigned to archaeological remains of the medieval period.

B8.5.16 Other HSMR entries relate to features recorded on earlier mapping of the area. These include the location of former brickworks (MHE13890) (adjacent to both SC1 and SC2) and the sites of two small quarries (MHE7765; MHE12657). There is a documentary reference to a landscape park at Merry Hill (MHE8611) (link SC1) but its exact location and extent are not known. The corridor also crosses the line of the former Hereford to Abergavenny tramway (MHE7905) – this section was completed in 1829 but was subsequently replaced by the

Newport, Abergavenny and Hereford railway. An overall **negligible value** has been assigned to archaeological remains of the post-medieval period.

Historic Landscape Character

B8.5.17 A short part of the eastern section of this corridor is in a block of H1.3 – this represents a landscape where the historic character has been eroded by recent total boundary loss. To the west the corridor passes into a block of D2.2 – former common fields that were subsequently enclosed and are characterised by the presence of small regular broad closes. The whole of the western part of the corridor is within a block of G2.3 – this represents small compass enclosure of the landscape involving multiple entity planned areas established through the reconfiguration of former common arable fields. An overall **low value** has been assigned to the historic landscape along this corridor. See figure B8.2 in Appendix B-A

B8.5.18 **Western Inner Corridor**

Designated Cultural Heritage Features

Scheduled Monuments

B8.5.19 The corridor passes to the east of the earthwork remains of a Norman ringwork (HE60) that is located to the south-west of the Church of St Michael at Lower Breinton. Excavations here in 1922 and subsequently in 1959-62 found a main building set within a walled embanked enclosure that dates from c. AD 1150 and probably went out of use in the 13th century. A hollow way immediately to the west of the ringwork leads down to a former crossing of the River Wye. This Scheduled Monument is of **high value**. See figure B8.4 in Appendix B-A, and Appendix B-D for Sites and Monuments Gazetteer.

Listed Buildings

B8.5.20 Just to the south of the corridor (near links WL1, WL2, WL3, WL5) at the junction with the A465 (Belmont Road) is a Grade II listed milestone of late 18th or 19th century date. Just to the west (near links WL4 and WL6) of the crossing of the B4349 is Clehonger Court where a barn and granary are separately listed at Grade II. Just to the east of the corridor in this area is Belmont Abbey – here the Abbey Church of St Michael and All Angels is a Grade II* listed building, and in addition the monastery buildings are listed as a single Grade II unit, as are the school, chapel and house. The gates and gate piers at the church and a statue of St Michael represent two other Grade II listed buildings.

B8.5.21 To the south of the point at which the corridor crosses the River Wye, immediately to the west of the corridor (links WL3, WL4, WL5 and WL6) is Belmont House – a Grade II* listed building that is now a golf clubhouse. To the west of the house is a stable block that is separately listed at Grade II, as is a nearby planting plaque.

B8.5.22 The corridor passes to the east of Lower Breinton, where the Church of St Michael is a Grade II listed building and a memorial and a tomb in the churchyard are also listed

separately at the same grade. Breinton House is Grade II listed, as is a pair of adjoining barns to the north of the church.

B8.5.23 At the northern end of this corridor link WL7 passes just to the west of the Grade II listed Huntington Court Farm and attached granary, and the Grade II listed Huntington House. Just to the east of these is the Grade II listed Huntington Court and the Grade II listed Church of St Mary Magdalene.

B8.5.24 The two Grade II* listed buildings are of high value whereas the Grade II listed buildings are of medium **value**.

Conservation Areas

B8.5.25 The corridor passes just to the west of the Huntington Conservation Area. This is considered to be of **medium value**.

Unregistered Historic Park and Gardens

B8.5.26 The corridor (links WL1, WL2, WL3, WL4, WL5 and WL6) passes through the Unregistered Historic Park and Garden of Belmont House, which also contains Belmont Abbey. An earlier property here was known as Old Hill Farm but following the purchase of this farm in 1788 the new house was constructed to a design by James Wyatt. The landscaping was advised by Humphrey Repton and included a long terrace above the river and a grotto looking towards Hereford. The estate was substantially enlarged in 1809 following the purchase of the Haywood Estate although much of it is now a golf course.

B8.5.27 The Unregistered Historic Park and Garden of Warham House lies wholly within this corridor, though is not crossed by any of the links. An older house here was replaced c. 1886 by a Jacobean-style mansion (MHE1707) and early 19th century mapping shows a walled garden surrounded by orchards. The present landscaping is late 19th or early 20th century although some indications of the walled enclosure still survive. An entry in the Domesday Book suggests that there was a small village at Warham at that time (MHE8327) and is close to links WL3, WL4 and WL5.

B8.5.28 Both of these Unregistered Historic Parks and Gardens are considered to be of **low value**.

Non-Designated Cultural Heritage Features

B8.5.29 No features or material of prehistoric date have been identified from within or adjacent to this corridor. There is an entry on the HSMR (MHE22459) that records the discovery of a Roman coin but this is a metal detectorist find and the location is only placed generally at the south-west corner of a 1 km grid square. The A4103 road at the northern end of the corridor follows the line of the Roman road running east from Kenchester (Magnis).

B8.5.30 Although records of prehistoric and Roman material along this corridor are very limited, this may well be the result of the absence of any detailed archaeological survey in this area.

Given the nearby presence of a promontory fort of probable Iron Age date at Eaton Camp to the west and also the Roman town at Kenchester with the road leading eastwards along the route of the modern A4103, an overall unknown value should be assigned to archaeological remains of the prehistoric and Roman periods.

- B8.5.31 Metal objects of medieval (and post-medieval) date have been found by metal detectorists at several locations within or adjacent to this corridor (MHE22441; MHE22450: MHE22440), but again the location is only placed generally at the south-west corner of a 1 km grid square. To the north-west of the church at Lower Breinton are the earthwork remains of a possible deserted medieval village. An overall negligible value has been assigned to archaeological remains of the medieval period.
- B8.5.32 The corridor (links WL4 and WL6) passes to the east of Clehonger (MHE16249). The manor here was owned by the Aubrey family from the late 16th century to the early 19th century. Its original focus was opposite All Saints parish church, where there was a large pond which may have been the manor's moat. The mansion was destroyed by fire in January 1794, but archaeological evidence for its garden could survive. The present Clehonger Court is an early 19th century replacement for the mansion. The area within and around Clehonger Court is considered to be of **low value**.
- B8.5.33 The northern part of this corridor (link WL7) passes just to the west of Huntington. As described above there is a Conservation Area here that contains a number of listed buildings. Additional HSMR entries here include a fishpond (MHE6786) that may have once been a formal canal and the possible site of a mill (MHE2371), and documentary evidence indicates that there was a village here until at least the 13th century (MHE2370). The area within and around Huntington is considered to be of medium value.
- B8.5.34 There are several HSMR entries that relate to the sites of former properties (usually cottages) that are present on historic maps of the area. These include a number alongside the A4103 Roman Road (MHE6784; MHE6785; MHE6788) as well as further to the south (MHE6789; MHE6790). Other features recorded on the earlier mapping include boundary stones (MHE7736), a pond (MHE988) and a canalised stream (MHE7751) which is close to an area of ridge and furrow earthworks. All of these features are considered to be of low value.
- B8.5.35 Some undated features are also present within or adjacent to this corridor. These include some minor earthworks (MHE7726) to the east of Belmont House that may actually be associated with the golf course, also a track or boundary feature south of King's Acre that was recorded as a cropmark on an aerial photograph (MHE7728). Another area of possible cropmarks (MHE7729) is located just to the south of the A4103 (Roman Road). These are all of **unknown value**.

Historic Landscape Character

- B8.5.36 A short part of the southern section of this corridor is in a block of G2.3 – this represents small compass enclosure of the landscape involving multiple entity planned areas established through the reconfiguration of former common arable fields. It then passes into a block of H1.2 – a landscape where the historic character has been eroded by recent boundary loss although some sinuous boundaries have survived. See figure B8.2 in Appendix B-A
- B8.5.37 To the north of the River Wye the corridor passes into a block of L3.3 – a landscape where an earlier enclosure system has subsequently been adapted by more than one historic process although elements of an underlying axial or coaxial alignment are still present. A small part in the eastern edge of the corridor here passes through a block of L2.1, where the former common arable fields were enclosed and subsequently adapted through boundary definition and insertion. An overall low value has been assigned to the historic landscape along this corridor.
- B8.5.38 However the northern part of the corridor is within a block of G2.2 – an area of small compass enclosure involving multiple planned entities established through the rationalisation of an existing grid system. There are only three such areas in the county and therefore this has been assigned a **medium value**.

B8.5.39 *Western Outer Corridor*

Designated Cultural Heritage Features

Scheduled Monuments

- B8.5.40 The corridor passes to the west of the earthwork remains of a Norman ringwork (HE60) that is located to the south-west of the Church of St Michael at Lower Breinton. Excavations here in 1922 and subsequently in 1959-62 found a main building set within a walled embanked enclosure that dates from c. AD 1150 and probably went out of use in the 13th century. A hollow way immediately to the west of the ringwork leads down to a former crossing of the River Wye.
- B8.5.41 To the west of the corridor and on the south side of the River Wye is Eaton Camp (HE10). This is a promontory fort, probably of Iron Age date, with natural defences on the north and south-east sides.
- B8.5.42 Both of these Scheduled Monuments are of **high value**. See figure B8.4 in Appendix B-A, and Appendix B-D for Sites and Monuments Gazetteer.

Listed Buildings

- B8.5.43 Just to the south of the corridor (link WL9 and WL10) at the junction with the A465 (Belmont Road) is a Grade II listed milestone of late 18th or 19th century date. Just to the west of the

crossing of the B4349 is Clehonger Court where a barn and granary are separately listed at Grade II. To the west of the corridor at Clehonger is the Grade I listed Church of All Saints, also the base of a churchyard cross and a cottage that are separately listed at Grade II.

B8.5.44 After crossing the River Wye the corridor passes to the west of Lower Breinton, where the Church of St Michael is a Grade II listed building and a memorial and a tomb in the churchyard are also listed separately at the same grade. Breinton House is Grade II listed, as is a pair of adjoining barns to the north of the church.

B8.5.45 In the same area the corridor passes to the east of a Grade II listed house that is subdivided into two properties – South View and 3 Manor Cottages. After the corridor crosses the A438 (King's Acre Road) it passes to the east of the Grade II* listed Church of St Mary Magdalene at Stretton Sugwas.

B8.5.46 The Grade I and Grade II* listed churches are of **high value**, whereas the Grade II listed buildings are of **medium value**.

Unregistered Historic Park and Gardens

B8.5.47 The corridor (links WL9 and WL10) passes to the west of the Unregistered Historic Park and Garden of Belmont House, which also contains Belmont Abbey. An earlier property here was known as Old Hill Farm but following the purchase of this farm in 1788 the new house was constructed to a design by James Wyatt. The landscaping was advised by Humphrey Repton and included a long terrace above the river and a grotto looking towards Hereford. The estate was substantially enlarged in 1809 following the purchase of the Haywood Estate although much of it is now a golf course.

B8.5.48 The corridor (links WL9 and WL10) passes through the central part of the Unregistered Historic Park and Garden of Wyeclyffe Court which is on the northern bank of the River Wye. This incorporates the grounds of Breinton Court, which is close to Breinton House and is an older building, first appearing on a map of 1796. It may have been a farm until the picturesque location was appreciated in the early 19th century, at which time there was park-style planting with gardens and shrubberies. Wyeclyffe Court was built some time before 1885 and has park-style planting with riverside woodland and extensive orchards.

B8.5.49 The corridor (link WL10) also passes to the east of the Unregistered Historic Park and Garden of Sugwas Court. The principal building here was formerly a manor house of the Bishops of Hereford and was entirely rebuilt in 1792.

B8.5.50 All of the Unregistered Historic Park and Gardens described above are considered to be of **low value**.

Non-Designated Cultural Heritage Features

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- B8.5.51 The HSMR records the finding of a flint blade and scraper (MHE3481) and a flint arrowhead (MHE3482) at a location just to the east of this corridor. However this location is the south-west corner of a 1 km grid square which indicates that the findspots are known to any greater degree of accuracy. A wide linear feature of possible prehistoric date was found during the investigation of the new livestock market site (MHE22911) to the south of the A4103 (Roman Road).
- B8.5.52 The A4103 (links WL13 and WL14) follows the line of the road leading east from the Roman town at Kenchester (Magnis), only c. 2.5 km to the west of Stretton Sugwas. Metal detectorists have found a small number of Roman items within and adjacent to this corridor, including three coins of 3rd century AD date (MHE22479) and a copper alloy finger ring (MHE22373) all found to the south-west of Stretton Sugwas. A denarius of Hadrian was also recovered from a location at King's Acre (MHE2366) and a pit of Roman or prehistoric date was observed in a service trench adjacent to the A4103 (MHE17221).
- B8.5.53 Although records of prehistoric and Roman material along this corridor are fairly limited, this is probably due to the low level of any detailed archaeological survey in this area. Where such survey has been undertaken significant buried remains have been identified, e.g. at the site of the new livestock market. Given the nearby presence of a promontory fort of probable Iron Age date at Eaton Camp to the west and also the Roman town at Kenchester with the road leading eastwards along the route of the modern A4103, an overall **unknown value** has been assigned to archaeological remains of the prehistoric and Roman periods.
- B8.5.54 Other material found by detectorists includes a medieval scabbard made of copper alloy (MHE22373), found just to the south of the A4103, a post-medieval mount made of silver and copper alloy (MHE22737) (near to link WL10) found to the east of Stretton Sugwas and a post-medieval bracelet and bell (MHE22479) found to the south-west of the same village. To the north-west of the church at Lower Breinton are the earthwork remains of a possible deserted medieval village. An overall negligible value has been assigned to archaeological remains of the medieval period.
- B8.5.55 At Lower Burlton and close to the A4103 (link WL14) road is a sluice gate and leat (MHE13123) leading to the mill at Huntington described above. Just to the south of the River Wye the corridor passes to the east of an earthwork that represents the remains of a 17th century gun emplacement (MHE2840) (link WL9 and WL10). An overall low value has been assigned to archaeological remains of the post-medieval period, although the gun emplacement could be considered to be of medium value.
- B8.5.56 The corridor passes to the east of Clehonger (MHE16249) (link WL9 and WL10). The manor here was owned by the Aubrey family from the late 16th century to the early 19th century. Its original focus was opposite All Saints parish church, where there was a large pond which may have been the manor's moat. The mansion was destroyed by fire in January 1794, but

archaeological evidence for its garden could survive. The present Clehonger Court is an early 19th century replacement for the mansion. The area within and around Clehonger Court is considered to be of low value.

B8.5.57 Undated features recorded on the HSMR include a boundary stone at Sandston (MHE13310) and an area of cropmarks, including rectangular enclosures, that is recorded on an aerial photograph of Swainshill (MHE2953). The boundary stone is of **negligible** value, but the area of cropmarks is of **unknown** value.

Historic Landscape Character

B8.5.58 A short part of the southern section of this corridor is in a block of G2.3 – this represents small compass enclosure of the landscape involving multiple entity planned areas established through the reconfiguration of former common arable fields. It then passes into a block of H1.2 – a landscape where the historic character has been eroded by recent boundary loss although some sinuous boundaries have survived. See figure B8.2 in Appendix B-A

B8.5.59 Just to the south of the River Wye the corridor passes through a block of G2.12 – an area of small compass enclosure involving multiple axial planned elements. To the north of the River Wye the corridor passes into a block of L3.3 – a landscape where an earlier enclosure system has subsequently been adapted by more than one historic process although elements of an underlying axial or coaxial alignment are still present. This may be associated with possible medieval settlement in the vicinity of Breinton.

B8.5.60 The northern part of the corridor is almost wholly within a block of G2.2 – an area of small compass enclosure involving multiple planned entities established through the rationalisation of an existing grid system. The very western edge of the corridor here is within another block of H1.2 - a landscape where the historic character has been eroded by recent boundary loss although some sinuous boundaries have survived, whilst a tiny part of the corridor passes through the edge of a block of D2.2 - former common fields that were subsequently enclosed and are characterised by the presence of small regular broad closes.

B8.5.61 An overall low value has been assigned to the historic landscape along this corridor. However the block of G2.2 is one of only three such areas in the county and therefore this has been assigned a **medium value**.

B8.5.62 *Northern Corridor*

Designated Cultural Heritage Features

Listed Buildings

B8.5.63 As it crosses the A49 (Holmer Road) this corridor passes to the north of the Grade II listed Holmer Hall. This is of **medium value**. See figure B8.5 in Appendix B-A, and Appendix B-D for Sites and Monuments Gazetteer.

Unregistered Historic Park and Gardens

B8.5.64 The corridor (link NC1) passes through the Unregistered Historic Park and Garden of Burghill Hospital. This was built in 1868-72 as the Hereford County and City Lunatic Asylum. The grounds of the hospital were enclosed by walls, beyond which was a 100 acre estate farmed by the patients. Maps of the later 19th century show orchards and parkland around the hospital. The main site has recently been developed and a number of new houses have been built but the main section of parkland to the south of the built development has been retained as open space. Link NC2 avoids the Unregistered Historic Park and Garden. This Unregistered Historic Park and Garden is of **low value**.

Non-Designated Cultural Heritage Features

B8.5.65 Single pieces of worked flint have been found at two locations within or adjacent to the corridor during archaeological work (fieldwalking) undertaken in 1990 with regard to a previous study for a road scheme (MHE4115; MHE4118). Finds made by metal detectorists include two coins that may be of Late Iron Age date (MHE22519) but the location is only placed generally at the south-west corner of a 1 km grid square.

B8.5.66 Findspots and sites of prehistoric date are therefore rare. However, given the presence within this corridor of areas containing cropmarks that remain undated but are potentially of prehistoric date (see below), an overall unknown value has been assigned to archaeological remains of this period.

B8.5.67 Other finds made by metal detectorists include two Roman coins, a Roman brooch, two medieval harness pendants and two spindle whorls, but again the location is only placed generally at the south-west corner of a 1 km grid square (MHE23390). Single sherds of Roman pottery were found at two locations within or adjacent to the corridor during the fieldwalking undertaken in 1990 (MHE4119; MHE4116). An overall **unknown value** has been assigned to archaeological remains of the Roman period.

B8.5.68 Single sherds of medieval pottery were found at three locations during the same programme of fieldwalking (MHE4114; MHE4117; MHE4120). The corridor passes just to the south of a deserted medieval settlement at Lyde Arundel (MHE2372). This includes house platforms and boundary banks, also some ridge and furrow indicating former arable cultivation of the land. At the western end of the corridor is a possible lynchet that would again suggest former arable land use (MHE7731). An overall low value has been assigned to archaeological remains of the medieval period, however the deserted medieval village at Lyde Arundel is considered to be of medium value.

B8.5.69 There are several entries on the HSMR that relate to cropmarks recorded on aerial photographs – this is almost certainly due to an extensive programme of aerial photographic assessment that has been undertaken by a specialist (the Lower Lugg Valley Archaeology and Aggregates Project). Just to the north of Holmer an area of cropmarks was identified

during the 1990 evaluation work (MHE3321). To the east of here, and just to the north of the A4103 (Roman Road) is a cropmark indicating the presence of a large sub-square enclosure, also a smaller enclosure and possibly a ring ditch (MHE2944). Just to the west of the railway another set of cropmarks (MHE2186) could be related to an earlier field system or possibly to a group of enclosures. These continue on the eastern side of the railway (MHE2185). To the south of the A4103 is a curvilinear ditch that might indicate the presence of a ring ditch (MHE4471) although this site has subsequently been developed. All of these areas of undated cropmarks are considered to be of **unknown value**.

B8.5.70 There are several HSMR entries that relate to the sites of former properties (usually cottages) that are present on historic maps of the area. These include two houses adjacent to the A4103 (MHE6767; MHE6768) and two former brickworks (MHE13944; MHE13947). All of these are considered to be of negligible value.

B8.5.71 The corridor crosses the line of the former Hereford-Gloucester canal. This was built between 1793 and 1845, but was replaced by the Gloucester-Ledbury railway in 1881. At the point where the A4103 road crosses over the canal, it does so on the original canal bridge (MHE10766). In this area the railway was to the west of the canal and therefore the bridge was not replaced. This bridge is considered to be of **low value**.

Historic Landscape Character

B8.5.72 The western part of this corridor is in a block of G2.2 – an area of small compass enclosure involving multiple planned entities established through the rationalisation of an existing grid system. It then passes into a block of G1.1 – again an area of small compass enclosure but one within which the enclosure was regularly planned as a single entity. See figure B8.2 in Appendix B-A

B8.5.73 A very small part of the corridor then passes through a block of L1.1 – a landscape where the former common arable fields were enclosed but this has subsequently been adapted through boundary reconfiguration with only minimal insertion of boundaries. Most of the corridor in this area also passes through a block of F1.1 – this represents large compass enclosure with the establishment of a single farm. It then passes into a block of L3.3 - a landscape where an earlier enclosure system has subsequently been adapted by more than one historic process although elements of an underlying axial or coaxial alignment are still present.

B8.5.74 To the east of the A49 (Holmer Road) the corridor (Links NC3 and NC4) passes briefly through a block of L2.1 – where the former common arable fields have been enclosed and subsequently adapted through boundary redefinition and insertion. It then passes through a block of D2.1 – a landscape where the former common arable fields have subsequently been enclosed and where the closes have a high frequency of dog-leg boundaries.

B8.5.75 The eastern end of the corridor is within a block of D3.1 - where the former common arable fields have subsequently been enclosed through the minimal insertion of boundaries along major headlands.

B8.5.76 An overall **low value** has been assigned to the historic landscape along this corridor; although the block of D2.1 is comparatively rare (there are only six such areas in the county).

B8.5.77 *Eastern Inner Corridor*

Designated Cultural Heritage Features

Scheduled Monuments

B8.5.78 Just to the east of the corridor (link EL2) is a scheduled monument, comprising ring ditches and rectilinear features (HE190). See figure B8.6 in Appendix B-A, and Appendix B-D for Sites and Monuments Gazetteer.

B8.5.79 To the south of the River Wye is the site of Rotherwas House (27543). The scheduled area includes the earthwork and buried remains of the 16th century Rotherwas House and the 18th century house that succeeded it, also the earthwork and buried remains of its formal gardens and the standing remains of the Roman Catholic Chapel of Our Lady of Assumption. There are documentary references to a chapel at Rotherwas from 1304, although this may not have been in exactly the same location. The 18th century house was demolished in 1926.

B8.5.80 Both of the Scheduled Monuments described above are of **high value**.

Listed Buildings

B8.5.81 Just to the north of the A438 (Ledbury Road) the Grade II listed Lower House Farmhouse lies within the corridor, but not the link (EL1), – a barn here was separately listed but was destroyed by fire c. 1988. A mid 19th century cast iron milepost just to the east of the corridor here is also Grade II listed. After crossing the River Wye a group of listed buildings is located immediately east of the corridor. These include Rotherwas Chapel (Grade II*) along with a former stable block (Grade II) and a barn (Grade II). The chapel is of **high value**, whereas the Grade II listed buildings are of **medium value**.

Conservation Areas

B8.5.82 The northern edge of the Aylestone Hill Conservation Area is just within this corridor, but is not cut by the link EL1, and also the eastern edge of the Hampton Park Conservation Area, but not the link EL2. These Conservation Areas are of **low value**.

Unregistered Historic Park and Gardens

- B8.5.83 The corridor (link EL2) passes just to the east of the Unregistered Historic Park and Garden of Hampton Dene. This is a large suburban house still within its grounds. Early 19th century mapping shows the house surrounded by orchards and pasture.
- B8.5.84 Just to the south of the River Wye the corridor (link EL3) passes through the Unregistered Historic Park and Garden at Rotherwas House. The original park associated with the house extended to the northern end of Dinedor Hill and elements of the park pale are still present in that area. When the new house was built in 1732 the park was abandoned and smaller pleasure gardens were established around the house. A new garden was created c. 1800 towards the River Wye featuring a sunken lawn and a walled garden, and it is this area that falls within the Unregistered Historic Park and Garden.
- B8.5.85 Both of these Unregistered Historic Parks and Gardens are considered to be of **low value**.

Non-Designated Cultural Heritage Features

- B8.5.86 Just to the north of Hampton Park are two findspots relating to prehistoric material (MHE2558; MHE2559). The material includes two fragments of polished stone axe, one reused as a scraper, as well as flint scrapers and chips of flint. Just to the east of this location the fieldwalking undertaken as part of the evaluation of the previous road scheme in 1990 found four flint flakes and one core (MHE4344). An overall unknown value has been assigned to remains of the prehistoric period within this corridor.
- B8.5.87 The fieldwalking finds described above were found within an extensive area of cropmarks seen on aerial photographs (MHE103). This includes the Scheduled Monument (HE190) and overall comprises a series of agglomerated ditched enclosures which either underlies or overlies at least five ring ditches – probably the remains of a Bronze Age barrow cemetery. Given the presence here of the Scheduled Monument a high value has been assigned to this area of cropmarks.
- B8.5.88 The corridor (link EL1) passes close to Walney Farm (MHE8778) – this is possibly the site of a medieval settlement known from documentary records as far back as 1166. Small areas of ridge and furrow earthworks were noted just to the north of here (MHE4461) and to the south (MHE7752; MHE7753; MHE4455) during the 1990 evaluation of the previous road scheme. A low value has been assigned to the Walney Farm area.
- B8.5.89 To the south-west of Walney Farm aerial photography has located three parallel north-facing lynchets on the slope overlooking Lugg Meadows (MHE19022) – these are likely to be part of the medieval field system and are of negligible value.
- B8.5.90 Just to the east of or even within the corridor and Link EL2 are the surviving common meadows of the parishes of Lugwardine, Hampton Bishop and Holmer (MHE4156). These are occupied in severalty for half the year and on common for the other half. The owners

hold their land in strips with boundaries marked by stones. The grass is grown for hay and each owner crops their own strip. The Lugg Meadows are unique within the county and are of **high value**.

B8.5.91 A bridge carrying the A438 road over a side channel of the River Lugg at Tupsley was constructed in 1807 (MHE16922). At the northern end of this corridor is the route of a toll road leading from Hereford towards Bodenham Moor (MHE15356), possibly on the line of the current A465. All of these are of negligible value.

B8.5.92 Examination of early mapping has located several small former quarries to the north of Tupsley (MHE11956; 11976; MHE11999). These are all of negligible value.

B8.5.93 At Rotherwas there are a number of other features of historic importance in addition to the scheduled monument, listed buildings and the Undesignated Historic Park and Garden described above. Earthworks to the west of the chapel here could be related to the documented medieval settlement of Rotherwas (MHE4336) and a fishpond is indicated on the tithe map for the area (MHE1631; MHE4337). A gravel pit was noted on the 1st edition Ordnance Survey map (MHE12906), whilst a set of cropmarks probably relates to the Royal Ordnance Factory that was located here during the First World War (MHE4009). Taken together as a group these features have been assigned a **medium value**, although the chapel and the house are of **high value** through their level of designation.

Historic Landscape Character

B8.5.94 The northern part of this corridor is within a block of U1.1 – unenclosed meadow. These are the Lugg Meadows; they are unique within the county and considered to be of high value. See figure B8.2 in Appendix B-A

B8.5.95 The corridor then passes into a block of L1.1 – a landscape where an earlier enclosure system has subsequently been adapted but which is characterised by boundary reconfiguration with only minimal insertion of boundaries.

B8.5.96 To the north of the River Wye the corridor passes through a block of G2.7 – this represents small compass enclosure involving multiple planned entities created through the reconfiguration and drainage of early meadow enclosures. To the south of the River Wye the corridor is within a block of Z1 – urbanisation.

B8.5.97 With the exception of the Lugg Meadows (which is of high value), an overall **low value** has been assigned to the historic landscape along this corridor.

B8.5.98 *Eastern Outer Corridor*

Designated Cultural Heritage Features

Scheduled Monuments

B8.5.99 At the junction with the A4103 (Roman Road) is Lugg Bridge - this carries the A4103 over the River Lugg and is a Scheduled Monument (HE32) as well as a Grade II listed structure. It was probably built in the 14th century and repairs are documented in 1409 and 1464. Links EL4 and EL5 would need to use the bridge. See figure B8.6 in Appendix B-A, and Appendix B-D for Sites and Monuments Gazetteer.

B8.5.100 Just to the west of the corridor is a Scheduled Monument, comprising an area of cropmarks recorded on aerial photographs and including ring ditches and rectilinear features (HE190). The site of Rotherwas House is also a Scheduled Monument (27543) – this is described in more detail above. All of these Scheduled Monuments are of **high value**.

Listed Buildings

B8.5.101 To the east of the Grade II listed Lugg Bridge is the Grade II listed Lugg Farmhouse – both of these are within the corridor and adjacent to link EL5. To the south-east the Grade II* listed New Court is within the corridor (close to links EL7 and EL8), as is the Grade II listed Lugwardine Bridge (close to links EL6, EL8 and EL11) which is probably of early 17th century date. Just to the north of this bridge is the Grade II listed Lower Lodge.

B8.5.102 To the west of the corridor (links EL9, EL10 and EL11) at the point where it crosses the B4224 (Hampton Park Road) is a Grade II listed house known as Whistle Field House. After crossing the River Wye a group of listed buildings is located within the corridor. These include Rotherwas Chapel (Grade II*) along with a former stable block (Grade II) and a barn (Grade II).

B8.5.103 The two Grade II* listed buildings are of **high value**, whereas the Grade II listed buildings are of **medium value**.

Conservation Areas

B8.5.104 The northern edge of the Aylestone Hill Conservation Area is just within this corridor, which also passes to the west of the Hampton Bishop Conservation Area. Both of these Conservation Areas are of **medium value**.

Unregistered Historic Park and Gardens

B8.5.105 The corridor (links EL6, EL7 and EL8) passes through the Unregistered Historic Park and Garden of New Court. The house may well have its origins in the 16th century but the park is first shown on an Ordnance Survey map of 1831 when it included all of the land south of the house as far as the River Lugg. The park was extended to the north in the 19th century.

B8.5.106 The corridor also passes just to the west of the Unregistered Historic Park and Garden of Lugwardine Court. The existing house here dates from c. 1810 but almost certainly replaced an earlier one. Early 19th century mapping shows some parkland and a walled garden. The grounds are now mostly filled with new houses and a school.

B8.5.107 Just to the south of the River Wye the corridor passes to the east of the Unregistered Historic Park and Garden at Rotherwas House. The original park associated with the house extended to the northern end of Dinedor Hill and elements of the park pale are still present in that area. When the new house was built in 1732 the park was abandoned and smaller pleasure gardens were established around the house. A new garden was created c. 1800 towards the River Wye featuring a sunken lawn and a walled garden, and it is this area that falls within the Undesignated Historic Park and Garden.

B8.5.108 All of the Unregistered Historic Parks and Gardens are of **low value**.

Non-Designated Cultural Heritage Features

B8.5.109 A ring ditch is clearly visible as a cropmark on aerial photographs of land just to the southwest of Lugg Bridge (MHE3807). It is likely to represent the remains of a Bronze Age barrow. An overall unknown value has been assigned to remains of the prehistoric period within this corridor.

B8.5.110 To the north of the A4103 at Lugg Bridge is an extensive area of land that has been subject to recent gravel extraction (MHE7792). Various programmes of archaeological work have been undertaken at this location in connection with the extraction. The work has recovered palaeo-environmental information and has also identified a probable medieval mill and a series of features associated with post-medieval water management. There is no further archaeological value in areas that have already been subject to extraction.

B8.5.111 A Saxon spearhead was found in 1973 during an inspection of the submerged riverbank adjacent to Lugg Bridge (MHE14860). A single sherd of medieval pottery was found during the fieldwalking undertaken in 1990 (MHE3317). An overall unknown value has been assigned to remains of the prehistoric period within this corridor.

B8.5.112 The corridor includes the southern edge of a large area of water meadow located to the north of the A4103 (MHE18935). This is on the floodplain of the river Lugg and is represented as an interlocking series of ditches. Traces of ridge and furrow earthworks are also visible and it is possible that these earthworks were subsequently remodelled to establish the water meadows.

B8.5.113 Ridge and furrow earthworks are also known at several other locations within or adjacent to this corridor (MHE3682; MHE7740; MHE7741; MHE7742; MHE2939). The water meadows and the ridge and furrow earthworks are of negligible value.

B8.5.114 At the northern end of this corridor is the route of a toll road leading from Hereford towards Bodenham Moor (MHE15356), possibly on the line of the current A465. Documentary and cartographic evidence suggests the presence of a toll house to the east of Lugg Bridge (MHE16000). The toll road and the site of the toll house are of negligible value.

B8.5.115 Examination of early mapping has located several sites or features including the former location of a building to the north of New Court (MHE6440), a pound (MHE13174), a boundary stone and possible relict stream channels (MHE7738) and a clay pit (MHE12907). All of these are of negligible value.

B8.5.116 Adjacent to Lugg Bridge is Lugg Mill (MHE5263) - a large complex here extended across the river until the 1930s, incorporating at least two wheels. Although there had been a mill at Lugg Bridge for several centuries, a large new mill was built in 1811. In 1925 the River Lugg Drainage Board bought the mill and then demolished the weir and some of the buildings. Those buildings that were retained gradually deteriorated until they were renovated into residences in the 1990s. It is likely that prior to the 18th century the mill was above the bridge. When the river is low, remains of the weir and lock walls are evident to the south from the bridge. The remains of the mill are of **negligible value**.

B8.5.117 The corridor (link EL6) passes through an area where assessment of aerial photographs has identified a rectilinear single ditched enclosure with a possible entrance and adjacent pits (MHE21877). This may be the same enclosure that was noted on a previous assessment of a road scheme in 1990 (MHE7744). Just to the south-east is another area where the aerial photographs show a complex of archaeological features (MHE2184) and is traversed by link EL6. These include a group of enclosures that are likely to be the remains of an Iron Age settlement along with a possible ring ditch, a possible hollow-way and some elements of ridge and furrow. Further to the east a possible trackway has been identified from an aerial photograph (MHE7743). An overall **unknown value** has been assigned to undated cropmarks within this corridor.

B8.5.118 To the south of the A438 road the corridor (links EL9, EL10 and EL11) passes through an extensive area within which there is considerable evidence for post-medieval water management in the form of water meadows and herringbone pattern drainage (MHE21885). These features are of **negligible value**.

B8.5.119 In the area of land between the River Wye and the B4224 road is a substantial linear earthwork flood defence that was constructed in the 1960s (MHE9104). This is of **negligible value**.

B8.5.120 At Rotherwas there are a number of other features of historic importance in addition to the scheduled monument, listed buildings and the Undesignated Historic Park and Garden described above. Earthworks to the west of the chapel here could be related to the documented medieval settlement of Rotherwas (MHE4336) and a fishpond is indicated on

the tithe map for the area (MHE1631; MHE4337). A gravel pit was noted on the 1st edition Ordnance Survey map (MHE12906), whilst a set of cropmarks probably relates to the Royal Ordnance Factory that was located here during the First World War (MHE4009). Taken together as a group these features have been assigned a **medium value**, although the chapel and the house are of **high value** through their level of designation.

Historic Landscape Character

B8.5.121 The northern part of this corridor is within a block of block of L1.1 – a landscape where the former common arable fields have subsequently been adapted but which is characterised by boundary reconfiguration with only minimal insertion of boundaries. See figure B8.2 in Appendix B-A

B8.5.122 It then passes briefly through a block of U1.1 – unenclosed meadows, before passing back into another block of L1.1. The unenclosed meadows are the Lugg Meadows; they are unique within the county and considered to be of **high value**.

B8.5.123 To the north of the River Wye the corridor passes through a block of G2.7 – this represents small compass enclosure involving multiple planned entities created through the reconfiguration and drainage of early meadow enclosures. To the south of the River Wye the corridor is within a block of Z1 – urbanisation.

B8.5.124 With the exception of the Lugg Meadows (**high value**), an overall **low value** has been assigned to the historic landscape along this corridor.

B8.6 STUDY OF OPTIONS DMRB ASSESSMENT

B8.6.1 The categories of **Slight Beneficial**, **Moderate Beneficial** and **Large Beneficial** are not relevant to the assessments in this case. It is likely that a relief road of the type proposed here has the potential to bring about improvements (i.e. benefits) to the general historic environment within the city of Hereford as a result of an overall reduction in the amount of traffic using the current road network (particularly heavy goods vehicles). However these benefits cannot be fully quantified or assessed until more detailed traffic figures are available, though the benefits are likely to be slight to negligible as the majority of the historic environment in Hereford city centre is not on the major road network.

B8.6.2 The following text summarises the impact assessments for each of the corridor options. The information is presented in more detail in the WebTAG worksheets (Appendix 2).

Southern Core Corridor

B8.6.3 The WebTAG assessment for this corridor has identified a potential for **uncertain** effects on buried archaeological remains, a **minor adverse** effect on a Grade II* listed building, **minor adverse** effects on six Grade II listed buildings or groups of buildings, a **minor adverse**

effect on an Unregistered Historic Park and Garden and **minor adverse** effects on the overall historic landscape.

B8.6.4 Overall this is assessed as a **minor adverse** effect.

Western Inner Corridor

B8.6.5 The WebTAG assessment for this corridor has identified a potential for **uncertain** effects on buried archaeological remains, a **minor adverse** effect on a Scheduled Monument, **minor adverse** effects on two Grade II* listed buildings, **minor adverse** effects on eighteen Grade II listed buildings, a **minor adverse** effect on the Huntingdon Conservation Area, a **moderate adverse** effect on an Unregistered Historic Park and Garden, a **minor adverse** effect on another Unregistered Historic Park and Garden and a **moderate adverse** effect on a block of historic landscape.

B8.6.6 Overall this is assessed as a **moderate adverse** effect.

Western Outer Corridor

B8.6.7 The WebTAG assessment for this corridor has identified a potential for **uncertain** effects on buried archaeological remains, **minor adverse** effects on two Scheduled Monuments, **minor adverse** effects on one Grade I listed building and one Grade II* listed building, **minor adverse** effects on eleven Grade II listed buildings, a **moderate adverse** effect on an Unregistered Historic Park and Garden, **minor adverse** effects on two other Unregistered Historic Parks and Gardens and a **moderate adverse** effect on a block of historic landscape.

B8.6.8 Overall this is assessed as a **moderate adverse** effect.

Northern Core Corridor

B8.6.9 The WebTAG assessment for this corridor has identified a potential for **uncertain** effects on buried archaeological remains, a **minor adverse** effect on a Grade II listed building, a **minor adverse** effect on an Unregistered Historic Park and Garden and **minor adverse** effects on the overall historic landscape.

B8.6.10 Overall this is assessed as a **minor adverse** effect.

Eastern Inner Corridor

B8.6.11 The WebTAG assessment for this corridor has identified a potential for **uncertain** effects on buried archaeological remains, **minor adverse** effects on two Scheduled Monuments, a **minor adverse** effect on one Grade II* listed building, **minor adverse** effects on four Grade II listed buildings, **minor adverse** effects on two Conservation Areas, a **moderate adverse** effect on an Unregistered Historic Park and Garden, a **minor adverse** effect on another Unregistered Historic Park and Garden and a **moderate adverse** effect on a block of historic landscape.

B8.6.12 Overall this is assessed as a **moderate adverse** effect.

Eastern Outer Corridor

B8.6.13 The WebTAG assessment for this corridor has identified a potential for **uncertain** effects on buried archaeological remains, **minor adverse** effects on three Scheduled Monuments, **minor adverse** effects on two Grade II* listed buildings, **minor adverse** effects on five Grade II listed buildings, **minor adverse** effects on two Conservation Areas, **minor adverse** effects on three Unregistered Historic Park and Garden and a **moderate adverse** effect on a block of historic landscape.

B8.6.14 Overall this is assessed as a **moderate adverse** effect.

B8.7 FURTHER WORK REQUIRED FOR STAGE 2 ASSESSMENT

B8.7.1 The Study of Options assessment will need the walkover assessment to update the assessment to Stage 2 and further work may occur as a result of the walkover. The traffic type impacts will also need to be assessed once the traffic data is available. This will include consideration of the noise and pollution impacts of the scheme on the historic environment.

B9 The Biodiversity Sub-Objective

B9.1 INTRODUCTION

- B9.1.1 This assessment has been produced to identify and evaluate the ecological constraints present along a series of possible alignments for the proposed Hereford Relief Road. A series of 200m wide route corridor links, with indicative centre-line alignments within them, have been developed. These are also shown on Figures B9.1 through 14 in Appendix B-A. Options that have been considered for this interim Stage 2 Assessment include routes both east and west of Hereford.
- B9.1.2 The links currently being considered have been modified from an initial set of options that were considered during the Stage 1 Assessment (see Hereford Relief Road: Stage 1 Report, Amey 2010). The route corridor options under consideration for the Stage 1 Assessment were necessarily highly indicative, and have been modified considerably following the Stage 1 work, in order to produce a series of more achievable route corridor options.
- B9.1.3 The Stage 1 assessment also allowed the location and extent of the majority of key ecological constraints for corridor selection (i.e. designated sites and important habitats) to be identified. It was then possible for the Study of Options route corridor options to be developed taking into account the location of these key ecological and other environmental constraints. Whilst it was not possible for the Study of Options links to completely avoid all of the ecological constraints within the Study Area, early identification of constraints has allowed impacts to be avoided or minimised wherever possible. Consideration has also been given in this Study of Options EAR to the presence or potential presence of protected species and species of conservation concern, where data was available.
- B9.1.4 This assessment has been produced in accordance with the guidance presented in TAG Unit 3.3.10, 'The Biodiversity Sub-Objective', and taking into account the guidance presented in DMRB Volume 11, Section 3, Part 4.

B9.2 LEGISLATIVE BACKGROUND

B9.2.1 European Legislation

- B9.2.2 The Habitats Directive (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora exists to promote the maintenance of biodiversity in Europe. The Directive provides for the creation of a network of protected areas across the continent, and the annexes to the document list habitats and species of importance in a Europe-wide context.
- B9.2.3 The Conservation of Habitats and Species Regulations 2010 constitute the UK government's implementation of the Habitats Directive in England and Wales. The Regulations provide for

the designation of both Special Protection Areas (SPAs) (first established under the Birds Directive, 1979) and Special Areas for Conservation (SACs) as part of the Natura 2000 network of protected areas across the European Union.

B9.2.4 For European Protected Species (EPS) the 2010 Conservation of Habitats and Species Regulations gives protection from the deliberate capture, killing or disturbance (such that the disturbance affects the ability of the EPS to survive, breed or reproduce, to rear or nurture their young, or to hibernate or migrate; or the disturbance affects significantly the local distribution or abundance of the EPS). It is also an absolute offence to destroy or damage the resting site or breeding site of an EPS.

B9.2.5 *National Legislation*

B9.2.6 The Wildlife and Countryside Act (1981); and subsequent amendments, as amended and strengthened by the Countryside and Rights of Way Act (2000), is the principle mechanism for the legislative protection of wildlife in Great Britain. The Act established a statutory framework for the protection of wildlife. The Act provides for the designation of Sites of Special Scientific Interest (SSSI), which are selected as the best national examples of habitat types, sites with notable species and sites of geological importance.

B9.2.7 Schedules 1-4 of the Wildlife and Countryside Act (and amendments) deal with the protection of wild birds. Schedule 5 of the Act details protection of other animal species. Full protection is given under Section 9 of the Act to certain animals listed on Schedule 5, including great crested newts, water voles and all species of bats. Partial protection under Section 9 is given to certain other species, including all common species of reptile, including common lizard. Badgers are listed on Schedule 6 of the Act which outlaws certain methods of taking or killing animals, where necessary. Schedule 8 of the Wildlife and Countryside Act details protection for plants and fungi.

B9.2.8 The Countryside Rights of Way Act (2000) gives greater protection to SSSIs and strengthens wildlife enforcement legislation by the introduction of the offence of 'reckless disturbance'. The Act also required Government Departments to have regard to biodiversity and conservation; Section 74 of the Act required lists of habitats and species of principal importance to be produced, for which conservation steps should be taken or promoted. The requirement to prepare such lists of habitats and species has recently been extended by the Natural Environment and Rural Communities (NERC) Act 2006 (see below).

B9.2.9 The Natural Environment and Rural Communities Act (2006) places a duty upon public bodies to consider enhancement of biodiversity within all of their actions. In addition, this Act provides for those species identified within the UK Biodiversity Action Plan (UKBAP) and the relevant Local Biodiversity Action Plans (LBAPs) to be considered as biodiversity conservation priorities (see below).

B9.2.10 *National Planning Policy*

B9.2.11 The statutory planning process requires that full account is taken of biodiversity, in accordance with international and national law. These requirements are set out in PPS9: Biological and Geological Conservation, which is summarised below.

B9.2.12 PPS9 states that Local Authorities should maintain up to date information on the environmental characteristics of their area, including identifying areas of ancient woodland and other important habitats that are not already designated.

B9.2.13 Plans and policies should aim to maintain, enhance, restore or add to biodiversity interests. They should also promote opportunities for the incorporation of beneficial biodiversity in and around new developments.

B9.2.14 Under PPS9 Planning decisions should aim to prevent harm to biodiversity. Where significant harm cannot be prevented, adequately mitigated against or compensated for, then planning permission should be refused.

B9.2.15 Statutory Development Plans and Local Plans have a vital role to play in the protection and safeguard of important habitats and species.

United Kingdom Biodiversity Action Plan (UKBAP)

B9.2.16 The UKBAP is the UK Government's response to the Convention on Biological Diversity (CBD) signed in 1992. It describes the UK's biological resources and sets out a detailed plan for the protection of these resources (JNCC, 2007). Habitat types and species are listed within the UKBAP with specific targets for their conservation. The UKBAP now includes 1149 priority species and 65 priority habitats. Species Action Plans (SAPs) and Habitat Action Plans (HAPs) have been produced for a number of these species.

B9.2.17 *Regional Planning Policy*

Biodiversity Action Plans (BAPs)

B9.2.18 Biodiversity Action Plans (BAPs) are strategies to conserve, protect and enhance habitats and species. The UKBAP sets out a national strategy for the conservation of biodiversity in Britain. Regional BAPs and Local BAPs (LBAPs) have also been produced to address biodiversity issues specific to particular areas in the UK.

Herefordshire Biodiversity Action Plan

B9.2.19 Herefordshire Biodiversity Action Plan describes habitats and species considered to be of particular importance for the County, and sets out existing information and targets for

conservation action for these in SAPs and HAPs. The Herefordshire BAP includes Action Plans for 14 species and 16 broad habitat types.

Herefordshire Unitary Development Plan

B9.2.20 A number of policies relating to biodiversity are relevant to the proposed HRR.

B9.2.21 Guiding principle P7 of the UDP recognises the need to protect and restore environmental assets and the need to protect resources including biodiversity by ensuring that activities such as development are carefully carried out. It seeks to:

- "ensure no net loss of either the quality or quantity of biodiversity in the County"; and
- "encourage the provision of features of value to wildlife in all development schemes".

B9.2.22 Policy NC1, 'Biodiversity and Development', states that "In determining all development proposals, the effects upon biodiversity and features of geological interest will be taken fully into consideration..."

B9.2.23 Policy NC2, 'Sites of International Importance', states that "Development which may affect a European Site, a proposed or candidate European Site or a Ramsar site will be subject to the most rigorous examination..."

B9.2.24 Policy NC3, 'Sites of National importance', states that "Development in or likely to affect Sites of Special Scientific Interest or National Nature Reserves will be subject to special scrutiny..."

B9.2.25 Policy NC4 'Sites of Local Importance', states that "Development proposals which could directly or indirectly affect a Special Wildlife Site, Site of Importance to Nature Conservation, Local Nature Reserve, a Regionally Important Geological/ Geomorphological Site or a site subject to an agreement under section 39 of the Wildlife and Countryside Act will not be permitted unless it can be demonstrated that there would be no harm to the substantive nature conservation value of the site".

B9.2.26 Policy NC5, 'European and Nationally Protected Species', states that "Development proposals which would have an adverse impact on badgers or species protected by Schedules 1, 5 or 8 of the Wildlife and Countryside Act as amended, will not be permitted. Where an over-riding need for the development is demonstrated, conditions on the planning permission will be imposed or a planning obligation entered into to:

- Facilitate the survival of individual members of the species;
- Reduce disturbance to a minimum; and

-
- Provide adequate alternative habitats to sustain at least the current levels of population of the species.”

B9.2.27 Policy NC6, ‘Biodiversity Action Plan priority habitats and species’, states that “Developments should have regard to those habitats and species listed in the UK and Herefordshire Biodiversity Action Plans in order to protect, manage and enhance priority species and habitats. Proposals that might result in a threat to such priority species or habitats will not be permitted unless the reasons for the development clearly outweigh the need to safeguard the habitat or species”.

B9.2.28 Policy NC7, ‘Compensation for loss of biodiversity’, states that “Where development is permitted, the use of conditions and/or planning obligations will be considered in order to provide appropriate mitigation and compensatory measures to avoid, minimise or offset the loss of or damage to any biodiversity feature covered by policies NC2 to NC6. Such measures will be at least proportionate to the scale of the loss or impact.”

B9.2.29 Policy NC8, ‘Habitat creation, restoration and enhancement’, states that “The design of new development and the restoration and reclamation of derelict and degraded sites and landscapes, should wherever possible, enhance existing wildlife habitats and provide new habitats for wildlife as opportunities arise”.

Herefordshire Green Infrastructure Strategy (2010)

B9.2.30 The Herefordshire GI Strategy seeks to identify GI assets within Herefordshire, and to identify targets for the sustainable management and use of GI within the county. It identifies key areas for enhancement of GI within Herefordshire, including a number of defined zones around Hereford.

Building Biodiversity into the Local Development Framework

B9.2.31 In 2009 Herefordshire council produced ‘Building Biodiversity into the Local Development Framework’ (2010). This document sets out the ecology and nature conservation assets within Herefordshire and a number of associated targets for the retention and enhancement of biodiversity during the development process. This includes mapping of nature conservation resources around Hereford, with the intention that this information is used to inform future development proposals around the city, particularly any proposals set out in the LDF (currently under development).

B9.3 DESK STUDY

B9.3.1 In order to identify the ecological constraints along each of the proposed route corridors, a search for designated sites was undertaken. Data was obtained from the Multi-Agency Geographic Information for the Countryside (MAGIC) website and from the Herefordshire

Biological Records Centre. Data was collected for the entire Study Area, which included the city of Hereford and up to 30km from each route corridor. Data were collected for Natura 2000 sites (Special Protection Areas, Special Areas of Conservation and Sites of Community Importance) for up to 30km from each proposed route corridor; for nationally designated sites (including National Nature Reserves, and Sites of Special Scientific Interest) for up to 5km from each proposed route corridor; and for statutorily designated local sites (Local Nature Reserves) for up to 2km from each proposed route corridor.

B9.3.2 Data on non-statutory designated local sites were also collected for up to 2km from each proposed route corridor. These include Herefordshire Nature Trust Reserves and sites identified by the Local Authority as being of particular importance for nature conservation at a local/county level. In Herefordshire these comprise Special Wildlife Sites in rural areas of the county, with Sites of Importance for Nature Conservation in and around Hereford City. A data request was sent to Herefordshire Nature Trust regarding the reasons for the designation of the Herefordshire Nature Trust Reserves located within 1km of each proposed route corridor and for any other relevant ecological information they may hold from within the Study Area.

B9.3.3 A review of the UK and Herefordshire Biodiversity Action Plan was also undertaken, in order to identify habitats of importance to nature conservation for up to 1km from each proposed route corridor. Natural England habitat inventories, including the ancient woodland inventory, were obtained from the MAGIC website for up to 1km from each proposed route corridor.

B9.3.4 *Protected species and species of conservation concern*

B9.3.5 Records of protected species and species of conservation concern were collected from Herefordshire Biological Records Centre and the National Biodiversity Network (NBN website) for up to 5km from each proposed route corridor. A review of the UK and Herefordshire Biodiversity Action Plan was also undertaken, in order to identify species of importance to nature conservation for up to 1km from each proposed route corridor.

B9.3.6 Herefordshire Council's Green Infrastructure Report (February 2010) and Building Biodiversity into Herefordshire's Local Development Framework report (December 2009) were consulted when undertaking the Study of Options Assessment.

B9.3.7 *Field surveys*

B9.3.8 Surveys of each of the route corridor options were undertaken between the 1st to 3rd and 24th to 25th of June, in order to gather additional ecological information for the study area.

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- B9.3.9 Access to privately-owned land was not available at the time the surveys were undertaken. Instead, surveys were undertaken from public rights of way and existing roads, in order to gather as much ecological information as possible. Whilst it was possible to undertake surveys from vantage points across many of the route links in this way, it was rarely possible to inspect the entirety of each link.
- B9.3.10 Where access was available, the broad habitats present within each 200m corridor were mapped, following Phase 1 Habitat Survey mapping codes and conventions (JNCC, 1993) wherever possible. Additional information on habitats considered to be of particular importance to nature conservation was recorded as Target Notes, where applicable. Although plant species indicative of the habitats present were recorded for sites or features considered to be of importance for nature conservation, exhaustive species lists were not compiled.
- B9.3.11 In parallel with recording information relating to the habitats present within each link, an assessment of the potential for protected species and species of conservation concern to be present was undertaken. This was particularly focussed on those species where key habitats within the wider countryside could be of particular importance – for example ponds potentially suitable for great crested newts; woodlands that were suitable for use by dormice; and features that could be suitable for use by roosting, commuting and foraging bats. Desk study information on the importance and distribution of protected species obtained from the Herefordshire Biological Records Centre, and the 'Building Biodiversity into the Local Development Framework' document (Herefordshire Council, December 2009), was also taken into consideration during the field-based assessment.
- B9.3.12 A large amount of data was collected during the field surveys, which was still being analysed at the time of this report production, and will be reported on fully in the final Stage 2 Assessment. Key findings likely to be of significance for corridor selection have been reported in this Study of Options assessment, where applicable.

B9.4 CONSULTATION

- B9.4.1 Initial consultation has been undertaken with Bridgit Symons, Herefordshire Council's Planning Ecologist, Hayley Pankhurst, Natural England's Environmental Planning Officer for Herefordshire and Worcestershire, and Gill Walters, Biodiversity Officer with the Environment Agency. Although detailed responses to consultation letters have not yet been received, initial meetings have been held with Natural England and Herefordshire Council in relation to the potential ecological impacts of the Scheme, and an initial consultation response has been received from the EA.
- B9.4.2 The results of desk study and field-based surveys have been discussed in detail with Natural England and Herefordshire council, as have the reasons for the preferred route corridors set

out in this report. The consultees are in broad agreement with the corridors identified as preferred in the ecological assessment so far. Consultation with the statutory consultees will be continued for the full Stage 2 assessment. It is also recommended that consultation with the non-statutory consultees be undertaken in advance of production of the completed Stage 2 assessment. In summary, the Statutory Consultees are broadly in agreement that the western route corridors under consideration would be preferable to the eastern options due to reduced impacts on the River Lugg SAC/SSSI and the Lugg Meadows SSSI/SWS/HNTR and associated areas of lowland floodplain meadow.

B9.5 **BASELINE CONDITIONS**

B9.5.1 *Designated Sites*

Natura 2000 Sites

B9.5.2 The River Wye SAC is the only European protected site that would be affected by the scheme. All of the proposed route corridor options would require a new bridge crossing the River Wye SAC, which is also designated as a SSSI. The site is important for the riverine habitats and species it supports. Annex 1 Habitats included as primary reasons for selection of the SAC include Watercourses of plain to montane levels with Ranunculus fluitans and Callitriche-Batrachion vegetation. A number of Annex 2 species are also listed as primary reasons for site selection, these include: white-clawed crayfish, sea lamprey, brook lamprey, river lamprey, Twaite shad, Allis shad, Atlantic salmon, Bullhead, and Otter. The SAC and SSSI citations for the site are provided in Appendix B-B to this report; these describe the qualifying interests for which the site has been designated in more detail.

B9.5.3 The River Lugg is a tributary of the River Wye, and also forms part of the designated SAC. The Lugg is situated in the east of the Study Area, and flows in a southerly direction, joining the Wye south-east of Hereford. The Lugg is also separately designated as a SSSI. See figures B9.1 to B9.14 in Appendix B-A

B9.5.4 *Sites of Special Scientific Interest*

B9.5.5 Both the Rivers Wye and Lugg are designated individually as SSSIs in addition to their SAC designation. Within the Study Area the areas covered by the SAC/SSSI designations largely overlap; thus, the features for which the SSSI have been designated are similar to the qualifying interests of the SAC. As such, anticipated impacts on the SSSI sites are the same as those for the SAC. The River Lugg forms the eastern boundary of the Lugg Meadows SSSI, Special Wildlife Site, and Herefordshire Nature Trust Reserve (HNTR).

B9.5.6 The Lugg Meadows SSSI forms part of a larger area of lowland hay meadow adjacent to the River Lugg, east of Hereford. Lowland hay meadow is now a particularly rare habitat type

(Lowland Meadow is a Priority Habitat in the UKBAP), and the Lugg Meadows are one of the most significant areas of this habitat in the West Midlands region. Although only part of the wider Lugg Meadows site has been designated a SSSI, much of the remainder of the site has been designated as a Special Wildlife Site by Herefordshire Council, and the habitats are contiguous. The site is also a Herefordshire Nature Trust Reserve, and is managed by the organisation. The habitats immediately south of the A438, south of the site also appeared to comprise lowland hay meadow, but could not be closely inspected during the surveys due to a lack of access and a lack of safe stopping points on the A438. See figure B9.10 in Appendix B-A

B9.5.7 *Local Nature Reserves*

B9.5.8 Three Local Nature Reserves are situated within 1km of the route corridor options currently under consideration. Belmont Meadows Local Nature Reserve (LNR) lies on the southern margins of Hereford south of Blackmarstone. Tupsley Common LNR is located within the city of Hereford, and is considered highly unlikely to be affected by any of the proposed route corridor options. Broadlands Wood LNR is located west of the Lugg Meadows SWS/HNTR, and is also a HNTR.

B9.5.9 Local Nature Reserves are statutorily designated under Section 21 of the National Parks and Access to the Countryside Act 1949 by principal local authorities, although the power to designate a LNR can also be delegated to town or parish councils. See figures B9.3, B9.10, and B9.12 in Appendix B-A

B9.5.10 *Special Wildlife Sites/Sites of Importance for Nature Conservation/Herefordshire Nature Trust Reserves*

B9.5.11 A number of locally designated sites are present within the Study Area. More detailed information on each of the sites potentially affected is provided in the description of each link under consideration. All of the route corridors currently under consideration could result in impacts on a number of SWS/SINC sites. Based on the information gathered so far it is considered likely that the most significant of these will be the Lugg Meadows, part of which is also designated as a SSSI, as described above. In a meeting with Hayley Pankhurst, Natural England's Environmental Planner for Herefordshire, it was indicated that Natural England considered the integrity of the entire Lugg Meadows site to be of importance for the ecological functioning of the SSSI. In light of the consultation response from Natural England, and the importance of the lowland meadow habitats present (also a UK Biodiversity Action Plan Priority Habitat), the wider Lugg Meadows are therefore considered to be of National importance for nature conservation. See figure B9.10 in Appendix B-A

B9.5.12 Other non-statutorily designated sites within the Study Area are considered to be of up to County Importance for nature conservation.

B9.5.13 *Non-designated sites & semi-natural habitats*

B9.5.14 Herefordshire Council's report, 'Building Biodiversity into the Local Development Framework' (2009) describes a number of semi-natural habitats, many of which are UK or Herefordshire BAP priority habitats, as being important features of the biodiversity resource around Hereford. A number of these have been recorded within the Study Area, although comprehensive data on their distribution within the Study Area has not yet been gathered; this information will be obtained when full access for surveys is available in advance of the full Stage 2 assessment.

B9.5.15 A number of areas of semi-natural ancient woodland (some replanted) are present within the Study Area. Ancient woodland is a UKBAP Priority habitat, and the Herefordshire Biodiversity Action Plan includes a target to restore 22% of plantation forestry on ancient woodland sites by 2015.

B9.5.16 Much of the land through which the route corridor options pass is agricultural, comprising either arable or pasture farmland. An extensive hedgerow network is present across much of this land, which would be severed by the Scheme for any of the route options. This would fragment habitats either side of the road, which could have implications for the movement of wildlife through the wider landscape within the Study Area (see also protected species below). A moderate adverse impact is predicted for each of the route corridor options, in the absence of detailed survey information allowing differences between the routes to be identified.

B9.5.17 A number of other habitats of importance for nature conservation are present throughout the Study Area, including habitats listed on the UK and/or Herefordshire Biodiversity Action Plans or in the Building Biodiversity into the LDF document, for example ponds and other standing waterbodies, smaller rivers and streams, other areas of woodland, semi-improved grassland and orchards. These will be investigated and reported upon further, with more detailed information gathered on their distribution, as part of the full Stage 2 assessment.

B9.5.18 *Protected species*

B9.5.19 A number of protected species and species of conservation concern will be present within the Study Area. Detailed information on the distribution of protected species and species of conservation concern has been obtained from Herefordshire Biological Records Centre, although it is recognised that this information does not represent a complete picture of the distribution of these species throughout the Study Area. The species/groups that have been identified as likely to be most significant through the later stages of the route corridor selection process include great crested newts, dormice and bats. These European Protected species are likely to make use of habitats within the Study Area, and also require habitats with good connectivity in order to thrive. As such, severance of the hedgerow

network and other habitats by the Scheme could be particularly significant for these species, where present.

B9.5.20 Particular consideration has also been given to legally protected species and species of conservation concern identified within the Herefordshire BAP and/or the 'Building Biodiversity into the Local Development Framework' (2009) report.

B9.5.21 The locations of protected species in relation to the route corridor options currently under consideration are shown on Figures B9.2-14. Protected species badger sett locations have been researched but are omitted from the drawings due to the sensitivity of this information.

B9.5.22 It will be necessary for any final Scheme to avoid having an adverse effect on the favourable conservation status of any European Protected Species present within the study area. In addition to dormice, bats and great crested newts, this will also include those European Protected Species associated with the River Wye SAC, and all practicable steps to avoid adverse impacts should be incorporated into the Scheme design as new information on the distribution of these (including areas away from the SAC) becomes available. Whilst it is not practical to undertake detailed surveys for these (and other protected species) during the Stage 2 assessments, they will require further consideration.

B9.5.23 More detailed consideration of potential impacts on significant species will be undertaken when the full Stage 2 Assessment is completed.

B9.6 POTENTIAL IMPACTS

B9.6.1 An overview of potential impacts of each link on nature conservation and ecology impacts are described below. Each link is discussed in reference to its 200m wide corridor.

B9.6.2 Southern Core Corridors

B9.6.3 Southern Core Link SC1 and Southern Core Link SC2 follow the same alignment until ch 1900. Up until this point both routes have the potential to directly impact an area of parkland habitat with mature deciduous trees, although this could be avoided by positioning the alignment of the road at the northern extent of the corridor. There are records of dormice to the north-east of SC1 and SC2, around the alignment of the Abergavenny to Hereford railway line. It should be noted that the species is likely to be under-recorded around Hereford, and may well be present within the route corridors; See figures B9.2 and B9.3 in Appendix B-A. See also Engineering Assessment Drawing Numbers A3.01 and A3.02, in Appendix A-A

B9.6.4 After ch 1900 SC1 passes through Hayleaseow Wood, Newton Coppice and Spring Grove SWS and Ancient Woodland. This woodland also contains a number of pools suitable for use by great crested newts, and contained habitats suitable for roosting and foraging bats

and for dormice. The Newton Brook within the woodland has records of white-clawed crayfish associated with it.

B9.6.5 After ch 1900 SC2 runs west of Hayleaseow Wood, Newton Coppice and Spring Grove SWS, although the site is within the 100m buffer around the Link. If link SC2 is used it would be appropriate to locate the alignment of the road south east of the SWS, preferably at least 50m away.

B9.6.6 *Western Inner Corridors*

B9.6.7 Western Link WL1 and Western Link WL2 follow the same alignment up to ch 2000. Up until this point both routes cross the River Wye SAC and SSSI between ch 1020 and ch 1240. The River Wye is considered to be of International Importance for Nature Conservation due to its designation as a SAC. A proposed viaduct will span the river and the 220m extent of the floodplain for both links. The Scheme has the potential to impact on the species and habitats associated with the River Wye designation, and with the habitats and species on either bank of the river. However, in common with the other western options, a crossing some height above the river is likely to be required, due to existing ground levels either side of the river. This contrasts with the eastern options where the ground either side of the river is largely at grade.

B9.6.8 Given this, it is considered that western options for crossing the Wye will result in reduced ecological impacts relative to options east of Hereford; See figures B9.3 to B9.7 in Appendix B-A. See Engineering Assessment Drawing Numbers A3.03 to A3.10, A3.13, A3.15 and A3.16, in Appendix A-A

B9.6.9 WL1 and WL2 would both also result in direct impacts upon the Belmont Wood and Hunterdon Rough SWS, although direct impacts on Breinton Wood SWS, located north of the River Wye and likely to be directly affected by links WL3 to WL6, would be avoided.

B9.6.10 WL2 could potentially result in direct impacts on Kings Acre SWS and HNTR, although it may be possible to avoid these if the alignment of the road within the corridor can be aligned at the northern extent of the 200m corridor.

B9.6.11 Semi-improved grassland and parkland habitats at Belmont Park Golf Course may also be affected by these links.

B9.6.12 Desk study data indicates a bat roost is present within the 200m corridor for WL1 and WL2, north of the River Wye. A further bat roost is present within the 200m corridor of WL2 at Upper Breinton. These should be investigated further at Stage 2 and 3, and avoided by any final alignment if at all possible.

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- B9.6.13 WL3 and WL5 follow the same alignment up to ch 2000. Both routes cross the River Wye SAC and SSSI and associated flood plain between ch 950 and ch 1270. The River Wye is considered to be of International Importance for Nature Conservation due to its designation as a SAC. A proposed viaduct will span the river and the 220m extent of the floodplain for both links. The Scheme has the potential to impact on the species and habitats associated with the River Wye designation, and with the habitats and species on either bank of the river. However, in common with the other western options, a crossing some height above the river, probably a viaduct structure, is likely to be required due to existing ground levels either side of the river. This contrasts with the eastern options where the ground either side of the river is largely at grade.
- B9.6.14 Given this, it is considered that western options for crossing the Wye will result in reduced ecological impacts relative to options east of Hereford.
- B9.6.15 Links WL3 and WL5 would likely use Link SC1 which would impact directly on Hayleaseow Wood, Newton Coppice and Spring Grove SWS and Ancient Woodland, as described in B.9.6.1 Southern Core Corridors; SC2 is therefore preferred from an ecological perspective.
- B9.6.16 WL3 and WL5 would both also result in direct impacts upon the Belmont Wood and Hinderton Rough SWS. Direct impacts on Breinton Wood SWS north of the Wye are also likely, although it may be possible to minimise direct impacts by aligning the road at the eastern extent of the corridor.
- B9.6.17 WL5 could potentially result in direct impacts on Kings Acre SWS and HNTR, although it may be possible to avoid these if the alignment of the road within the corridor can be aligned at the northern extent of the 200m corridor.
- B9.6.18 Semi-improved grassland and parkland habitats at Belmont Park Golf Course may also be affected by these links.
- B9.6.19 There is a record for great crested newts at Lower Breinton, within approximately 250m of the centreline of both WL3 and WL5. If these alignments are used, maintaining the centreline of the road in its present position, or relocating it further east, should ensure any impacts are minimal.
- B9.6.20 WL4 and WL6 follow the same alignment up to ch 2500. Up until this point both routes cross the River Wye SAC and SSSI and associated flood plain between ch 1500 and ch 1800. The River Wye is considered to be of International Importance for Nature Conservation due to its designation as a SAC. A proposed viaduct will span the river and the 220m extent of the floodplain for both links. The Scheme has the potential to impact on the species and habitats associated with the River Wye designation, and with the habitats and species on either bank of the river. However, in common with the other western options, a crossing some height above the river, probably a viaduct structure, is likely to be required due to
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existing ground levels either side of the river. This contrasts with the eastern options where the ground either side of the river is largely at grade.

B9.6.21 Given this, it is considered that western options for crossing the Wye will result in reduced ecological impacts relative to options east of Hereford.

B9.6.22 WL4 and WL6 would both also result in direct impacts upon the Belmont Wood and Hinderton Rough SWS. Direct impacts on Breinton Wood SWS north of the Wye are also likely, although it may be possible to minimise direct impacts by aligning the road at the eastern extent of the corridor.

B9.6.23 WL6 could potentially result in direct impacts on Kings Acre SWS and HNTR, although it may be possible to avoid these if the alignment of the road within the corridor can be aligned at the northern extent of the 200m corridor.

B9.6.24 Semi-improved grassland and parkland habitats at Belmont Park Golf Course may also be affected by these links.

B9.6.25 WL7 crosses the Yazor Brook at ch 1000, with the remainder of the habitats present across this link comprising predominantly arable fields. Yazor Brook is designated as a SWS/SINC, with the Pond at Huntington Court SINC approximately 400m downstream.

B9.6.26 *Western Outer Corridors*

B9.6.27 WL8 crosses the Railway Line near Green Farm SINC east of the Wyevale Nurseries, resulting in direct impacts and potential severance of the site. See figures B9.3 to B9.7 in Appendix B-A. See also Engineering Assessment Drawing Numbers A3.10 to A3.14, in Appendix A-A.

B9.6.28 Ecological works undertaken as part of the Hereford Livestock Market development (currently under construction), has revealed that great crested newts are present in a number of waterbodies to the west of WL8. Given the constraints on the alignment of this link (the livestock Market will be located in the field to the east, meaning there will be limited options to relocate the road in this direction), significant impacts upon the local great crested newt population could occur. These would require further investigations during Stage 2 and 3. Any significant adverse impacts would require mitigation and/or compensation measures.

B9.6.29 WL9 and WL10 follow the same alignment up to ch 2750, passing through predominantly arable fields. Up until this point, both routes cross the River Wye SAC and SSSI ch 2245 and ch 2495, crossing the Wye between ch 2440 and ch 2479. The River Wye is considered to be of international importance for nature conservation due to its designation as a SAC. A proposed bridge will span the river and the 220m extent of the floodplain for both links. The Scheme has the potential to impact on the species and habitats associated with the River

Wye designation, and with the habitats and species on either bank of the river. However, in common with the other western options, a crossing some height above the river is likely to be required, due to existing ground levels either side of the river. This contrasts with the eastern options where the ground either side of the river is largely at grade.

B9.6.30 Both options avoid Belmont Wood and Hunterdon Rough SWS and Breinton Wood SWS, which are affected by the majority of the Inner Western corridors. Impacts on Hayleaseow Wood, Newton Coppice and Spring Grove SWS and Ancient Woodland are also likely to be minimised, as WL8 and WL9 tie-in to SC2 rather than SC1.

B9.6.31 Both options do however directly impact on an area of semi-natural broadleaved woodland north of the River Wye. Although not formally designated, the habitats are considered to be of intrinsic importance for nature conservation, and of value for protected species, including bats and potentially dormice. The site is also continuous with the River Wye SAC, and may be of importance for some of the species associated with the SAC, particularly otters.

B9.6.32 North of the River Wye both options pass through habitats dominated by arable farmland and improved grassland, with the exception of an area of commercial orchard at Breinton.

B9.6.33 WL11 does not pass within 200m of any designated sites. If this link was used it would involve an on-line widening of an existing road, encroaching into plantation woodland, amenity grassland and arable farmland.

B9.6.34 WL12 passes through predominantly arable farmland, and does not pass within 200m of any designated sites.

B9.6.35 *A4103 Roman Road*

B9.6.36 Western Link L13 is an existing road, A4103 Roman Road, to be realigned and widened under these proposals. WL13 passes through predominantly arable farmland and improved grassland habitats either side of the existing A4103. No significant ecological impacts are anticipated with this Link. See Engineering Assessment Drawing Numbers A3.15 and A3.16, in Appendix A-A

B9.6.37 WL14 is the eastern section of the existing A4103 Roman Road proposed for realignment and widening. Yazor Brook is culverted under the existing road at ch300, and it is proposed to extend this culvert. Yazor Brook is designated as a SINC downstream of the A4103, and comprises a semi-natural watercourse running through a tree-lined corridor, with many mature Crack Willows present. A number of the trees along the watercourse are suitable for use by roosting bats. The corridor of the Brook is likely to be of value to commuting and foraging bats, and for the movement of otters. Habitat suitable for use by white-clawed crayfish was present in the watercourse. If this option is used, consideration should be given

to using a wide-span crossing, in order to maintain or enhance the habitat corridor provided by the brook.

B9.6.38 There are desk study records for water vole at the waterbody north of the A4103 at Lower Burton Farm.

B9.6.39 *Northern Core Corridors*

B9.6.40 NC1 and NC2 follow very similar alignments, and ecological impacts are anticipated to be similar for each route. A desk study record for great crested newts exists approximately 200m north of the current centreline of both routes. The Local Authority Ecologist (B. Symons, pers. Comm.) stated that the population here had been recently surveyed by Herefordshire Amphibian and Reptile Team, and that the surveys indicated the population was the second largest known in Herefordshire. This population is therefore likely to be of at least County Importance for nature conservation. It would be appropriate for the alignment of NC1/NC2 to be moved as far south as possible, in order to minimise impacts upon the great crested newt population; See figures B9.8 and B9.9 in Appendix B-A. See also Engineering Assessment Drawing Numbers A3.17 to A3.20, in Appendix A-A

B9.6.41 NC3 passes through predominantly species-poor semi-improved and improved grassland and areas of arable farmland. Towards the eastern end of the route three SINC sites are located within the 200m corridor of the Link; Land West of Staniers Way SINC, Hereford to Gloucester Canal, and Lugg Rhea SINC. NC3 also crosses the Old Canal at Burcot SWS.

B9.6.42 There is a great crested newt record towards the northern extent of the corridor adjacent to the Canal SWS, which may indicate the canal is used as a breeding site by the species.

B9.6.43 Northern Core NC4 follows a similar alignment to NC3 in the west. The eastern portion of NC4 has a more northern alignment than NC3, which means direct impacts on the SWS and SINC sites affected likely to be affected by NC3 are avoided and indirect effects are likely to be reduced. At present, NC4 is therefore considered to be preferable to NC3.

B9.6.44 *Eastern Inner Corridors*

B9.6.45 EL1 passes in close proximity to the Lugg Meadows SSSI (within 50m with the present alignment), and runs adjacent to the wider Lugg Meadows site for most of its length. The alignment of the link also follows the current alignment of the Lugg Rhea SINC, which is also a tributary of the River Lugg. Indirect effects on the nationally important Lugg Meadows complex could be significant. See figures B9.10 to B9.14 in Appendix B-A. See also Engineering Assessment Drawing Numbers A3.21 to A3.23, in Appendix A-A

B9.6.46 The southern portion of Link EL1 would also result in direct and indirect impacts on the Broadlands Local Nature Reserve and the Lower House Farm HNTR.

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- B9.6.47 A large number of otter records are associated with the Lugg Rhea SINC. The alignment of link EL1 would likely result in the extensive culverting of this watercourse, and in combination with increased disturbance from the road would be likely to reduce the suitability of the habitats in this location for otters substantially. The Lugg Meadows and surrounding habitats are also likely to be of particular importance for bats.
- B9.6.48 EL2 runs south from the A438 to the B4224, passing through predominantly arable farmland. Immediately north of the B4224 an area of commercial orchard is present.
- B9.6.49 EL3 runs south from the B4224 through predominantly arable farmland to cross the River Wye. This would require a new bridge crossing of the River Wye. The Scheme has the potential to impact on the species and habitats associated with the River Wye designation, with *Ranunculus* beds noted either side of the river at the proposed crossing location. Habitat suitable for nesting kingfishers was also recorded along the width of the 200m corridor. The surrounding land is largely at grade meaning the elevation above the river is likely to be minimal compared to the western options. It is therefore considered that the eastern options have greater potential to result in impacts on the River Wye SAC than the western options, which would be elevated some height above the river.
- B9.6.50 *Eastern Outer Corridors*
- B9.6.51 EL4 would involve the on-line widening of the A4103, which could result on impacts on the Lugg Meadows SSSI/SWS/HNTR to the south, and on other areas of lowland floodplain meadow to the north. It is likely a new bridge would need to be constructed as the existing bridge is only two carriages and is also a Scheduled Ancient Monument. There is the potential for direct and indirect impacts on the River Lugg and associated Little Lugg in the course of junction works at the eastern end of this alignment. See figures B9.10 to B9.12 in Appendix B-A. See also Engineering Assessment Drawing Numbers A3.24 to A3.32, in Appendix A-A.
- B9.6.52 The first 730m of EL5 is the same as EL4, as discussed above, with an additional 515m of route proposed to the east as part of EL5. Impacts would therefore be similar to those outlined for EL4, above, although there would be additional landtake for the on-line widening of the eastern section.
- B9.6.53 EL6 passes through predominantly arable farmland in the north. The southern section of EL6 passes through parkland with mature deciduous trees associated with New Court. There is a bat roost located in the vicinity of New Court, and the habitats in this area were considered to comprise particularly suitable habitat for use by foraging bats.
- B9.6.54 A small watercourse that is a tributary of the River Lugg would be crossed by this link. The watercourse was potentially suitable for use by foraging otters with the potential for lying up sites or holts to be present. The watercourse was tree-lined, with areas of riparian
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vegetation, and was considered to comprise a good flightline for foraging and commuting bats.

- B9.6.55 At its southern extent this link would cross the River Lugg SAC/SSSI and part of the Lugg Meadows complex, resulting in potentially significant direct and indirect impacts on these sensitive sites.
- B9.6.56 EL7 passes through similar habitats to EL6, described above, and the impacts associated with this route are therefore likely to be similar. However, the more eastern alignment of this corridor at present would result in direct impacts on the bat roost in the vicinity of New Court. Further investigation of any roosts present would be needed for the Stage 2 and 3 Assessment. Should a significant bat roost be present, it would be appropriate to avoid this if an eastern alignment is taken forward.
- B9.6.57 As with link EL6, there would be potentially significant direct and indirect impacts on the Lugg Meadows complex and the River Lugg SAC/SSSI if this corridor was used.
- B9.6.58 EL8 passes through similar habitats to EL6 and EL7, as described above, and the impacts associated with this route are therefore likely to be similar to those Links. However, the more eastern alignment of this corridor could result in direct impacts on the bat roost in the vicinity of New Court. This is common to option EL7, but not EL6. Further investigation of any roosts present would be needed for the Stage 2 and 3 Assessment. Should a significant bat roost be present, it would be appropriate to avoid this if an eastern alignment is taken forward.
- B9.6.59 As with Option EL6/7, there would be potentially significant direct and indirect impacts on the Lugg Meadows complex and the River Lugg SAC/SSSI if this corridor was used, as part of the Lugg Meadows complex is crossed and a new bridge crossing of the River Lugg would be needed.
- B9.6.60 Careful consideration of the protected species associated with the River Lugg would be needed if any of Options EL6 to EL8 were taken forward. All of these links have the potential to impact significantly on the movement of otters and bats along the river corridor if used.
- B9.6.61 EL9, EL10 and EL11 all follow similar alignments, and with the information available to date are anticipated to have similar ecological impacts. South of the A436 all of the links pass through lowland floodplain meadow habitats along the western bank of the River Lugg. Consultation responses from Hayley Pankhurst and Mark July of Natural England and Bridgit Symons of Herefordshire Council (meeting date 30th June) indicate that this area of meadow should be considered as part of the overall Lugg Meadows complex, and therefore an integral part of that nationally important site.

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- B9.6.62 Each of these links also crosses the Lugg Rhea, a tributary of the River Lugg SSSI/SAC at the southern extent of the lowland floodplain meadow habitats described above. South of this watercourse the links converge to form one route corridor, passing through arable farmland and commercial orchard before reaching the B4224.
- B9.6.63 EL12 runs south from the B4224 through predominantly arable farmland to cross the River Wye. This would require a new bridge crossing of the River Wye. The Scheme has the potential to impact on the species and habitats associated with the River Wye designation, with *Ranunculus* beds noted either side of the river at the proposed crossing location. Habitat suitable for nesting kingfishers was also recorded along the width of the 200m corridor, and Swifts were noted to be nesting in the southern bank at the location of the proposed crossing point. An island was also present immediately upstream of the proposed crossing point, and may provide lying up sites for otters. The river corridor is also likely to be of value to foraging bats. The surrounding land is largely at grade meaning the elevation above the river is likely to be minimal compared to the western options. It is therefore considered that the eastern options have greater potential to result in impacts on the River Wye SAC than the western options, which would be elevated some height above the river.
- B9.6.64 *Rotherwas Access Road*
- B9.6.65 It is proposed that Rotherwas Access Road (RAR) will be widened. There are records of roosting bats, including lesser horseshoe bats around the northern section of this link, and a maternity colony of lesser horseshoe bats is believed to be present in the building in one of these locations. See figures B9.13 to B9.14, and B9.2 in Appendix B-A.
- B9.6.66 As lesser horseshoe bats are considered to be at particular risk of mortality from road traffic, due to their habit of flying very close to ground level, particular consideration to the species is likely to be required when reviewing options for the design of the road in this location.
- B9.6.67 Great crested newts are also known to be present in ponds to the west of the RAR at Rotherwas Industrial Estate, and further surveys and mitigation are likely to be required for the species in this location.
- B9.6.68 The Scheme crosses both the Norton Brook and the Red Brook. Both these watercourses are used by otters. The Red Brook also contains habitat suitable for use by white-clawed crayfish. The Red Brook sits within a tree-lined corridor where crossed by the RAR, and is likely to be of some value as a flightline for foraging and commuting bats.
- B9.6.69 The habitats that would be affected by the widening of the RAR are largely within the existing verges of the RAR, and comprise a mix of immature landscape planting, semi-improved species poor and improved grassland, with small areas of arable farmland and improved grassland.

B9.7 MITIGATION MEASURES

- B9.7.1 Recommendations for avoiding or minimising ecological impacts have been provided in the text for each of the Links, above. At this stage it is also possible to provide broad recommendations for measures to minimise the ecological impacts of any route corridor options taken forward; these are identified below:
- B9.7.2 Minimise the number of new bridge crossings across the Rivers Wye and Lugg. Where new bridges are required, wide span structures should be used, and construction methodologies should avoid direct working in the watercourse. Options west of Hereford are likely to result in less significant impacts compared to those east of the City.
- B9.7.3 Avoid direct impacts on the Lugg Meadows SSSI/SWS and associated floodplain grazing meadow. Seek to avoid, if at all possible, a route in close proximity to the Lugg Meadows SSSI/SWS and other areas of lowland grazing meadow adjacent to the River Lugg. The habitats present will be sensitive to nitrogen deposition and other air pollution; thus, even if direct impacts are avoided, a new route in close proximity to the site could negatively affect the habitats present. Drainage and wider hydrological considerations could also be significant.
- B9.7.4 Continue to align any route corridor options taken forward to avoid direct impacts on the locally designated sites present across the Scheme, wherever possible. Where designated sites and/or sensitive habitats fall within the 200m corridors currently under consideration, the proposed alignment within these corridors should avoid the features of interest wherever possible.

B9.8 Further work for full Stage 2 Assessment

- B9.8.1 In order to build upon the work completed for the interim Stage 2 Assessment and confirm the preferred route corridor option(s), it will be necessary for further work to be undertaken, as highlighted below.
- B9.8.2 *Consultation*
- B9.8.3 The consultation process is already underway with Natural England, the Environment Agency and Herefordshire Council's Planning Ecologist. For the full Stage 2 assessment, further desk study research and consultation is recommended with the following organisations:
- Herefordshire Nature Trust
 - The Royal Society for The Protection of Birds

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- The British Trust For Ornithology
 - The Badger Trust
 - The Woodland Trust
 - Hereford Amphibian and Reptile Trust
 - Herefordshire Bat Group
 - Herefordshire Action for Mammals
 - Herefordshire Ornithological Club
 - Herefordshire Council Tree Officer

B9.8.4 Completion of field surveys and reporting will be conducted for Stage 2, when access has been arranged.

B9.8.5 Access is required to survey each route link fully as not all areas can be covered from public rights of way. An assessment of the broad habitats along each of the links under consideration would be made once access is available for surveys to be undertaken. Full access for surveys would also allow a more complete assessment of the potential for protected species and species of conservation concern likely to be present along each route link to be made.

B9.8.6 This would also include identification of veteran trees and species rich hedgerows wherever possible, and a search for otter lying up sites and holts at each of the proposed bridge crossings over the main rivers crossed by the corridors.

B9.8.7 For the routes within 200m of the Lugg Meadows lowland hay meadow habitat an air quality assessment for nitrogen deposition based Annex F "Assessment of designated sites" of HA207/07 will be conducted at Stage 2.

B9.9 GEODIVERSITY

B9.9.1 For this study a 1 km buffer zone has been set around each of the route corridor options. Designated sites that fall within this buffer zone are described below.

B9.9.2 *Geological Conservation Review (GCRs)*

B9.9.3 The Lugg Meanders SSSI is designated by the Geological Conservation Review in part for the fluvial geomorphology. EL6, EL7, EL8, EL9, EL10 and EL11 cross the SSSI but are not expected to have a significant impact on the geodiversity.

B9.9.4 **Local Geological Sites (LGSs)**

B9.9.5 The closest Local Geological Site to the scheme is Upper Lyde Pit at NGR 349200,244700. This falls outside the 1 km buffer zone and lies approximately 1.9km north of links NC1 and NC2 of the Northern Core corridor.

B9.9.6 Upper Lyde Pit has been designated due to the occurrence of the Older Drift, which is limited to hill cappings, benches and spurs. This is a glacial deposit of till and outwash gravel from a single pre-Devensian glaciation. The strata at Upper Lyde Pit include well stratified, sometimes imbricated, cobbles and gravels. The clasts are typically derived from the Old Red Sandstone and have variable sizes and degrees of sorting. Larger cobbles and gravels tend to be sandstone whilst the fine gravels tend to be calcrete.

B9.9.7 **Geological and Geomorphological Sites of Special Scientific Importance (SSSIs)**

B9.9.8 The Western Inner Corridor (WL1, WL2, WL3, WL4, WL5 and WL6) and Western Outer Corridor (WL9 and WL10) and Eastern Inner Corridor (EL3) and Eastern Outer Corridor (EL12) cross the River Wye (Lower Wye) SSSI. Although not specifically a Geological SSSI, geomorphology is cited as part of the reason for its designation. In particular, the complex pattern of meanders along the length of the river has remained free from man-made straightening, widening and deepening.

B9.9.9 The Eastern Outer Corridor EL6, EL7, EL8, EL9, EL10 and EL11 cross the River Lugg SSSI, GCR number 2865. Although not specifically a Geological SSSI, geology (principally the Old Red Sandstone Group) is cited as a reason for its designation. Together with flow and substrate, variations in geology are cited as a contributory factor to the aquatic plant communities for which the site has also been designated.

B10 The Water Environment Sub-Objective

B10.1 INTRODUCTION

B10.1.1 This chapter assesses the potential impacts of the route options on the water environment, including consideration of surface water, groundwater and flood risk.

B10.1.2 Publicly available information from Herefordshire Council and the Environment Agency website were used to identify surface water features, flood risk, groundwater vulnerability and source protection zones (SPZs). Consultation undertaken with the Environment Agency during the Stage 1 assessment is also included which provides some general comments on the route proposals.

B10.1.3 Water constraints mapping is available in Figures B10.1 through to 4.

B10.2 LEGISLATIVE BACKGROUND

B10.2.1 European Planning Policy

B10.2.2 In terms of the water environment the Water Framework Directive (WFD) is the over-riding piece of legislation in place. The WFD is transposed to English law through the implementation of The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003.

B10.2.3 National Planning Policy

B10.2.4 At a national level, the central government strategy document 'A Better Quality of Life – A Strategy for Sustainable Development for the United Kingdom' recognises the fundamental importance of good water quality to health and the environment. It identifies the major challenges to water quality which it states are; growing demand for water supplies, pollution pressures from new development, diffuse pollution inputs, changed weather patterns and loss of habitats.

B10.2.5 In addition to the national planning policy the route options are liable for consideration by the Environment Agency (EA) under the Land Drainage Act (1991) and the Water Resources Act (1991). Consent from the EA is required for any proposed discharges to controlled waters. Consent would also be required for any development within 8m of a watercourse under the Land Drainage Act. A Flood Defence Consent is also required from the EA for any permanent or temporary works within the flood plain, such as temporary/ permanent culverting.

B10.2.6 Other important legislation this chapter refers to includes the Water Act 2003 and the Groundwater (England and Wales) Regulations 2009 and relevant planning policy documents include Planning Policy Statement (PPS) 25 (Development and Flood Risk, 2010), and PPS23 (Planning and Pollution Control, 2004).

B10.2.7 PPS25 Development and Flood Risk (2010), explains how flood risk should be considered at all stages of the planning and development process in order to reduce future damage to property and loss of life. It states the importance the Government attaches to the management and reduction of flood risk in the land-use planning process, acting on a precautionary basis and taking account of climate change.

B10.2.8 The overall aim of PPS23 (Planning and Pollution Control, 2004) is to ensure the sustainable and beneficial use of land, in particular encouraging use of previously developed land over greenfield.

B10.2.9 *Regional Planning Policy*

B10.2.10 Regional policies relating to hydrology include:

- Regional Spatial Strategy for the West Midlands, 2004 (Ref 10.1); and
- Herefordshire Unitary Development Plan, 2007 – Policies S1, DR4, DR6, DR7 (Ref 10.2);
- Local Development Framework – Draft Water Cycle Study (Ref 10.3); and
- Herefordshire Council's Core Strategy Place Shaping (Ref 10.4).

B10.3 METHODOLOGY

B10.3.1 Review of publicly available information and information provided by Herefordshire Council has been made in order to provide a description of the baseline environment. The baseline environment has been described in terms of its physical environment and the nature of the catchment into which it drains.

B10.3.2 The comparison of the route options have been assessed in terms of:

- The length of each proposed route option crossing areas of high groundwater vulnerability;
- The length of the route options which cross flood plains, and the probability of flooding in these areas;
- The number of surface water and groundwater abstractions that could potentially be affected by the route options; and

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- The proximity of the route options to water courses classified in accordance with the requirements of the Water Framework Directive (WFD) and the length of any crossings.

B10.3.3 The following sources were used to gain an appreciation of existing conditions in terms of the water environment:

- Local Development Framework – Strategic Flood Risk Assessment for Herefordshire;
- Local Development Framework – Draft Water Cycle Study;
- GroundSure EnviroInsight Report for Hereford Relief Road Route (Report Reference HMD-404-826563);
- GroundSure FloodInsight Report for Hereford Relief Road Route (Report Reference HMD-404-828218);
- EA website;
- British Geological Survey website;
- Draft Severn River Basin Management Plan;
- Wye and Usk Catchment Flood Management Plan;
- National Rivers Authority: Groundwater Vulnerability of Worcestershire Sheet 29, Scale 1:100,000;
- Institute of Geological Sciences: Hydrogeological Map of England and Wales (1977), Scale 1:625,000; and
- Ordnance Survey mapping.

B10.4 THE STUDY AREA

B10.4.1 The Study Area of this assessment is taken as 500m from the extent of the Scheme link footprint.

B10.5 BASELINE CONDITIONS

B10.5.1 *Surface Watercourses*

B10.5.2 The Study Area falls within the Wye catchment located within the Severn River Basin District, the third largest river basin district in England and Wales which covers an area of 21,590 km². As well as the River Severn and its main tributaries, the Avon and the Teme,

this district includes rivers in southeast Wales, including the Wye, the Usk and the Taff and others which discharge to the Severn Estuary.

B10.5.3 The principle water courses within the Study Area are illustrated in Figures B10.1-4 and listed below:

- River Wye;
- River Lugg;
- River Frome;
- Little Lugg;
- Yazor Brook;
- Eign Brook;
- Norton Brook;
- Red Brook;
- Newtown Brook;
- Cage Brook; and
- Widemarsh Brook.

B10.5.4 The River Wye is the only European designated site within the Study Area, designated as a Special Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI). The River Wye is important for its riverine habitats and the species they support. The headwaters of the River Wye (Afon Gwy) originate in the Cambrian Mountains, Wales and discharges to the River Severn to the south.

B10.5.5 The River Lugg, an important tributary of the River Wye, is included within the River Wye SAC designation and is also a SSSI. A flood relief channel runs parallel to the River Lugg between Hampton Bishop and Aylestone Hill. More detail on the qualifying interests of the River Wye and Lugg is provided in Chapter B9: Biodiversity.

B10.5.6 Other significant rivers which converge with the River Lugg within the Study Area include the Little Lugg and River Frome. Reference to OS maps indicates the Little Lugg flows overland in a general southerly direction before converging with the River Lugg north of Lugg Meadows SSSI. The River Frome converges with Little Lugg north of Hampton Bishop, southeast of Hereford.

B10.5.7 Smaller tributaries of the River Wye include Norton Brook, Red Brook, Newtown Brook and Cage Brook to the south and Yazor Brook, Widemarsh Brook and Eign Brook to the north. Norton Brook and Red Brook appear to start at the higher ground near Aconbury Hill, south of Hereford, and run parallel to each other before joining the River Wye upstream of the sewage works.

B10.5.8 Reference to OS maps show Newtown Brook starting in woodland near Belmont Abbey, southwest of Hereford. It flows in a general northerly direction before joining the River Wye on the western outskirts of Hereford. Cage Brook starts in rural land, west of Hereford near the village of Madley, and flows in a general northeast direction before joining the River Wye immediately upstream of Tuck Mill.

B10.5.9 Yazor Brook commences in the high ground near Yazor village, northwest of Hereford, before flowing overground to just after the confluence with the Widemarsh Brook. Yazor Brook appears to be culverted through Hereford town before joining the River Wye. Reference to OS maps show Eign Brook starting within Hereford town west of Eign Hill before joining the River Wye immediately downstream of the railway bridge.

B10.5.10 The River Wye, Lugg, Frome and Little Lugg are all Main River's as designated by the Environment Agency. There are no other designated water courses within the Study Area.

B10.5.11 *Water Quality*

B10.5.12 The Environment Agency undertake water quality sampling at regular intervals to monitor chemistry, biology and nutrient levels. Chemistry and biology samples are classified between the range of Class A 'Very Good' to Class F 'Bad'.

B10.5.13 Water quality monitoring data between 2004 – 2008 was reviewed within the Study Area and generally shown to vary between Class A 'Very Good' and Class E 'Very Poor' (Ref 1.x Groundsure report). Very poor water quality was recorded at the confluence of the River Lugg and the Widemarsh Brook in this monitoring period and poor water quality was noted in the Yazor Brook upstream of Hereford city limits.

B10.5.14 Water quality of the River Wye, between the confluence with the Cage Brook and Eign Brook, was noted as very good in the same monitoring period (Ref 1.x EA website). The River Lugg is sampled upstream of Hereford city and is noted as at least good water quality over the same monitoring period.

B10.5.15 Water quality of the River Frome immediately upstream of the confluence with the River Lugg obtained Very Good status over the same monitoring period.

B10.5.16 Under the WFD, the status of water is assessed using a range of parameters including chemical, ecological, physical, morphological and hydrological measures, to give a holistic

assessment of aquatic ecological health. In terms of the WFD, Table B10.1 summarises the current status and predicted 2015 level of achievement for ecological and chemical water quality.

Table B10.1: Water Quality Classification under the Water Framework Directive				
Watercourse	Current WFD Ecological Quality	Current WFD Chemical Quality	2015 Predicted Ecological Quality	2015 Predicted Chemical Quality
River Wye	Good	Good	Good	Good
Eign Brook	Good	Good	Good	Good
Norton Brook	Moderate	Does not require assessment	Moderate	Does not require assessment
Yazor Brook	Moderate	Does not require assessment	Moderate	Does not require assessment
Cage Brook	Poor	Does not require assessment	Poor	Does not require assessment
Frome River	Poor	Good	Poor	Good
River Lugg	Poor	Does not require assessment	Poor	Good
Little Lugg	Poor/ Moderate	Does not require assessment	Poor	Does not require assessment

B10.5.17 *Fisheries*

B10.5.18 Records from the Department for Environment, Food and Rural Affairs indicate that none of the water courses within the Study Area are classed as Cyprinid Waters under the EC Freshwater Fisheries Directive. The River Wye and Lugg are designated as Salmonid Waters under this Directive, which means these waters are identified as having water quality suitable for sustaining fish populations and therefore requiring protection.

B10.5.19 There are no known fisheries within the Study Area. The River Wye fishery is located approximately 20km downstream of the Study Area, between Ross-on-Wye and Monmouth.

B10.5.20 *Groundwater*

B10.5.21 The Groundwater Body in the Hereford area is classed as Wye Minor and currently has Good status under the WFD monitoring regime. The Hereford area is designated as a drinking water protected area, water abstraction management area and is also protected under the Nitrates Directive.

B10.5.22 A review of the Hydrogeological Map of England and Wales, scale 1:625 000, indicates that the Raglan Mudstone Formation underlying all of the route options is a minor aquifer of limited potential where the bedrock is generally impermeable and without groundwater except at shallow depth.

B10.5.23 The recent deposits located along the course of the banks of the River Wye and Lugg are classed as a concealed aquifer with limited or local potential.

B10.5.24 The Groundwater Vulnerability Map of Worcestershire (Sheet 29, 1:100 000) and Groundwater Vulnerability Map of Powys (Sheet 28, 1:100 000) were reviewed to ascertain the groundwater vulnerability below the scheme options. These indicate that the drift deposits which overlie the Raglan Mudstone Formation are either of high or intermediate leaching potential.

B10.5.25 The recent deposits located along the course of the banks of the River Wye and Lugg have a high leaching potential.

B10.5.26 A groundwater Source Protection Zone (SPZ) is located to the northwest of Hereford, with zones I, II and III located within the Study Area. The Total Catchment (zone III) is equivalent to the total area needed to support the discharge from the protected groundwater resource. The Outer Zone (zone II) covers an area where pollution takes up to 400 days to travel to the borehole, or 25% of the total catchment area – whichever area is the biggest. The Inner Zone (zone I) is defined as the 50 day travel time from any point below the water table to the source.

B10.5.27 All of the route options lay within a Nitrate Vulnerable Zone (NVZ). These are areas which have been designated to protect drinking water supplies from nitrate pollution where water is being polluted or is at risk of being polluted by nitrates.

B10.5.28 *Abstractions*

B10.5.29 Reference to the Groundsure EnviroInsight report indicates there are a number of groundwater and surface water abstractions recorded within the Study Area, as shown on Figures 551497-Stage2-ENV-10-03 and 551497-Stage2-ENV-10-04.

B10.5.30 *Discharge Consents*

B10.5.31 Reference to the Groundsure EnviroInsight report indicates there are records of ninety-four authorised industrial discharges consents, thirteen Environment Agency List 1 and one List 2 Recorded Pollution Incidents within the Study Area.

B10.5.32 *Strategic Flood Risk Assessment*

B10.5.33 Reference is made to the Herefordshire Council's Strategic Flood Risk Assessment and the Outline Water Cycle Study. The SFRA is based on the principle that floods do not originate from rivers, and rivers present a pathway for flooding. It addresses fluvial risk, but focuses on catchment dynamics and the importance of catchment hydrology in an appreciation of flood risk management.

B10.5.34 The widespread flooding of July 2007 in Herefordshire confirmed that up to 40% of flooding within Herefordshire arises from sources other than major fluvial floodplains. The sub-catchment with the greatest fluvial flood risk (determined by hazard x consequence) is the Lower Wye sub-catchment extending along the River Wye between Belmont and Monmouth including Hereford. It has been determined that within this sub-catchment 1253 properties are at risk in a 1% Annual Equivalent Probability (AEP) flood event. According to the SFRA, the greatest development pressures fall within the Hereford and Leominster environs.

B10.5.35 Hereford has a significant history of flooding, therefore any future development proposals need to take particular reference with regard to avoidance of increased flood risk. In 2007, Herefordshire Council prepared a major database of potential development sites and the SFRA concludes that there is significant scope to allocate housing outside Flood Zone 2 and 3 in compliance with PPS 25: Development and Flood Risk.

B10.5.36 The SFRA developed a set of catchment flood hazard and risk indexes. As a general guide only, a single composite index known as the Catchment Flood Hazard Index has been derived for each sub-catchment, based on the average ranking of the following parameters:

- Proportion of time that Soil Moisture Deficit (SMD) was less than 6mm;
- Standard Percentage Runoff (SPR);
- Time to Peak (Tp(t)) of the FEH Unit Hydrograph; and
- Number of Recorded Flood Reports / Divided by Catchment Area.

B10.5.37 The catchments within the Study Area ranked according to the Catchment Flood Hazard Index are listed:

- Little Lugg ranked 6th;

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- Yazor Brook ranked 9th;
 - Cage Brook ranked 15th;
 - Lower Lugg ranked 30th;
 - Middle Wye ranked 33rd; and
 - Lower Wye ranked 44th.

B10.5.38 The SFRA identified three categories of catchment scale flood risk, namely general surface water flooding, fluvial flooding by floodplains and historical flooding. Fluvial flooding from adjacent floodplains is prevalent for properties adjacent to the Wye, Red Brook, Yazor Brook and Withy Brook in Hereford, Pinsley Brook and River Lugg in Leominster, Eardisland on the River Arrow, and the River Lugg at Bodenham, Mordiford and Hampton Bishop. In terms of the fluvial flood risk, the SFRA ranked the River Wye and Yazor Brook as the top two highest fluvial flood risk catchments with both affecting Hereford.

B10.5.39 Historically, Hereford, Lower Bullingham and Hampton Bishop report the greater number of repeatedly flooded properties.

B10.5.40 In summary, the SFRA has recommended Herefordshire Council prepare a Surface Water Management Plan for areas where the risk from surface water drainage is significant, for example in Hereford.

B10.5.41 *Outline Water Cycle Study*

B10.5.42 The Outline Water Cycle Study should be regarded as a sister document to the SFRA. The Study outlines the requirements of a sustainable water environment for Herefordshire by assessing the county's capacity for water resources and supply, sewage disposal and treatment, and surface water drainage and flood risk management.

B10.5.43 The Study highlights the Lugg as being principally adversely affected by current discharges from mainly wastewater treatment works. It also states that the Lower Lugg and Lower Wye catchments are principally affected by adverse water resource impacts.

B10.5.44 There are five EA defined Water Resource Management Units (WRMUs) in Herefordshire; four in the Wye and one in the Teme. Under the Catchment Abstraction Management Strategy (CAMS) process, each of the five WRMUs is assessed as at 'No Water Available' status. This would mean that at the fully licensed uptake scenario, the ecological river flow objective would be compromised. It also implies that any increases to licensed flows are unlikely to be available in the future and new abstraction licenses are unlikely to be granted in any WRMU according to EA.

B10.5.45 The Regional Spatial Strategy ‘Spatial Options’ requires Herefordshire Council to provide in the order of 16,600 dwellings from 2006-2026, and of these 8,300 dwellings will be in and around Hereford. In view of the intense housing pressure in and around Hereford, combined with the extensive historical flood risk, the Study has also recommended that a Surface Water Management Plan is urgently required for northwest and southeast Hereford.

B10.5.46 *Flood Zone Map*

B10.5.47 The Environment Agency Flood Zone Map illustrates the worst-case scenario as it does not include the effect of any flood defence structures. The Study Area contains major flood defence structures at the Belmont area in Southern Hereford and Hampton Bishop to the east of Hereford; therefore the EA Flood Zone Map provides an extreme indication of actual flood risk areas. Figures B10.1 and 2 provide a detailed illustration of the Study Area in relation to EA flood risk areas.

B10.5.48 *Historical Flooding*

B10.5.49 Review of the FloodInsight report indicates the extent of flood events recorded by the Environment Agency and previous bodies. This data does not take into account of flood management schemes or improved flood defences, such as Belmont and Hampton Bishop. Extent of historic flooding is illustrated on Figures B10.1 and 2, and an overview of any site within the Study Area which has been subject to historic flooding is provided in Table B10.2.

**Table B10.2: Historical Flooding events recorded by the Environment Agency
(Source FloodInsight report)**

Event Name	Date of Flood	Flood Source	Flood Cause	Type of Flood	Environment Agency Comments
HamptonBishop 01 April 1947	Start:01-04-1947 End:01-04-1947	River Lugg	Channel capacity exceeded (no raised defences)	Fluvial	Historical records do not indicate date/year of flood, or include a detailed 'key' showing which line was the extreme flood outline. Records assumed to be that of the April 1947 flood. Polygon includes the Lugg Rhea & Back Brook - H.Bishop.
Lugwardine 01 April 1947	Start:01-04-1947 End:01-04-1947	River Lugg	Channel capacity exceeded (no raised defences)	Fluvial	Historical records do not indicate date/year of flood, or include a detailed 'key' showing which line was the extreme flood outline. Records assumed to be that of the April 1947 flood. Polygon also includes flooding from the Lugg Rhea & Little Lugg.
Hereford 01 December 1960	Start:04-12-1960 End:04-12-1960	River Wye	Channel capacity exceeded (no raised defences)	Fluvial	Peak flow measured at Belmont occurred on 4 th December 1960. No start or end date of flood recorded
LuggBridge 01 April 1947	Start:01-04-1947 End:01-04-1947	River Lugg	Channel capacity exceeded (no raised defences)	Fluvial	Historical records do not indicate date/year of flood, or include a detailed 'key' showing which line was the extreme flood outline. Records assumed to be that of the April 1947 flood. Polygon also includes the Sutton Rhea.
Breinton Common to BroomyHill 01 April 1947	Start:01-04-1947 End:01-04-1947	River Wye	Channel capacity exceeded (no raised defences)	Fluvial	Historical records do not indicate date/year of flood, or include a detailed 'key' showing which line was the extreme flood outline. Records assumed to be that of the April 1947 flood.
HamptonBishop 02 April 1947	Start:01-04-1947 End:01-04-1947	River Lugg	Channel capacity exceeded (no raised defences)	Fluvial	Historical records do not indicate date/year of flood, or include a detailed 'key' showing which line was the extreme flood outline. Records assumed to be that of the April 1947 flood.

B10.6 CONSULTATION

- B10.6.1 Consultation was undertaken with the Environment Agency (Email from Graeme Irwin, Senior Planning Officer, dated 06/04/10) during the Stage 1 assessment however at the time of writing the Stage 1 report no response had been received.
- B10.6.2 For the Study of Options report a response based on the current routes has been received, the EA conclude that the western options have less ecological constraints and significantly less high risk flood plain than the east. The option on the east with the least impact on the River Lugg floodplain would be the most preferable to the other eastern options.

B10.7 POTENTIAL IMPACTS

- B10.7.1 An overview of potential impacts of each link on the water environment is provided below. Each link is discussed in reference to its corridor.

B10.7.2 *Southern Core Corridors*

- B10.7.3 Southern Core Link SC1 and Southern Core Link SC2 follow the same alignment until ch 1900. Up until this point both routes cross a tributary of Norton Brook at ch 850 which is already culverted under Grafton Lane. It is proposed that this culvert will be extended for either proposed route. Both SC1 and SC2 do not cross any Water Framework Directive (WFD) designated water bodies, however the start of both routes are within 200m of Norton Brook, designated moderate ecological potential in terms of the WFD. Both route options SC1 and SC2 do not cross any flood plains. See Engineering Assessment Drawing numbers A3.01 and A3.02, in Appendix A-A.

- B10.7.4 After ch 1900 SC1 crosses Newton Brook between ch 2750 – 2950 and it is proposed to cross this watercourse with a 200m wide bridge at Haywood Forest Park. Route SC1 is located within 200m of six groundwater abstractions and no surface water abstractions.

- B10.7.5 After ch 1900 SC2 does not cross any significant water courses. SC2 is located within 200m of eight groundwater abstractions and no surface water abstractions.

B10.7.6 *Western Inner Corridors*

- B10.7.7 W L1 and WL2 follow the same alignment up to ch 2000. Up until this point both routes cross the River Wye SAC and SSSI and associated flood plain between ch 1020 and ch 1240. The River Wye is designated as good ecological potential at this crossing in terms of the WFD. A proposed viaduct will span the 220m extent of the floodplain for both links. Construction of a viaduct and/ or road within the floodplain would result in loss in flood storage capacity. See Engineering Assessment Drawing numbers A3.03 to A3.10, A3.13, in Appendix A-A.

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- B10.7.8 WL1 crosses SPZ 3 (total catchment) between ch 3180 and 3240 and encroaches into SPZ 2 (outer zone) between ch 3240 and ch 3573. Route option WL1 is located within 200m of five groundwater abstractions and no surface water abstractions.
- B10.7.9 WL2 crosses Source Protection Zone 3 (total catchment) between ch 4040 and ch 4346. Route option WL2 is located within 200m of eight groundwater abstractions and no surface water abstractions.
- B10.7.10 WL3 and WL5 follow the same alignment up to ch 2000. Both routes cross the River Wye SAC and SSSI and associated flood plain between ch 950 and ch 1270. The River Wye is designated as good ecological potential at this crossing point in terms of the WFD. It is proposed for either route that a viaduct is built to span part of the floodplain. Construction of a viaduct and/ or road within the floodplain would result in loss in flood storage capacity.
- B10.7.11 WL3 crosses Source Protection Zone 3 (total catchment) between ch 2950 and ch 3010 and SPZ 2 (outer zone) between ch 3010 and ch 3353. WL3 is located within 200m of three groundwater abstractions and no surface water abstractions.
- B10.7.12 WL5 crosses Source Protection Zone 3 (total catchment) between ch 3770 and ch 4058. WL5 is located within 200m of seven groundwater abstractions and no surface water abstractions.
- B10.7.13 WL4 and WL6 follow the same alignment up to ch 2500. Up until this point both routes cross the River Wye SAC and SSSI and associated flood plain between ch 1500 and ch 1800. The River Wye is designated as good ecological potential at this crossing point in terms of the WFD. It is proposed for either route that a viaduct is built to span part of the floodplain. Construction of a viaduct and/ or road within the floodplain would result in loss in flood storage capacity.
- B10.7.14 WL4 crosses Source Protection Zone 3 (total catchment) between ch 3500 and ch 3550 and SPZ 2 (outer zone) between ch 3550 and ch 3887. WL4 is located within 200m of five groundwater abstractions and no surface water abstractions.
- B10.7.15 WL6 crosses Source Protection Zone 3 (total catchment) between ch 4220 and ch 4596. WL6 is located within 200m of seven groundwater abstractions and no surface water abstractions.
- B10.7.16 WL7 crosses the Yazor Brook at ch 1000, crossing floodplain between ch 750 and ch 1100. It is proposed to culvert the Yazor Brook at this crossing. Construction of a new road within the floodplain and culverting of an existing water course would likely result in increased flood risk downstream. Yazor Brook is designated as moderate ecological potential in terms of the WFD. The route option crosses Source Protection Zone 2 (outer zone) between ch 0 and ch

1190 and SPZ 3 (total catchment) between ch 1190 and ch 1234. WL7 is located within 200m of four groundwater abstractions and no surface water abstractions.

B10.7.17 *Western Outer Corridors*

B10.7.18 WL8 does not cross any significant watercourses. The route option crosses Source Protection Zone 3 (total catchment) between ch 0 and ch 1093. WL8 is located within 200m of seven groundwater abstractions and one surface water abstraction. See Engineering Assessment Drawing numbers A3.10 to A3.14, in Appendix A-A

B10.7.19 Western Link L9 and Western Link L10 follow the same alignment up to ch 2750. Up until this point, both routes cross the River Wye SAC and SSSI and associated flood plain between ch 2245 and ch 2495, crossing the Wye between ch 2440 and ch 2479. The River Wye is designated as good ecological potential at this crossing point in terms of the WFD. It crosses a small tributary of the River Wye between ch 2600 and ch 2610 and crosses the flood plain of this tributary, mapped as Flood Zone III, between ch 2600 and ch 2664. In total, approximately 315m of flood plain is crossed by both routes and it is proposed that a bridge will be built to cross the floodplain for either route. Construction of a bridge and/ or road within the floodplain would result in loss in flood storage capacity.

B10.7.20 WL9 crosses Source Protection Zone 3 (total catchment) between ch 4035 and ch 4360. WL9 is located within 200m of thirteen groundwater abstractions and no surface water abstractions.

B10.7.21 WL10 crosses Source Protection Zone 3 (total catchment) between ch 4735 and ch 4900. WL10 is located within 200m of twelve groundwater abstractions and no surface water abstractions.

B10.7.22 WL11 does not cross any significant watercourses. The full length of the route option, all 735m, is located within Source Protection Zone 3 (total catchment). WL11 is located within 200m of six groundwater abstractions and no surface water abstractions.

B10.7.23 WL12 does not cross any significant watercourses. The full length of the route option, all 755m, is located within Source Protection Zone 3 (total catchment). WL12 is located within 200m of two groundwater abstractions and no surface water abstractions.

B10.7.24 *A4103 Roman Road*

B10.7.25 WL13 is an existing road, A4103 Roman Road, to be realigned and widened under these proposals. WL13 does not cross any significant watercourses. The full length of the route option, all 867m, is located within Source Protection Zone 3 (total catchment). WL13 is located within 200m of two groundwater abstractions and one surface water abstraction. See Engineering Assessment Drawing numbers A3.15 and A3.16, in Appendix A-A

B10.7.26 WL14 is the eastern section of the existing A4103 Roman Road proposed for realignment and widening. Yazor Brook is culverted under the existing road at ch300, and it is proposed to extend this culvert. WL14 crosses approximately 500m of flood plain. The proposed widening will require culverting of Yazor Brook between ch 400 and ch 700. Construction of a new road within the floodplain and culverting of an existing water course would likely result in increased flood risk downstream. Yazor Brook is designated as moderate ecological potential in terms of the WFD. The full length of the route option, all 758m, is located within Source Protection Zone 3 (total catchment). WL14 is located within 200m of one groundwater abstraction and one surface water abstraction.

B10.7.27 *Northern Core Corridors*

B10.7.28 Northern Core NC1 does not cross any significant watercourses. The first 200m of the route is located within Source Protection Zone 3 (total catchment). NC1 is located within 200m of two groundwater abstractions and no surface water abstractions. See Engineering Assessment Drawing number A3.17 to A3.20, in Appendix A-A

B10.7.29 Northern Core NC2 does not cross any significant watercourses. The first 200m of the route is located within Source Protection Zone 3 (total catchment). NC2 is located within 200m of two groundwater abstractions and no surface water abstractions.

B10.7.30 Northern Core NC3 does not cross any significant watercourses. The end of the route crosses 30m of River Lugg floodplain, between ch 2200 to ch 2230. NC3 is located within 200m of five groundwater abstractions and no surface water abstractions.

B10.7.31 Northern Core NC4 does not cross any significant watercourses. The end of the route crosses 280m of River Lugg floodplain, between ch 2050 to ch 2330. NC4 is located within 200m of six groundwater abstractions and no surface water abstractions.

B10.7.32 *Eastern Inner Corridors*

B10.7.33 EL1 crosses the River Lugg flood relief channel at ch 240, and crosses or encroaches into approximately 1550m of floodplain. It is proposed to culvert this channel as part of the construction of this route. Construction of a new road within the floodplain and culverting of an existing water course would likely result in increased flood risk from blockage of the culvert and run off from the road . Parts of the route are within 50m of the Lugg Meadows Site of Special Scientific Interest (SSSI). EL1 is located within 200m of no groundwater abstractions and one surface water abstraction. See Engineering Assessment Drawing numbers A3.21 to A3.23, in Appendix A-A

B10.7.34 EL2 does not cross any significant water courses. The start of this route passes within 50m of the flood plain, however none of this route crosses or encroaches into any flood plain. EL2 is located within 200m of one groundwater abstraction and two surface water abstractions.

B10.7.35 EL3 crosses approximately 1200m of flood plain. The route crosses the River Wye SAC and SSSI at ch400 within the flood plain between ch 100 and ch 1293. The River Wye is classed as good ecological potential at this crossing. It is proposed to build a bridge in order to span the River Wye. Construction of a bridge and/ or road within the floodplain would result in loss in flood storage capacity. EL3 is located within 200m of one groundwater abstraction and one surface water abstraction.

B10.7.36 *Eastern Outer Corridors*

B10.7.37 The full 730m length of EL4 is located within flood plain. EL4 crosses the River Lugg SSSI, designated also as part of the River Wye SAC, at ch 690 and the Little Lugg at the end of the route. The River Lugg and Little Lugg at this route crossing are both classed as moderate ecological potential in terms of the WFD. It is proposed to utilise the existing bridge over the River Lugg and to culvert the Little Lugg under the proposed junction. Widening of the existing road within the floodplain and culverting of an existing water course would likely result in increased flood risk downstream. EL4 is located within 200m of no groundwater abstractions and one surface water abstraction. See Engineering Assessment Drawing numbers A3.24 to A3.32, in Appendix A-A

B10.7.38 The first 730m of EL5 is the same as EL4, as discussed above, with an additional 515m of route proposed to the east as part of EL5. As outlined, EL5 crosses the Little Lugg at ch 730 and encroaches it again at ch 880. It is proposed to utilise the existing bridge over the River Lugg and to culvert the Little Lugg. Widening of an existing road within the floodplain and culverting of an existing water course would likely result in increased flood risk downstream. EL5 is located within 200m of no groundwater abstractions and one surface water abstraction.

B10.7.39 EL6 crosses approximately 420m of flood plain, between ch 980 - ch 1100 and ch 1640 – ch 1940. EL6 crosses the River Lugg SSSI, designated also as part of the River Wye SAC, at ch 1895 near the end of the 1940m long route and crosses the Little Lugg at the start. At this proposed crossing the River Lugg is designated as moderate ecological potential in terms of the WFD. It is proposed to culvert the Little Lugg and to build a bridge to span the River Lugg. Construction of a new road within the floodplain and culverting of an existing water course would likely result in increased flood risk downstream. EL6 is located within 200m of one groundwater abstraction and two surface water abstractions.

B10.7.40 EL7 crosses approximately 370m of flood plain, between ch 630 – ch 700 and ch 1150 – ch 1452. EL7 crosses a tributary of the River Lugg at ch 670 and crosses the River Lugg SSSI

itself at ch 1380, which is also designated as part of the River Wye SAC within this stretch. At the proposed crossing of the River Lugg the river is designated as moderate ecological potential in terms of the WFD. It is proposed that the tributary will be culverted and the River Lugg will be crossed through the construction of a bridge. Construction of a new road within the floodplain and culverting of an existing water course would likely result in increased flood risk downstream. EL7 is located within 200m of one groundwater abstraction and no surface water abstractions.

B10.7.41 EL8 follows the same alignment as EL7 up until ch 740, as discussed above. From ch 740 until the end of the route at ch 1580 the route crosses approximately 400m of floodplain. It crosses the River Lugg SSSI at ch 1475, designated also as part of the River Wye SAC and classed as moderate ecological potential in terms of the WFD at this proposed crossing. It is proposed that the River Lugg will be crossed through the construction of a bridge. Construction of a new road within the floodplain would likely result in loss of flood storage capacity. EL8 is located within 200m of one groundwater abstraction and no surface water abstractions.

B10.7.42 The first 1350m of the Eastern Link L9 and the last 212m cross floodplain, totalling 1562m. EL9 crosses the River Lugg flood relief channel at ch 590 and it is proposed to cross this channel with a bridge. Construction of a new road within the floodplain would likely result in loss of flood storage capacity. The route is located within 200m of two groundwater abstractions and no surface water abstractions. From ch 1400 until the end of the route at ch 1982, EL9 is the same as routes EL10 and EL11.

B10.7.43 EL10 crosses 1470m of floodplain, from the start of the route to ch 1250 and between ch 1670 and ch 1887. EL10 crosses the River Lugg flood relief channel at ch 500 and it is proposed to cross this channel with a bridge. Construction of a new road within the floodplain would likely result in loss of flood storage capacity. The route is located within 200m of two groundwater abstractions and no surface water abstractions.

B10.7.44 EL11 crosses 1300m of floodplain at the start of the route and 312m of flood plain at the end of the route. EL11 crosses the River Lugg flood relief channel at ch 530 and it is proposed to cross this channel with a bridge. Construction of a new road within the floodplain would likely result in loss of flood storage capacity. The route is located within 200m of two groundwater abstractions and no surface water abstractions.

B10.7.45 The full 1381m length of EL12 is located within floodplain. The route crosses the River Wye SAC and SSSI at ch 490 and the river is designated as good ecological potential in terms of the WFD at this crossing. It is proposed that the River Wye SAC will be crossed with a bridge as part of this route. Construction of a new road and bridge within the floodplain would likely result in loss of flood storage capacity. The route is located within 200m of one groundwater abstraction and no surface water abstractions.

B10.7.46 *Rotherwas Access Road*

B10.7.47 It is proposed that Rotherwas Access Road will be widened if an eastern relief road option is chosen. The road crosses up to 1000m of floodplain and any widening would result in a loss of flood storage capacity. The proposal would require extending existing culverts where the road crosses Norton Brook at ch 3000 and Red Brook at ch 1950. Widening of the road within the floodplain would likely result in loss of flood storage capacity. Rotherwas Access Road is located within 200m of one groundwater abstraction and no surface water abstractions.

B10.8 MITIGATION MEASURES

B10.8.1 *Construction*

B10.8.2 A Construction Environmental Management Plan (CEMP) should be developed for the construction process. The CEMP is an active document which should be updated regularly during construction by the contractor. It will list best practise measures which the contractor will adhere to as a minimum including:

B10.8.3 Pollution Prevention Guidance (PPG) 1 – General guide to the prevention of pollution;

- PPG 5 – Works and maintenance in or near water;
- PPG 6 – Working at construction and demolition sites;
- PPG 18 – Managing fire water and major spillages;
- PPG 21 – Pollution incident response planning;
- PPG 22 – Dealing with spillages on highways; and
- Construction Industry Research and Information Association (CIRIA) Control of water from construction sites.

B10.8.4 In order to mitigate the potential adverse effects to surface and groundwaters during the construction phase, the following measures are recommended:

- Management of construction works so as to comply with the necessary standards and consent conditions as identified by the EA;
- All construction workers will be briefed on the importance of the water quality, location of the surface water features and the location and use of the accidental spill kits as part of the site induction;

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- The construction drainage network will incorporate measures (e.g. potentially an interceptor) to prevent the discharge of hydrocarbons to surface or ground water systems;

B10.8.5 Any areas where there is increased risk of hydrocarbon/chemical spillage and hazardous substance stores additional precautions will be taken. These will include bunding (in accordance with EA PPG 8: Safe storage and disposal of used oil), impermeable bases, suitable drainage systems and suited away from any open drainage channels;

- Any stockpiled materials will be stored within enclosed areas to enable the runoff to be stored and treated where required;
- Any concrete works will be carefully controlled and where required any concrete tankers will be washed out in controlled areas;
- All plant and machinery will be maintained in a good condition and any maintenance required will be undertaken within safe areas;
- A Pollution Prevention and Spill Response Procedure should be developed by the Contractor and a site kit and clean up equipment maintained onsite; and
- Wheel washers and dust suppression measures will be used to prevent the migration of pollutants.

B10.8.6 Given that some of the route options entail construction over a Main River, as designated by the Environment Agency, there is a need to obtain a Flood Defence Consent for works in, over or under a Main River under the Water Resources Act (1991) and Land Drainage Act (1991). The Flood Defence Consent is required prior to any construction work taking place and is applied for from the Environment Agency as part of the detailed design stage. In addition, the Environment Agency must be given 7 days written notice of any intention to temporarily divert the flow of any watercourse, carry out works within the river channel or commence any operations in the river channel so that the appropriate arrangements can be made concerning aquatic life.

B10.8.7 In order to reduce the risk of flooding during construction it is recommended that the contractor keeps up to date with Environment Agency flood risk forecasts for the Hereford area. Detailed forecasts are available through the EA Floodline.

B10.8.8 *Operation*

B10.8.9 Details of the drainage for the route options is not known at this stage, however it is envisaged that road runoff will be controlled and managed by a surface water drainage

system. The EA will provide discharge consent limits as part of the consent process to ensure the quantity and quality of the discharge is maintained within threshold levels.

B10.8.10 Hydraulic assessment of the route should be undertaken to enable suitable mitigation measures to be put in place. Measures such as flood relief culverts, flood walls and compensatory flood storage need to be fully considered and investigated before implementation, in order to refrain from moving the flooding problem elsewhere. Ideally, compensatory storage should be created immediately adjacent to the location of the new road, however upstream sites may also be effective.

B10.9 ASSESSMENT METHODOLOGY

B10.9.1 It is envisaged that the next stage of this assessment will be mainly desk-based and consist of a number of separate assessment methods. The next stage is the update and completion of the Stage 2 Scheme Assessment Report which will determine if there is a potential for impact from routine runoff, spillage and flooding on the water environment.

B10.9.2 This assessment will be consistent with the methods set out in the Design Manual for Roads and Bridges Volume 11, Section 3, Part 10 HA45/09. An outline of the tasks for the next stage with appropriate methodology is provided below.

B10.9.3 *Surface Water*

B10.9.4 In order to identify the potential impact of routine runoff on surface waters a simple assessment using the Highways Agency Water Risk Assessment Tool (HAWRAT) will be used (Method A: Simple Assessment, DMRB HA45/09). This will assess the level of pollution risk of road runoff from the proposed route options on receiving surface watercourses within the Study Area.

B10.9.5 Parameters required for input to HAWRAT include number and location of proposed outfalls, presence of downstream confluences, river structures, Annual Average Daily Traffic (AADT) for each road segment of the proposed route options, Q95 surface water flow for affected watercourses and width of watercourse. The majority of the parameters can be sourced through desk-study research through the Environment Agency website, Centre for Ecology and Hydrology (1999) Flood Estimation Handbook and the Multi-Agency Geographic Information System (MAGIC) website.

B10.9.6 In addition, a simple assessment using HAWRAT will be undertaken to identify the potential risk of spillage causing a pollution impact on receiving surface watercourses within the Study Area (Method D: Assessment of Pollution Impacts from Spillages, DMRB HA45/09). The risk is defined as the probability of a pollution spillage affecting a watercourse to such an extent as defined as a serious pollution incident. Similar to the pollution risk assessment the

following data are required for each watercourse reach: length and category of road to be assessed, AADT for each road link and percentage Heavy Goods Vehicles.

B10.9.7 *Ground Water*

B10.9.8 To assess the groundwater vulnerability and potential pollution pathways a simple assessment in line with Method C: Assessment of Pollution Impacts from Routine Runoff on Groundwaters, DMRB HA45/09 will be undertaken. This method will determine the potential impact on groundwater quality from routine runoff discharges to the ground by assessing the overall risk to groundwater and identifying high risk sites.

B10.9.9 Parameters required for the risk assessment which influence the pollutant loading properties of road runoff include road traffic, rainfall volume and intensity, and lithology of the aquifer. A number of the route options cross a Source Protection Zone (Outer Zone and Total Catchment areas) to the northwest of Hereford. Professional judgement will be used in the assessment of the level of risk to groundwater from development within these areas.

B10.9.10 *Flood Risk*

B10.9.11 It is proposed that as part of the update of the Study of Options to Stage 2, a review of the following hydraulic models will be undertaken:

- 1998 Local Study of the River Wye at Hereford, part of the Environment Agency's Section 105 Local Flood Mapping;
- 2003 update of the 1998 Local Study of the Wye, updated as part of the design for the Flood Alleviation Scheme;
- 2006 update of the 2003 model, specifically to study the effects of varying return periods at the Wye/ Lugg confluence downstream of Hereford; and
- 2006-07 Study of Hereford Ordinary Watercourses, model of the Yazor Brook, Eign Brook and Widemarsh Brook.

B10.9.12 Consultation with the Environment Agency Flood Risk Data and mapping team will be undertaken to obtain the relevant information and to determine if any further hydraulic models are available.

B10.9.13 Consultation with the Environment Agency will be undertaken in order to scope out the level of assessment needed for flood risk. It is envisaged that hydraulic modelling will not be undertaken as part of the Stage 2 assessment, until the development of the preferred option at Stage 3. An Environmental Statement will be prepared as part of Stage 3.

B10.9.14 Scoping discussions will be undertaken with the Environment Agency in order to confirm the level of assessment at Stage 3, namely:

- extent and type of hydraulic modelling required for the preferred option;
- requirement of hydrological flow assessment and validation of the preferred hydrological technique; and
- requirement of a Surface Water Drainage Strategy.

B10.9.15 The assessment at Stage 3 will take form of a Flood Risk Assessment (FRA) which will be included as a Technical Appendix to the Environmental Statement. It is likely the preferred option will cross a number of surface watercourses within the Wye catchment, therefore the FRA will be developed on a catchment wide basis and not on individual watercourses. The FRA will comply with Appendix C of Planning Policy Statement 25: Development and Flood Risk.

B10.9.16 *Significance Criteria*

B10.9.17 The importance (or value) of each element of the water environment will be identified using the criteria set out in Chapter 2, Tables 2.1-2.4 which are consistent with DMRB Volume 11, Section 3, Part 2.

B10.9.18 *Consultations*

B10.9.19 Consultation with the Environment Agency will be required at several stages including completion of this Study of Options report, and then again on completion of the final Stage 2 report.

B10.9.20 Prior to undertaking the Flood Risk Assessment of the preferred option at Stage 3 discussions should be undertaken.

B10.10 SUMMARY

B10.10.1 Hereford has a significant history of flooding, therefore any future development proposals need to take particular reference with regard to avoidance of increased flood risk. The Study Area contains a number of surface water courses and associated Flood Zone 2 and 3 flood plains.

B10.10.2 In terms of fluvial flood risk, the River Wye and Yazor Brook are ranked as the top two highest fluvial flood risk catchments within the county with both affecting Hereford. Historically, Hereford, Lower Bullingham and Hampton Bishop report the greater number of repeatedly flooded properties.

B10.10.3 It is envisaged that the next stage of this assessment will be mainly desk-based and consist of a number of separate assessment methods. The next stage is the update and completion of the Stage 2 Scheme Assessment Report which will determine if there is a potential for impact from routine runoff, spillage and flooding on the water environment.

B10.10.4 It is proposed that a Simple assessment is required to identify the level of pollution risk of road runoff and the potential risk of spillage from the proposed route options on receiving surface watercourses within the Study Area.

B10.10.5 It is recommended that a Simple assessment is required to assess groundwater vulnerability and potential pollution pathways.

B10.10.6 Consultation with the Environment Agency Flood Risk Data and mapping team will be undertaken to obtain the relevant information in terms of existing hydraulic models for the Study Area. A review of available hydraulic models will be undertaken to assess the level of flood risk.

B10.10.7 The assessment at Stage 3 will take form of a Flood Risk Assessment which will be included as a Technical Appendix to the Environmental Statement. The FRA will comply with Appendix C of Planning Policy Statement 25: Development and Flood Risk.

B11 The Physical Fitness Sub-Objective

B11.1 INTRODUCTION

B11.1.1 The function of this chapter of the Study of Options is to identify the impacts of the proposed route alignments of the relief road on the journeys made within a locality by pedestrians, cyclists and equestrians (non-motorised users - NMU's) and to determine whether communities within the proposed alignment and surrounding area are likely to experience increased severance from community facilities and services as a result of the proposed new routes. The assessment will also consider the knock on effect of these changes on Physical Fitness.

B11.1.2 The assessment will also determine if the amenity value of public rights of way (PROW) within the vicinity of the new routes will be diminished as a result of the proposals. PROW comprise minor public routes primarily for NMU's that serve they provide a transport network to the benefit of the community. They consist of the following:

- Footpaths
- Bridleways
- Byways open to all traffic (BOATs)
- Restricted byways
- Cycleways

B11.1.3 Impacts to PROW are perceived if a proposed link acts as a barrier to community facilities which might ultimately deter people from using the features. This might for example occur as a result of the new route crossing an existing footpath. Impacts to the amenity of PROW may occur as a result of the decrease in quality of the experience of the route as a result of the presence of traffic. Conversely, positive impacts may occur as a result of a new road diverting traffic and improving crossing and safety on other lesser roads in the area. Where possible the assessment will also identify potential mitigation measures that could be put in place to prevent, reduce or compensate for any detrimental effects to the PROW network. The relief road can also be used as an opportunity to create footpaths and cycleways alongside the carriageway.

B11.2 METHODOLOGY

B11.2.1 At the time of writing a total of six potential route corridors are still under consideration. These are Northern Core, Southern Core, Western Inner, Western Outer, Eastern Inner and Eastern Outer Corridors. These routes are derived from a combination of thirty three 'links'. The links interchange to provide singular route options, thus many of the links are integral

parts of several route options. In the absence of more detailed route alignments and owing to such a large number of constituent links, the Study of Options focuses on the main conceivable route options within the corridors.

- B11.2.2 The high number of routes at this stage places constraints on the assessment process. Many of the different constituent links are clustered within close proximity to each other and provide a negligible difference in terms of the Physical Fitness assessment. As such, a methodology has been adapted which uses guidance provided by the Design Manual for Roads and Bridges (DMRB) and assesses each of the potential route options. Where necessary constituent links are assessed independently.
- B11.2.3 The assessment comprised a desk based study of readily available information including OS mapping, aerial and street view photography, and review of previous reporting.
- B11.2.4 Consultation has not yet been undertaken during the production of the Study of Options Assessment and will be undertaken on the completed Study of Options and for the Stage 2 assessment.
- B11.2.5 Where possible the assessment is designed to attribute a +/- numerical score to each link. This is intended to provide an indicative score and enable a cursory assessment of which route options represent the most favourable conditions with regards to NMU's and for determining the extent of community severance and increased journey times.

B11.3 RELEVANT POLICY

B11.3.1 A review of relevant Policies and Plans has been undertaken in order to ascertain central and local government's intentions for non-vehicular transport in Hereford. A hierarchy has been established as listed below ranging from National policy through to local policy:

- Planning Policy Guidance / Planning Policy Statements (PPG/PPS)
- Regional Spatial Strategy for the West Midlands (RSS)
- Herefordshire Unitary Development Plan (UDP)
- Herefordshire Local Transport Plan (LTP)
- Herefordshire Rights of Way Improvement Plan (RoWIP)

B11.3.2 The Herefordshire Unitary Development Plan (UDP) was adopted on 23rd March 2007 and guides development within the county ensuring consistency with national and regional policy. However, the UDP is nearing expiry and is to be replaced in stages by the Core Strategy of the Local Development Framework (LDF). Until such time as the Local Development Framework takes over, the policies in the UDP which have been "Saved" by the direction of

the Secretary of State will remain in effect. A review of these policies has found the following to be of primary importance to the scheme:

- S6 Transport
- T6 Walking
- T7 Cycling
- T8 Road hierarchy: promotion of sustainable and integrated transport, including access to development by means other than the private car
- RST6 Countryside access: good connections are made to the local public rights of way network and any promoted recreational routes, and that access is promoted by other means than private car.
- E8 Design standards for employment sites: should provide include measures for improving access by employees by alternative means of transport including travel plans;
- H13 Sustainable residential design: should give priority to pedestrians and cyclists in accordance with the transport user hierarchy;
- S11 Community facilities and services: provision for the retention of existing community facilities
- CF5 New community facilities: incorporate safe and convenient pedestrian access together with appropriate provision of car and cycle parking and operational space

B11.3.3 In addition to the policies saved for the pending LDF, Herefordshire Council has also published a draft Rights of Way Improvement Plan for the period 2007-2011. The plan assesses the current level of demand and the current extent of the ROW network in Herefordshire and sets out an improvement plan with following principle headings:

- Ensure the Definitive map and statement is an accurate record of all public rights of way
- Maintain the public rights of way network so it is easy to use and clear of obstructions
- Seek to improve access to the network wherever possible
- Encourage the use responsible of the public rights of way network through proactive promotion

B11.4 IMPACT ASSESSMENT

B11.4.1 The six main corridors and routes are shown in Figure B8.1 in Appendix B-A.

B11.4.2 *Northern Core Corridor*

B11.4.3 The Northern Core Corridor comprises links NC2 and NC1 west of the A49 and links NC3 and NC4 east of the A49. All the links join with the A49 by a proposed roundabout on the A49. Very little variation is apparent between links NC2 and NC1. Links NC3 and NC4, show only a minor deviation towards their eastern extent, east of Holmer. As such, all routes will be assessed as one from west to east comprising a singular northern route.

Links NC1 & NC2

B11.4.4 The links start at the A4103 Roman Road in the north west of Hereford. The Roman Road has existing NMU provision in the form of shared use foot/cycleway and footpaths HER1 and HER55 join the main road from the south either side of the proposed roundabout on the A4103 which ties the new links into the network. An increase in traffic crossing the Roman Road at this point could have a Slight new severance impact for NMU's crossing the A4103, new roundabout and using footpaths in the vicinity but design is considered likely to negate any potential impacts. Stretton Sugwas Vc School is located east of the roundabout and is considered a key community facility that will be affected by the proposal.

B11.4.5 The links extend north east through Lower Burlton Farm rising on an embankment before crossing Tillington Road using a new bridge. Both links sever HC footpath BX11, although new severance impacts may be avoided if the proposed embankment can accommodate an NMU tunnel. The proximity of the new road could decrease the amenity value of the path if not sever the route (-1). An elevated alignment over Tillington Road would alleviate detrimental impacts to an existing pedestrian footway between Burghill north of Hereford and the A4103 whilst not creating new severance or increasing existing journey times (+1).

B11.4.6 The presence of a new road with improved NMU provision could positively impact journeys between communities north of Hereford and southern and eastern areas of Hereford by avoiding voyages through the town centre thus decreasing journey times and improving route choice and safety (+1). Further east both links cross under the A4110 Canon Pyon Road by means of new cuttings also avoiding impacts to the footway aligning the south bound lane of this road (+1), although this footway is not considered likely to provide significant contribution to NMU movements.

B11.4.7 The links then share the same footprint and both cross HC footpath PL9. This is considered to be a significant route for countryside access from northwest Hereford. Initial route alignments indicate the links to rise on an embankment towards the A49 and it may be possible to avoid new severance by tunnelling the footpath although the presence of the road will diminish the tranquillity of the route.

B11.4.8 Further east the route crosses the A49 north of Holmer which will be facilitated by an at grade roundabout. The A49 is the main arteriole route north of the city. East of the roundabout the route is comprised of links NC3 and NC4. Community features align the A49

including Holmer Church and Church Centre south of the new route and Pipe and Lyde north of the route. A footway is not present on the A49 north of Holmer. The addition of NMU provision in this area would represent a Moderate relief from existing severance in this area (+1).

B11.4.9 East of the A49 the links cross footpath H04. This footpath extends north from the district of Holmer and is of a semi rural/rural location considered to be of high amenity value. A route corridor in this location is at this stage indicated to be on embankment and again the footpath could possibly be channelled within the earthworks. The presence of the existing A49 would infer that impacts to the amenity of the routes would be neutral. East of the footpath, the routes head south crossing Coldwells Road via a new bridge. Community features in Holmer include the Rose Garden Inn. East of the corridor lies the village of Munstone. The presence of an elevated crossing over Coldwells Road would negate severance issues (+1).

B11.4.10 South of Coldwells Road the two links cross footpath HO8A which provides an NMU link between Holmer and the Rose Garden Public house and Munstone and footpath HO6. The links are elevated on embankment in the vicinity of HO8A which may provide tunnelling opportunity for the footpath avoiding new severance of the Holmer district from the public house. The road will however decrease the amenity value of the footpath (-1). East of Holmer the links cross Munstone Road. The presence of the new road may provide improved NMU accessibility and a decrease in journey times for residents of Munstone towards the city centre and community features south of the A4103 via the A465 and improve linkage for HO6, which currently uses the road, in this area (+1).

B11.4.11 From Munstone Road, links NC3 and NC4 separate. Link NC4 crosses footpath HO14 before crossing the railway line and meeting its conclusion at a proposed new roundabout with the A465. Initial vertical alignments for both NC3 and NC4 indicate embankments for crossing of the Hereford to Birmingham railway line. It is advised that earth works for this crossing incorporate a pedestrian tunnel for footpath HO14 should NC4 be progressed. The presence of a road in either of the corridors will have detrimental impacts to the amenity of HO14. Therefore incorporating a facilitating structure to avoid severance of the footpath for NC4 is considered beneficial to the routes selection.

B11.4.12 There are no further impacts to Pedestrians and others for the conclusion of link NC3.

B11.4.13 *Southern corridor: Links SC1 & SC2*

Link SC1

B11.4.14 Both southern core links SC1 and SC2 share the same footprint for approximately two thirds of their route. The two divide shortly after crossing the Hereford and Abergavenny railway

line south west of Grafton using a proposed new bridge. Both begin at the new roundabout on the A49 where the B4399 Rotherwas Access Road also meets the A49.

B11.4.15 The routes are in a rural setting predominantly at grade with very few settlements in the surrounding area. Occasional residential properties are present although are predominantly isolated farmsteads. Access is restricted to rural minor lanes with no pedestrian provision, such as Grafton lane (east) which is to be closed up. It is anticipated that such lanes will be utilised for recreation frequently by cyclists and equestrians. The presence of the road in this area could therefore improve the safety for these modes by further relieving the minor rural lanes of traffic volumes (+1). There is an absence of community features and obvious direct routes towards the city throughout the Southern Core Corridor. As such no significant severance issues are anticipated (+1).

B11.4.16 West of the A49 roundabout the links pass through a small area of woodland through which runs HC footpath GF3 which is bisected by the routes with no indication of opportunity for amelioration (-1). Both links then cross the proposed closed Grafton Lane (west) before rising on an embankment and crossing the railway line. Immediately after the railway line both links then cross footpath HA7. It is anticipated that owing to the elevated alignment, severance of the footpath may not occur as the earthworks should provide opportunity for the alignment of the link to cross over the path.

B11.4.17 Slightly further west the routes split. The vertical alignment decreases for both routes and both pass under Grafton Lane in cut avoiding severance of this still open section of the lane. SC1 bears north via Merry Hill Farm immediately after crossing under Grafton Lane while SC2 continues on a more westerly course. SC1 intersects HC footpath HA3 at Merry Hill Farm which provides a lateral non-motorised route between Grafton and Clehonger.

Link SC2

B11.4.18 After departing from the shared chainage of SC1, SC2 skirts south of the grounds of Merry Hill Farm crossing bridleway HA7 (-1) and passing within close proximity to HC bridleway HA6 and HA3. The vertical alignment of the corridor is shown to be in cut at this location. Therefore breakage of the footpath can be avoided by provision of bridge crossings for HA7 and HA3 (+1). The sunken alignment will also reduce impacts to the amenity of other footpaths in the vicinity (+1).

B11.4.19 SC1 bears north after crossing the railway line and crosses footpath HA3. Similarly, the sunken alignment will be easily negotiated by a footpath bridge and so no further severance issues are foreseen. Both links terminate at a proposed new roundabout with the A465 south west of Hereford.

B11.4.20 *Western Inner corridors*

Links WL1 to WL8

B11.4.21 There are 8 constituent links within the Western inner corridor within which broadly lie two main route options. For ease of assessment the links are divided into northern and southern clusters. Some of the links will extend throughout the entire scheme length. These will be referred to where necessary. The southern links comprise WL1, 2, 3, 4, 5, and 6. The northern links will comprise WL5, 6, 7 and 8. Of the links in the south of the Western Inner corridor area, links WL4 and WL6 are separated to the west from the remaining links.

B11.4.22 Detailed route alignments have not been provided for links WL4 and 6 at the time of writing. However, it is anticipated both, after exiting the proposed roundabout on the A465 south of Clehonger Court, will immediately ascend an embankment in order to cross the B4349 via a new bridge. The B4349 links Clehonger in the west with the A465 towards Hereford and has adjoining pedestrian footway to the east bound lane and is considered an important community link, although no new severance is anticipated owing to the new bridge. The links then bear north east rejoining the remaining links.

B11.4.23 Links WL1, 5 and 6 leave a roundabout with the A465 and SC1 and bear north ascending an embankment and crossing a minor rural lane, suspected of being favourable for cyclists and equestrians, before immediately intersecting HC footpath CH7 (-1). The presence of the new bridge and constituent earthworks should enable the opportunity for tunnelling footpath CH7 thus avoiding potential severance.

B11.4.24 This footpath is an east west route between Clehonger and Hereford and is expected to be an important non-motorised community route of high amenity value. As such the presence of the road in this location is anticipated to adversely impact the amenity value. All routes crossing the River Wye are indicated to be in cutting to the south of the river before crossing via new bridges. The vertical alignments are level with the river cliffs north of the river.

B11.4.25 In crossing the river the routes also cross the Wye Valley Walk National Trail (BT1). The presence of a major infrastructure feature in the vicinity of this trail is expected to have major significant adverse effects to the scenery, tranquillity and overall enjoyment for users of this path although a road will not result in direct breakage (-2). Immediately north of the new bridge, links WL3 and 5 bisect HC footpath BT2 in Warnham. The routes are in cutting at this location and severance is therefore avoidable by provision of a footpath bridge (+1). All routes then cross minor rural roads as they progress through Lower Breinton which are all considered likely to support recreational cyclist and equestrian usage. Lower Breinton also has a community hall.

B11.4.26 Links WL3 and WL5 will be in cut below Breinton Road (west). Two instances of severance occur for links WL1 and WL2 where they traverse rural lanes at Warnham. This may represent an instance of new severance between Warnham and Lower Breinton and

community features in the White Cross district of western Hereford via Breinton Road and Broomy Hill. Severances in this area could increase journey times for communities west of Hereford by forcing diversions toward the A465 White Cross Road in the north (-1).

B11.4.27 North of Breinton Lane the western links form their northern alignments. Links WL2, 5 and 6 bear west toward a confluence with the Western Outer Corridor to potentially join with links WL8 or WL11. These links are predominantly indicated as being at grade or in shallow cut and as such could potentially cause severance of footpaths HER25, BT9 and BT2A. These footpaths are considered likely to provide an important amenity network for the Kings Acre area and their loss would be considered a significant adverse impact, whilst the presence of the road will impact the amenity value of the paths (-3).

B11.4.28 Links WL1, WL3 and WL4 potentially bisect footpaths HER25 and BT3, although it may be possible to accommodate a foot bridge over HER25 owing to the links being in cut at this location. The links are however at grade as they cross BT3 and as such severance of this NMU route is anticipated (-1). The presence of the road will also decrease the amenity value of the paths in this area owing to the predominant vertical alignment (-1). The Western Inner Corridor links are all tied in to the network by signalised junctions with the A438. No loss of NMU provision or new severance for residents west of Kings Acre is anticipated owing to design incorporating suitable mitigation measures.

B11.4.29 North of the A438 Link WL7 between Kings Acre and the A4103 Roman Road skirts the western perimeter of Huntington. The Link is predominantly at grade with a slight increase in vertical alignment in the north. Before meeting the proposed roundabout at the A4103 the Link bisects footpath HER1 north of Huntington and is anticipated to result in loss of the path (-1).

B11.4.30 *Western Outer Corridors*

Links WL8 to WL14

B11.4.31 The Western Outer corridors are comprised of links WL8 to WL14 and incorporate two sections of the A4103 Roman Road for Links WL13 and WL14 at Stretton Sugwas. The routes extend north from a new roundabout at the A465 south east of Clehonger Court and immediately create severance of the B4349. Severance of such an important local route for residents of Clehonger is considered to be untenable and likely not to be considered for progression. Scheme drawings indicate that an earthwork assisted change in vertical alignment has not been considered to accommodate a cutting or embankment and as such the severance is unavoidable. In addition to the loss of vehicle carriageway the B4349 has adjoining pedestrian footway and would represent a considerable loss of NMU routes and creation of Severe new severance for the Clehonger community and community features in south west Hereford (-2).

B11.4.32 The route corridor also falls within close proximity to footpath CH8 at Clehonger Court which is considered of high amenity value. The presence of a road in the vicinity of the heritage feature and walking route would be detrimental to the tranquillity of the route (-1). Shortly further north the link crosses footpath CH7. Although an embankment is indicated at the location it is not considered likely that earth works will be of a scale to accommodate a footpath tunnel in this location (-1).

B11.4.33 The links then cross the River Wye south of Upper Breinton. Immediately north of the Wye links WL9 and WL10 split with WL10 bearing north east and WL9 continuing due north. All links cross footpath BT10 in this area. Severance may be avoided providing the River Wye bridge crossing can accommodate an underpass. Both corridors then cross minor rural roads in Upper Breinton, all for which have been attributed bridge crossings of the new road, avoiding community severance. North of Upper Breinton Link WL9 runs parallel to footpath BT2 and BT2A. The presence of the road within such close proximity to the footpath is considered likely to represent a considerable detrimental impact to the amenity of the NMU route.

B11.4.34 Link WL10 crosses footpath BT7 west of Upper Breinton and is likely to result in severance of the route (-1). North of the A438 the Western Outer routes comprise 3 links between the A438 and the 4103 Roman Road; Links WL12, WL11 and WL8. Link WL12 connects to WL10 and is the most easterly of the routes. It ends in Stretton Sugwas at an existing roundabout and does not result in any instances of severance and could potentially decrease journey times for NMU's towards community features in Stretton Sugwas including local schools from south of the a4103. Links WL11 and WL8 are at grade and diverge around the nursery. Between them the links account for multiple severances and impingements of footpaths, including severance of footpath BT11, SS5, HER 33, and HE35. The severances and presence of the road is not considered viable at this location by account of the significant impacts to movements of NMU's and reduction in amenity value of routes in the area and for moderate new severance for settlements west of Kings Acre with the community features of White Cross.

B11.4.35 The most northerly sections of the Western Outer Corridor, Links WL13 and WL14 use the existing A4103. Therefore, although the corridors are within close proximity to footpaths S38, BT11, SS2 and HER35, adverse impacts are not anticipated compared with the existing situation as design should seek to enhance the existing NMU network provision in this area.

B11.4.36 *Eastern Inner Corridor*

Links E1 to E3

B11.4.37 The Eastern Inner corridor comprises a single linear route between the Rotherwas Industrial estate in the south and the A4103 Roman Road in the north skirting the eastern outskirts of Hereford and consisting of the constituent links, EL1, EL2 and EL3. Link EL1 lies between

the A4103 in the north and the A438 in the south. Many NMU routes are present within the corridor and are considered likely to provide highly used access to the Lugg Meadows Local Nature Reserve and River Lugg for recreational NMU visitors. Many footpaths in the area extend east from residential areas of eastern Hereford including Aylestone Hill and Tupsley. These routes include HER42,

B11.4.38 HER42A, HER43, HER44, and HER45 and bridleways HER43A, LU25 and HB14. Despite an elevated alignment for most of EC1 and the possibility of incorporating design features to reduce the severance experienced, it is considered that severance of many of these footpaths will be unavoidable. The high amenity value of these paths including exceptional views across the River Lugg floodplain will also undoubtedly be diminished by the presence of the road in this location. It is therefore considered that a road would be detrimental to the amenity value of the local NMU network and could adversely impact physical fitness of nearby residents.

B11.4.39 EL2 extends south from EL1 at a proposed roundabout with the A438 Ledbury Road. Ledbury Road has a footway to the eastbound carriageway between the district of Tupsley and the village of Lugwardine and is expected to be an important community link. Pedestrian and cycling movements should not be inhibited by a road in this location and opportunity for enhancement of this NMU route should be considered. New severance is not anticipated between rural communities and eastern Hereford as the scheme has the potential to enhance connections providing more NMU routes and decreasing journey times.

B11.4.40 Link EL2 does not contribute to any further reduction in usage of NMU network although bridleway HER47 lies within the corridor running parallel between the edge of Hampton Park and Link EL1. A road will decrease the amenity value of the bridleway (-1). Link EL3 crosses the River Wye south of its start point at the B4224 Hampton Park Road. Hampton Park Road has a very narrow footway to the eastbound lane as far as Franchise Stone. The B4224 in this location is considered to potentially provide an important link between Hampton Bishop and east Hereford and the presence of the new road and associated NMU provision could provide an improvement to the NMU network in the area (+1).

B11.4.41 South of the B4224 the vertical alignment rises in order to cross the River Wye. In doing so the crossing passes over the Wye Valley Walk National Trail, footpaths HER16 and DD1A north and south of the river respectively and the presence of a road in this location is considered likely to decrease the amenity value and tranquillity for users of this important trail (-1).

B11.4.42 *Eastern Outer Corridor*

Links EL4 to EL12

B11.4.43 The Eastern Outer Corridor lies in a rural setting between eastern Hereford and the village of Lugwardine. The corridor comprises Links EL4 to EL12 and provides a number of route options. Owing to the absence of designated footpaths and bridleways within the corridors, the assessment need only focus on the most northerly sections including EL4 and EL5, where the corridors cross the A438, the B4224 and where the corridor crosses the River Wye.

B11.4.44 Links EL4 and EL5 follow the existing A4103 Ayelstone Hill road between north east Hereford and Withington. At present a footway or cycleway are not present on this route. Despite an absence of footway the area is considered likely to be well used by walkers as many footpaths cross or begin from the main road including HO17 and bridleway HO18 adjacent to the River Lugg and HR42 and HR43A which extend south from the road toward the Lugg Meadows.

B11.4.45 Should a new road lie within this corridor an opportunity would arise to provide relief from exiting severance with provision of pedestrian footway and cycle way connecting rural areas north east of Hereford with the city improving opportunity for modal shift and improved physical fitness (+1). This will also increase safety for people using footpaths extending from the road (+1). Similarly the footway on the A438 Ledbury Road could be improved between Tupsley and Lugwardine despite the need for an at grade roundabout as crossing issues for NMU's could be designed out and no new severance of rural settlements and the community facilities in the east of the city need occur (+1). In addition, no designated footpaths or bridleways lie within EL10 or EL11 (+1). The route could also provide highly desirable NMU routes between rural areas north east of Hereford and the employment area of the Rotherwas Industrial estate (+1).

B11.4.46 South of the B4224 the route crosses the River Wye. Although more eastern than the Inner Eastern routes, the assessment considers the same outcome as for the inner Links, in that impacts will be experienced by users of footpaths aligning the River Wye (-1). However, a river crossing with NMU provision in this location, as with the Inner Links, could have a large beneficial impact on modal shift and traffic volume as it would relieve existing severance caused by the river and encourage trips between eastern Hereford and the Rotherwas Industrial estate employment area (+1).

B11.5 FURTHER WORK REQUIRED FOR STAGE 2 ASSESSMENT

- B11.5.1 Whereas the Study of Options assessment has been undertaken using a combination of DMRB Stage 1 and Stage 2 guidance for Pedestrians and Others, the final Stage 2 report should develop the non-motorised user element of the study into an assessment of Physical Fitness. This should reflect an amalgamation of the Stage 2 DMRB guidance with that defined for the governments Major Scheme Appraisal methodology WebTAG unit 3.3.12, The Physical Fitness Sub-Objective. The key objective of the WebTAG assessment will be the identification of the contribution of the adoption of a relief road route in the Local Development Framework to overall health levels by changing levels of physical activity in order to secure government funding for the scheme.
- B11.5.2 This has not been undertaken at the Study of Options assessment level owing to an absence of traffic and pedestrian count data at the time of writing. It is recommended that the Stage 2 assessment is progressed with the inclusion of this data in order to fulfil the requirements of the DMRB and WebTAG objectives.

B12 The Journey Ambience Sub-Objective

B12.1 INTRODUCTION

B12.1.1 This chapter assesses the six corridor options for the scheme with regards to vehicle travellers. The assessment has been undertaken in line with guidance provided by the DMRB Volume 11 and TAG unit 3.3.13.

B12.1.2 The new road scheme has the potential to impact a wide array of proponents. These include vehicle travellers and can be manifest in both positive and negative impacts. Vehicle travel consumes a significant amount of time for most people for both work and leisure purposes. The quality and duration of this time spent travelling can have a defining influence on many components related to human health and quality of life. The two aspects of the quality of travelling experience identified by the DMRB are:

- Travellers' stress - those factors detrimental to the experience of a user of a road network; and
- Travellers view from the road - the extent to which travellers are exposed to different types of scenery through which a route option passes.

B12.1.3 Within each corridor option, consideration has also been given to features associated with the existing road network that may influence stress levels experienced by users of the new road and draws upon the findings of the landscape and visual impact assessment for consideration of travellers' views.

B12.2 METHODOLOGY

B12.2.1 *Travellers' Stress*

B12.2.2 As defined in the DMRB, driver stress is the adverse mental and psychological effect experienced by travellers traversing a road network. The factors principally identified as influencing stress levels include:

- Road layout and geometry;
- Surface riding characteristics;
- Junction frequency; and
- Speed and flow per lane.

B12.2.3 Alone or in combination these can inflict discomfort, annoyance, frustration or fear on travellers that collectively can result in physical and emotional tension ultimately decreasing the quality and potentially the safety of the journey.

B12.2.4 The three main components of driver stress are:

- Frustration;
- Fear of accidents; and
- Uncertainty relating to the route being followed

B12.2.5 The DMRB defines frustration as being caused by a driver's inability to drive at a speed consistent with his or her own wishes in relation to the general standard of the road. The level of frustration experienced is considered to rise proportionately with a decrease in speed. Journey speed is influenced by many factors such as traffic volume, road works or unavoidable slow moving traffic.

B12.2.6 Driver fear can be created by a number of external factors. These can be related to interaction with others such as the presence of other vehicles particularly heavy vehicles and their behaviour and the likelihood of pedestrians, particularly children stepping into the road. Physical characteristics such as inadequate lighting, narrow roads, road works a characteristics of the road can also heighten fear.

B12.2.7 *Route uncertainty*

B12.2.8 Route uncertainty can arise from inadequate signing that does not conform to the expectations or purpose of the user for a given route. This factor is not considered likely to be a contributing factor to driver stress for a new road scheme and is more likely to be attributed to existing road networks.

B12.2.9 An assessment of driver stress is undertaken by collation and review of the data for average journey cruise speeds, average peak hourly flows and review of the existing situation with regards to the contributing factors towards fear, frustration and stress. Once these have been obtained comparison to the three point scale - low, medium or high as in DMRB guidance can be made.

B12.2.10 *View from the road*

B12.2.11 The assessment of view from the road takes into account the variations in the scenery between the different corridor options and makes a judgement as to whether the corridor provides a beneficial or detrimental visual experience for the traveller. The study assesses the types of scenery taking into account the landscape baseline assessment (Chapter B6);

the expected profile of the alignments in relation to Ordnance Survey (OS) mapping (Engineering Assessment Drawings, Appendix A-A); the expected ability of the traveller to view the surrounding area for each of the route corridors; and any features of interest of prominence in views within the corridors.

B12.2.12 The assessment for vehicle traveller's has been undertaken at a corridor scale owing to the high number of potential route options, the close proximity of the differing route options within the corridors and the similarity of layout within each corridor in relation to proposed signalised junctions and roundabouts. The corridors to be assessed are as follows:

- Southern Core Corridor;
- Western Inner Corridor;
- Western Outer Corridor;
- Northern Core Corridor;
- Eastern Inner Corridor; and
- Eastern Outer Corridor;

B12.3 ASSESSMENT OF IMPACTS

B12.3.1 *Travellers' stress*

B12.3.2 The Study of Options assessment intends to inform the design process of the stress inducing factors associated with the different options where the options are significantly different. Regardless of layout all of the route corridor proposals will lead to a net reduction in driver stress as all of the options would relieve congestion in the city centre. In addition, all of the route options will experience similar peak hourly flows.

B12.3.3 Assessment for driver stress at Stage 2, is according to the DMRB, to include quantitative analysis in order to measure the change in stress between the do-minimum and do-something scenario. However, traffic data has not been made available at the time of writing of the Study of Options report and as such quantitative assessment has not been possible. Therefore the quantitative analysis will be undertaken for the Stage 2 assessment.

B12.3.4 In the absence of traffic data, a cursory assessment taking into consideration proposed junction tie-in methods and speed limits (Engineering Assessment Report) would suggest that the Eastern Outer Corridor would provide the least stressful option for vehicle travellers given the proposed speed limits not decreasing below 60 mph for all of the constituent links and the use of roundabouts to traverse the existing road network at the B4224 and A438. The majority of the constituent links for the western corridors have a speed limit of 40 mph

and all are hindered by signalised junctions. The characteristics of the northern and southern corridors are comparatively evenly balanced. The southern routes are both uninterrupted however, whereas the northern routes are both subject to a proposed at-grade roundabout necessary to traverse the A49. As such, the southern routes are considered to be marginally less stressful to the traveller.

B12.3.5 *Views from the road*

B12.3.6 Assessment of travellers view from the road will be described with reference to the four criteria listed below and are based on observations of OS mapping and reference to the Landscape and Visual Impact assessment in chapter B6 At this stage detailed route alignments have not yet been designed. Therefore the assessment is based on corridor analysis. Each corridor has been assessed as a single entity where possible but includes direction specific description where necessary. Beneficial effects and their significance are shown in brackets e.g. (slight). The indicative criteria are:

- Landscape character baseline;
- The extent to which travellers will be able to see the scenery;
- Landscape quality; and
- Features of interest

Northern Core Corridor

B12.3.7 The landscape character baseline within which the Northern corridor is located is identified in chapter B6 as comprising mostly Principal Settled Farmlands and Wet Pasture Meadows in the west, northeast of Stretton Sugwas. The corridor traverses a gently undulating landscape ascending from 70 mAOD in the west rising to 80 mAOD in the east resulting in ascending views for eastbound traveller's and descending views for westbound. See Engineering Assessment Drawing Numbers A3.17 to A3.20, in Appendix A-A

B12.3.8 The landscape character descriptions describe a lowland environment of settled farmlands separated by thinly scattered hedgerows with occasional groups of trees. Visibility for travellers of the surrounding area is considered to be good (large beneficial). The corridor does not lie in an area of designated landscape quality but all areas surrounding Hereford are recognised as being of a medium or high landscape value and this is expected to be reflected in a moderate positive impact to travellers' views.

Southern Core Corridor

B12.3.9 The landscape character baseline identifies the South Corridor between the A49 south of Hereford and the A465 south west of Hereford to lie within the landscape character type of

Wooded Estatelands. The southern corridor runs approximately east-west rising from approximately 70 mAOD in the east at the A49 roundabout to 100 mAOD in the west at the A465. As a result, the gradual descending profile of the corridor would provide extensive panoramic clear open views for eastbound travellers across mixed farmland towards the high landscape quality feature of Dinedor Hill and southern Hereford. This is expected to provide a high value (large beneficial) travelling experience. See Engineering Assessment Drawing Number A3.01 and A3.02, in Appendix A-A.

B12.3.10 The landscape character description for Wooded Estatelands, describes a wooded agricultural landscape of isolated farmsteads. The landscape relies heavily on its large, discrete, irregular shaped outline semi-ancient woodlands which combine to frame views in the area while hedgerows define the scale and provide a structure to the landscape. As a result, although the corridor does not lie within a landscape designated for its quality, the views experienced by travellers, including ascending eastbound journeys, are expected to be high (large beneficial). In addition the views for westbound travellers toward the ornamental grounds and parklands of estates including Belmont Abbey and Clehonger Court are expected to be of high quality (large beneficial).

Western Inner Corridor

B12.3.11 The landscape character baseline within which the corridor is located is mostly Wooded Estatelands as described above. However, the route also penetrates Principal Timbered Farmlands around Breinton and River Meadows flanking the River Wye. The Western Inner Corridor is orientated north-south and stretches between Belmont Abbey on the A465 in the south, crosses the River Wye via a proposed new bridge crossing, traverses the A438 via a new signalised junction and meets the A4103 at King's Acre. The profile of the corridor is gradually undulating with higher areas of between 95 and 110 mAOD in the south, falling steadily to the River Wye flood plain at 55 mAOD. See Engineering Assessment Drawing Numbers A3.03 to A3.10 and A3.13, A3.15, A3.16, in Appendix A-A.

B12.3.12 North of the River Wye the profile ascends sharply to 85 m east of Breinton before falling to 75 m in the far north of the corridor. The descending views towards the River Wye valley from both north and southbound approaches is expected to provide a high quality visual experience for travellers with panoramic views northbound from Belmont in particular towards the Wye with Breinton beyond particularly interesting (large beneficial).

B12.3.13 Principal Timbered farmlands are rolling lowland landscapes with occasional steep sided hills and low escarpments. They allow glimpsed views through dense scattered hedgerow trees and small scale and linear woodlands associated with streams. This area is considered likely to represent a high value landscape but subject to enclosed and contained views in places. An area of Lower Breinton adjacent to the corridor is identified as National Trust land.

B12.3.14 The River Wye section of the corridor is expected to be as described in the landscape character description following analysis of OS mapping, i.e. flat, seasonally waterlogged meadows running alongside the rivers are characteristic of the Wye and the Lugg, often (especially for the Wye) bounded by steeper, sometimes wooded, river cliffs. The flood plain lies approximately 20 m below more elevated areas a short distance north and south. This would infer that a bridge crossing in this area would provide spectacular views east and west out across the River Wye (large beneficial) and its floodplain.

B12.3.15 Views in the north of the corridor for both southbound and northbound users are expected to be pleasant uninterrupted views across a wooded agricultural landscape of isolated farmsteads towards Hereford in the east and to settlements west of Hereford including Swainshill, Huntington and Kings Acre.

Western Outer Corridor

B12.3.16 The Western Outer Corridor follows much the same profile as the inner traversing the same landscape character areas. One key difference is present south west of Kings Acre where the corridor passes through a larger tract of orchard which is likely to contain both north and south bound travellers' views in this area. In addition northbound users may be provided with enhanced distant glimpses of Credenhill Park Wood northwest of the corridor (slight). No other significant differences are anticipated between the Western Inner Corridor and Western Outer Corridor. See Engineering Assessment Drawing Numbers A3.10 to A3.16, in Appendix A-A

Eastern Inner Corridor

B12.3.17 The landscape character baseline within which the corridor is located is mostly Principle Settled Farmlands. This type extends around much of the area to the east and north of the city, other than within the river valleys of the Wye and Lugg. In the far north the corridor overlies the River Meadows landscape character area of the upper section of the Lugg meadows. The profile of the Eastern Inner Corridor resides mostly around the level of the River Wye and Lugg flood plain at around 50 mAOD with a rise to around 65 mAOD north of the B4224 at an isolated peak called Highfield. See Engineering Assessment Drawing Numbers A3.21 to A3.23, in Appendix A-A

B12.3.18 The corridor clings tightly to elevated land which marks the eastern boundary of Hereford. North of the River Wye this area comprises mostly residential properties and south of the River Wye the Rotherwas Industrial Estate, imparting a relatively low quality view in the west for both northbound and southbound users. In the northern stretch of the corridor, views to the east over the River Lugg and its flood plain are expected to comprise the features common to Principle Settled Farmland including settled agricultural landscapes of dispersed, scattered farms, relic commons and small villages and hamlets and River Meadows, combining to create an extensive high quality vista for all users (large beneficial). For

southbound users that have ascended the summit of an elevated orchard east of Hampton Park, views across the Rotherwas area towards Dinedor hill and east towards the meandering rivers are also expected to be of high value (large beneficial) whilst a new river crossing could provide much enhanced views towards the city in the west and rural settlement of Lugwardine in the east (large beneficial).

Eastern Outer Corridor

B12.3.19 Similar to the Eastern Inner Corridor, the Eastern Outer Corridor lies mostly within the landscape character area Principle Settled Farmlands with a section of the corridor in the vicinity of the A438 lying within the Lower Lugg Meadows River Meadow character area. The corridor lies almost entirely within the floodplains of the Rivers Lugg and Wye at approximately 48 mAOD, with the exception of a small area of orchard towards the south where the land ascends to 64 mAOD east of Hampton Park before falling to 48 m again at the Wye floodplain and Rotherwas district. It is anticipated that the flood plain location of any road within this corridor will have to be designed with an elevated vertical alignment either on an embankment or raised structure to alleviate flood risk. This elevated position would give rise to excellent views for all travellers (large beneficial) over the surrounding meadows, farmlands, meandering rivers and rural settlements. See Engineering Assessment Drawing Numbers A3.24 to A3.32, in Appendix A-A

B12.3.20 The corridor overlies a large area of the Lugg Meadows River Meadow landscape character area. Although the presence of a road within this proposed corridor is likely to incur great loss of landscape resource and habitat area, it is considered that any views from the road are likely to be of extremely high value (large beneficial). Similarly to the Eastern Inner Corridor, the elevated section in the south would give rise to enhanced views towards Dinedor Hill (large beneficial) for south bound users and a new crossing of the River Wye would provide enhanced rural views east and west towards the city (large beneficial).

B12.4 CUMULATIVE EFFECTS

B12.4.1 Construction of the scheme and the unavoidable disruption to the existing road network this would entail will have temporary significant adverse effects to vehicle travellers' stress owing to disruption of traffic flows and impacts to views experienced by travellers.

B12.4.2 The scheme will result in a long-term cumulative beneficial impact during operation for all vehicle travellers due to a reduction driver stress owing to reduces congestion in Hereford City centre and an improvement in journey experience for travellers using the relief road owing to a significant improvement in views.

B12.4.3 Traffic data has not been available for the Study of Options assessment and detailed route alignments have not yet been decided. Using available scheme information it is considered that all of the proposed corridors will be beneficial in terms of vehicle travellers with little

discernable difference, but that the Eastern Outer Corridor is the most beneficial when considering cumulative effects.

B12.5 RECOMMENDATIONS

B12.5.1 Following selection of specified routes for assessment at Stage 2, a quantitative assessment should be undertaken for drivers stress. This should include analysis of traffic data and site reconnaissance to appraise the existing route network with regards to signage. Sufficient detail should also be provided at Stage 2 of the likely road profile so as to better assess the expected view from the road.

B12.6 CONCLUSIONS

B12.6.1 With regards to traveller stress it is perceived that there will be a negligible difference between the northern and southern corridors. Owing to the presence of signalised junctions and reduced speed limits in all western corridors, lower driver stress is expected in the eastern routes. However, all route options identified at this stage would relieve congestion from Hereford city centre and would be designed to current standards.

B12.6.2 None of the corridors result in a detrimental impact to travellers' views. All of the options represent a significant improvement to the existing urban situation with little discernable difference between the corridor options.

B13 Summary and Recommendations

B13.1 KEY ENVIRONMENTAL ISSUES

B13.1.1 All of the Sub-Objectives of TAG are key environmental issues though the Landscape, Biodiversity, Noise, Water Environment, and Heritage of Historic Resources Objectives will be environmental issues of particular concern. Landscape and ecological constraints are likely to be very significant for both the western and eastern options. The ecological assessment shows that a western corridor should be used because of the potential impact on habitats associated with the Lugg in the eastern corridor. This is contrast with the landscape assessment which identifies that the eastern corridor options will have a lower impact on the landscape than the western corridor options.

B13.1.2 Detailed analysis cannot be given at Study of Options Stage as the route corridors contain a variety of links that could be used and the assessment of impacts is limited to “land take type impacts” as traffic data is not yet available to conduct the assessments related to “traffic type impacts”. The traffic type impacts will be assessed at Stage 2.

SUB-OBJECTIVE	PREFERRED OPTIONS	LEAST FAVOURED OPTIONS
Noise	Outer Corridors, SC2, NC2, NC4	Eastern Inner Corridor
Local Air Quality	Outer Corridors SC2, NC2, NC4	Eastern Inner Corridor
Greenhouse Gases	Inner Corridors	Outer Corridors
Landscape	Eastern Corridors SC2, WL9, WL11, NC1, NC4	Western Corridors
Townscape	Do-Something	Do-Nothing
Heritage of Historic Resources	SC2, WL4, WL9, WL11, NC1, NC4	No Least Favoured Option
Biodiversity	Western Outer Corridor, SC2, NC4, WL9, WL11	Eastern Inner Corridor
Water Environment	Western Outer Corridor, NC3, SC2	Eastern Inner and Outer Corridors
Physical Fitness	Eastern Outer Corridor SC2, NC1, NC3	Western Outer Corridor (WL9-WL11)
Journey Ambience	Do-Something	Do-Nothing

Table B13.1 Preferred and least favoured route options based on TAG Sub-Objectives.

B13.1.3 From the data collected for the Study of Options, it appears there is no clear best environmental option as each of the route corridor options performs differently to the different Sub-Objectives. The environmental impact of the proposed relief road options is generally adverse for Noise, Greenhouse Gases, Landscape, Biodiversity, Water Environment and Physical Fitness and beneficial for Townscape, Journey Ambience and Local Air Quality. Table B13.1 is a synthesis of the assessment for the environmental sub-objectives and on balance the western routes are preferred because of the impact of an eastern route on the Lugg, Lugg Meadows, Lugg floodplain and associated habitats and species. This has been established in consultation with Natural England and the Environment Agency. On this basis it has been decided not to proceed with assessment of the eastern routes. Though the Western Inner Corridor is likely to be preferred from a Greenhouse Gas and Journey Ambience view as they provide a shorter route the Western Outer Corridor is likely to be preferable for Biodiversity, Water Environment, Landscape, Heritage of Historic Resources, Air Quality and Noise Objectives. The links around Stretton Sugwas (in particular WL11 and WL12) are likely to create severe severance and an inner route (WL1-WL7) may be preferable because of the community effects of severance.

B13.1.4 We recommend that the environmental assessment is taken forward to Stage 2 which will consist of Scoping of focused route options, rather than the large number of links assessed for the Study of Options, and Simple or Detailed Assessment for the topics as required.

B13.2 ROUTES TO ASSESS AT STAGE 2

B13.2.1 The Stage 1 and Study of Options assessments have indicated that the routes to be assessed at Stage 2 should be routes on the western side of Hereford. An inner and outer western route should be assessed along with the two inner city routes and sustainable transport alternatives identified by Herefordshire's Local Transport Plan 3. The Western Inner Corridor should be based on SC2 – WL1 – WL7 – NC1 – NC4 and the Western Outer Corridor on the routes SC2 – WL9 – W11– NC1 – NC4. Nevertheless it should be considered that the Study of Options has focused on land take type impacts and so does not fully consider traffic type impacts such as air quality and noise through use of these links.

B13.3 CUMULATIVE EFFECTS

B13.3.1 The cumulative effects of the proposal are indicated to be large adverse along the chosen route corridor with combined noise, visual impact, severance and pollution. Intrinsic to the relief road proposal is the increase in traffic, and land take, from the Hereford housing allocation. Nevertheless the traffic modelling will take into account the increase in traffic from the housing and employment allocation as part of the use of the proposed road.

B13.3.2 The Environmental Statement produced at Stage 3 will consider the cumulative effects of other developments. The effects in central Hereford will largely be beneficial as traffic is alleviated from this area.

B13.4 MITIGATION

B13.4.1 Mitigation at the Study of Options stage consists of identifying environmental constraints and choosing alignments and design features that minimise environmental harm. Mitigation at later stages will be required for the chosen route option, including landscaping and visual and acoustic screening, compensation for lost vegetation and habitats, pollution prevention measures for surface runoff, consideration of SUDS, tunnels and green bridges for wildlife and non-vehicular traffic amongst other mitigation. Best environmental practice will be considered in the design. The route options could be promoted to include opportunities for habitat creation and sustainable transport through provision of an associated foot and cycle way. These measures would greatly help to mitigate the environmental impact of the proposed scheme and reduce the adverse impact or create a beneficial impact. The Relief Road scheme mitigation can also provide a valuable opportunity to enhance Green Infrastructure around Hereford.

B13.5 SIGNIFICANCE OF ENVIRONMENTAL EFFECTS

B13.5.1 The environmental effects are likely to be High and the sensitivity of the receptors is High so the impact will be Major Adverse for all route options, prior to mitigation. After mitigation the impacts are likely to be Negligible to High Adverse.

B13.6 FURTHER WORK FOR STAGE 2 ASSESSMENT

B13.6.1 This Options Study is a step towards the Stage 2 Assessment and much of the work done for this study will follow through directly into the final Stage 2 Report. However, a number of additional activities are necessary to ensure the route selection process undertaken within the Stage 2 Report is robust and compliant with the Department for Transport (DfT) guidance. These activities are summarised below:

- a. Traffic modelling of the routes, including the Do-Minimum and Sustainable Transport Packages requires completion for the routes assessed within this report so that they can further inform the recommendation made to date.

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- b. The location of major junctions has been identified within this study. However, the junction type and the design of the junctions has not been considered within this study. Therefore, for the Stage 2 Assessment, junctions require feasibility designs including a strategy for connecting the proposed development sites into the network. These proposals will need to be included within the traffic model if different from the assumptions made to date.
 - c. If the recommendations from this report to not progress with options on the east side of the city are adopted, then more detailed route 'alignment' assessments will be conducted on the western routes at Stage 2. This will avoid abortive environmental survey and traffic modelling costs of full assessment of the eastern options.
 - d. Arrangements for site access should be made to allow for full environmental surveys of proposed routes to be undertaken to inform the final selection of an alignment.
 - e. Assessment of traffic type based environmental impacts; (Noise, Air Quality, Greenhouse Gases, Physical Fitness, Journey Ambience) and updating of land take type impacts with traffic type environmental impacts (Biodiversity, Landscape, Townscape, Water Environment, Heritage).
 - f. A wider consultation to include non-statutory consultees should be considered to inform the final alignment selection.
 - g. It is recommended that the final Stage 2 assessment report includes clear 'scheme specific' objectives set by Herefordshire Council and their delivery partners (in addition to the National DfT Objectives. These objectives will define the requirements of the relief road but also the wider aspirations of the city encompassing growth and sustainable transport objectives

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