



# Environmental Impact Assessment Evaluation for the A4440 Worcester Southern Link Road Phase 4

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## 1. Introduction

Global population continues to grow, as does human consumption, over-exploitation of natural resources and expansion of cities and human infrastructure (Ritchie 2017). Despite global agreements, strategies, and goals, these factors continue to represent an ever-increasing threat to biodiversity and life on earth, with human activities believed to be the main contributor to climate change, the main threat to biodiversity globally (Ganivet 2020). It is therefore vital to protect our natural assets and ecosystems, whilst also advancing human wellbeing, and implementing sustainable development throughout policy and legislation.

Appropriate planning laws and tools, such as Environmental Impact Assessments, when structured, utilised, and implemented properly, are integral to ensuring future developments are progressed in a sustainable way, with no detrimental overall effect on the environment, human or natural. Rishi Sunak, Chancellor of the Exchequer since February 2020, confirmed in March 2020 the UK government remained committed to plans for a £27bn roadbuilding programme, calling it “the largest investment in English strategic roads.” With over 4000 miles of roads pledged to be improved, this report highlights the key role the Environmental Impact Assessment plays as a whole and particularly in the development of road networks and improvements in transport infrastructure in protecting the human and natural environment (Topham 2020).

Milton Friedman is quoted as saying, ‘One of the great mistakes is to judge policies and programs by their intentions rather than their results’ (Bali Swain and Yang-Wallentin 2020). This evaluation of the EIA process and its utilisation in a large-scale road infrastructure scheme in Worcestershire, aims to provide an insight into the workings of EIAs in England.

Furthermore, the steps and considerations within the undertaking of an EIA, such as the production of an Environmental Statement will be considered with specific reference to Phase 4 of the Worcester Southern Link Road.

## 2. The Environmental Impact Assessment Process

### 2.1 EIA Purpose

Governed by the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, the general purpose of an Environmental Impact Assessment (EIA) is to ensure local planning authorities have an appropriate level of detail and understanding of a project’s potential effect on the environment and the significance, likelihood, and scale of any impact to accurately assess, consult, protect the environment, and ultimately decide on the suitability and success of a planning application (UK Government 2017a). This anticipatory, participatory, and systematic tool works to ensure sustainable development and after approval of Directive 85/337/EEC in 1985, was introduced in EU Member States in July 1988 (Barker and Wood 1999), superseded by the Directive 2011/92/EU, amended by 14/52/EU and transposed into UK law in 2017.

### 2.2 EIA Steps

#### 2.2.1 Screening

The Screening process takes place to determine whether a proposal may have a significant effect on the environment and therefore whether an EIA is required, and which steps should follow. Schedule 1 listed projects, consisting generally of large scale potentially very high impact, nationally significant proposals such as airports, power stations, and hazardous material or chemical facilities always require an EIA to be conducted, whereas projects falling into the broader Schedule 2 banding require screening early in the process to consider whether they fall within the EIA remit and require production of an Environmental

Statement (ES). However, an ES can be voluntarily carried out without the need for formal screening opinion prior to application submission.

### **2.2.2 Scoping**

Scoping or an official scoping opinion can be requested from the local planning authority (LPA). On provision of the required information of the proposal, to include land details, nature of the project, and its likely environmental impacts, the LPA can provide this scoping opinion, although there is no right to seek this opinion after a planning application is submitted and no requirement for the applicant to request it (UK Government 2017b). The purpose of scoping is to determine the extent of issues to be considered within the ES and will involve the LPA collaborating with the relevant consultation bodies, such as the Environment Agency, Natural England, or the Marine Management Organisation (UK Government 2017a). The opinion should be relevant, proportionate, and tailored to the specific development and main environmental areas of consideration.

### **2.2.3. Production of Environmental Statement**

When required, the Environmental Statement forms an essential and often substantial part in gaining permission to proceed with a project and should be created by the planning applicant, ensuring that competent experts are fully involved with its preparation, of which statements of their qualifications and subject expertise must be provided with the ES. Considered a core element of the EIA process (Gallardo *et al* 2015), the ES must be accurate and factual and include all significant environmental impacts concerning the development. Not all environmental concerns are necessary to address, however, all main effects on the environment must be considered, along with measures to mitigate any negative outcomes. Significance is a vital part of the EIA as a whole and significant impacts are described as those with the potential to disturb or alter the environment to a measurable degree.

The ES is required to include an overall description of the proposed development, with location, scale, and features, the integral description of potential significant effects on the environment during and post-development, and prevention and mitigation. However, accuracy and effectiveness in determining significance is an area of difficulty (Briggs and Hudson 2013).

Alternative development options are also to be considered and justification for the selected method

and processes, with particular regard to environmental impacts. A non-technical summary (NTS) must also be included with the EIA to provide a general overview of the scheme or project which is easily accessible to the public and non-expert stakeholders. This summary should reference main purposes and reasons for the proposed development, along with environmental impacts, how these will be limited or compensated for and provide the reader with a greater understanding of decision-making processes and timescales. Being an accessible summary of the ES, in effect providing another level of consultation, the NTS is not only important in terms of EIA Directive compliance but also provides one of the final pieces of an effective pre-application engagement process (IEMA 2012).

Compliance with Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 is also essential in production of the EIA which include some of the factors mentioned previously, such as location and description of the development. Further inclusions are cumulative effects of the project as a whole and in relation to existing developments, baseline surveys and information with realistic predictions on how they will be impacted, along with factors specified in Regulation 4 (2), such as air quality and climate, cultural heritage, ecology, biodiversity and nature conservation, landscape and visual impacts and hydrological factors. Once complete, whether structured specifically to official scoping opinion or without this provision, the EIA can be submitted to the LPA for decision-making (UK Government 2017b). The process of the EIA is shown in the diagram in Figure 1.

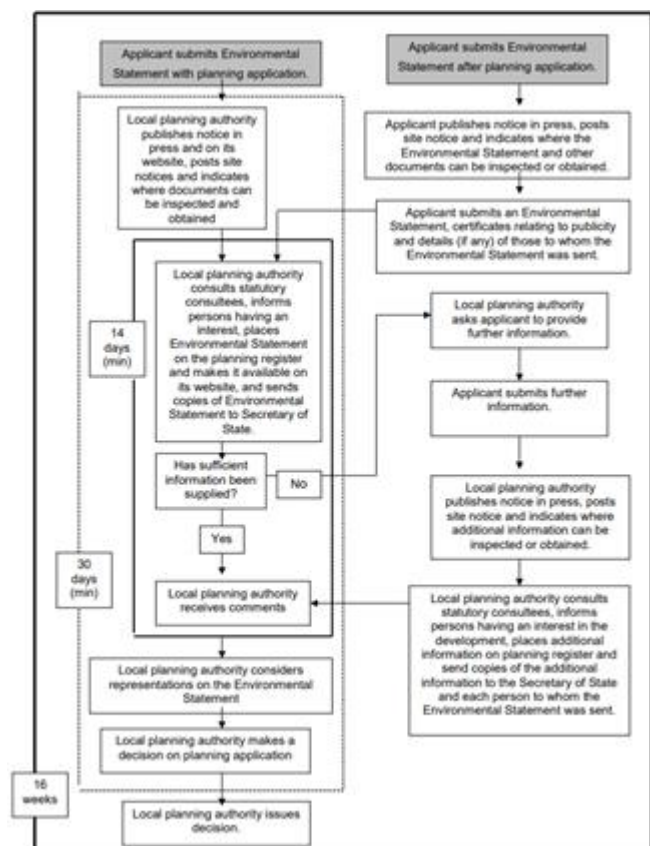


Figure 1. Environmental Statement Process (UK Government 2020)

#### 2.2.4. Submission and Consultation

Submission of a planning application and ES to the LPA should include all usual associated documents, along with the ES, with further copies for the Secretary of State and the consultation bodies, along with a list of other proposed stakeholders to be served copies and those already in receipt, with consultation consider the cornerstone of the EIA process (Graggaber and Pistecsky 2012). Further copies must also be made available to the public, either free of charge or at a cost reflective of printing and distribution costs. Details of where a copy of the ES can be viewed free of charge, where a copy can be obtained, including pricing, a website where documents are available and a final date all representations regarding the application should be received by the LPA, all need to be provided.

#### 2.2.5. Assessment and Decision Making

Where an EIA is required, the adequacy of the information within the submission is considered, along with the consultation process, required publicity stipulations followed and finalising a reasoned conclusion of the significant effects on the environment from the project. Further information can be requested by the LPA if insufficient detail is provided and must, unless otherwise agreed in writing, provide a decision on planning permission within sixteen weeks

of receipt of the completed planning application and ES. Figure 2. Shows results from a questionnaire following the completion of the EIA process, representing its benefit for raising awareness of environmental issues.

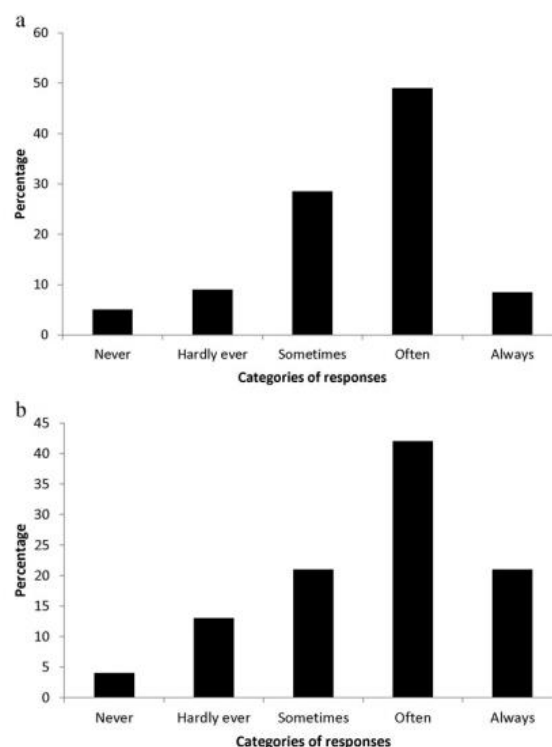


Figure 2. EIA effect in increasing environmental Awareness (Jha-Thakur and Fischer 2016)

#### 2.2.6. Mitigation and Monitoring

Monitoring measures may be imposed by the LPA in deemed appropriate, with the use of existing arrangements of regulatory regimes used if possible. Monitoring must be specific to the project as opposed to general data gathering and is particularly relevant for monitoring mitigation measures identified within the ES. Mitigation measures can be instructed through planning conditions and obligations and enforced by the LPA. However, this is thought to be a continually poor element of many EIAs, with current emphasis on pre-decision analysis and insufficient post-planning follow-up, the EIA process is falling short on its purpose and duty (Jha-Thakur and Fischer 2016).

### 3. Case Study - Worcester Southern Link Road Phase 4 - A4440

Worcestershire County Council's (WCC) proposed dualling of the Worcester Southern Link Road and its statutory Environmental Impact Assessment are the focus for this case study. The Temeside Way section of the A4440 between the Ketch and Powick Roundabouts, south of the city of Worcester has been planned, granted planning permission, and is currently

under construction. This section of the scheme consists of widening of the existing road in part and constructing parallel bridges alongside the existing structures of Powick Common Viaduct and Carrington Bridge, with the new roadway providing two lanes for westbound traffic and the original single carriageway acting as the eastbound carriageway.

Intended to significantly reduce congestion, delays, and pollution for vehicular traffic on this bypass route, linking the M5 motorway, Hereford, Ledbury, the Malvern Hills Area of Outstanding Natural Beauty (AONB), and routes into Wales. Provision of this additional capacity is also stated as being a benefit to Worcester, lessening the demand on city centre through roads, improving traffic flow, creating local socioeconomic benefits for businesses, shoppers, and residents, and leading to less pollution within the city itself (WCC 2017a). Figure 3. Below, shows the location of the proposed Phase 4 and previous Phases.

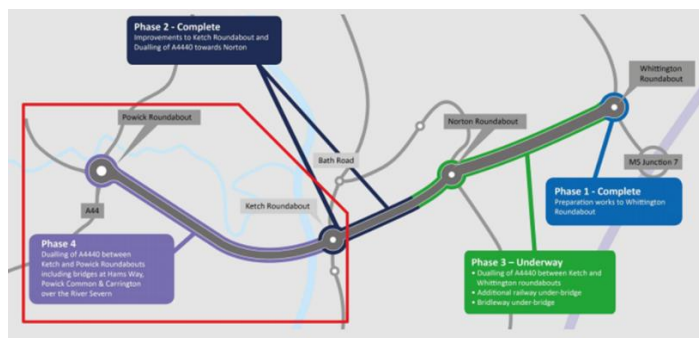


Figure 3. Development Phase Map (WCC 2017b)

Phase 4 follows on from Whittington Junction improvements during Phase 1, Ketch Junction improvements and dualling of 600m of road at Norton Roundabout, completed in 2013 and 2015 respectively and Phase 3 with Norton Roundabout works and further dualling between Whittington and Ketch junctions. The latest of which, Phase 3, was due for completion by the end of 2018, although work continues here in 2021, causing severe delays at peak times.

After consultation with the LPA, production of what is described as a voluntary Environmental Statement was undertaken by Griffiths Civil Engineering and Construction Ltd on behalf of Worcestershire County Council in October 2017, without Scoping Opinion, preferring to privately address scoping through collaboration between CH2M, WCC and statutory bodies, with Screening Opinion also conducted by WCC. Categorised as Schedule 2, the proposal was required to produce an ES, in part due to its immediate adjacency to the River Teme Site of Special Scientific

Interest (SSSI). The ES was prepared in accordance with the Town & Country Planning (Environmental Impact Assessment) Regulations 2011 (SI No 1824), rather than the 2017 Regulations, which had come into force earlier in May of 2017, as the proposals were part of the existing scheme, developed prior to the change in regulations (WCC 2017b).

The scheme area totalling 41 hectares, building across a 40-metre span of the River Sever, designated a Local Wildlife Site (LWS), into the Powick Conservation area, abutting the Registered Battlefield of Powick Bridge 1642 and the Battle of Worcester 1651, and alongside the Scheduled Monument of Old Powick Bridge, on a floodplain near the confluence of the River Teme SSSI and River Sever, with water meadows and other features of ecological and archaeological importance, the potential for significant effect on the environment was and is substantial.

This final stage of the scheme was originally planned for completion in 2021, however with adverse a weather, a particularly active floodplain and the COVID-19 pandemic as contributing factors, the aim has been adjusted for a Spring 2022 conclusion to the project (WCC 2021a).

### 3.1 Consultation and Alternatives

A series of stakeholder engagement meetings were undertaken prior to scoping, to aid this process in identifying the proposed scope of the project overall. In addition to this the Griffiths Team held an Environmental Liaison Group meeting with statutory bodies, who were consulted throughout the planning stages and creation of the ES. A summary of the key issues identified are:

- Protection of the River Teme SSSI from pollution during construction and run-off during operations
- Views of the site from sensitive receptors, the Malvern Hills AONB and the viewpoint at the Ketch Roundabout
- Location of relocated Ketch viewpoint
- General construction impacts and traffic management
- Potential impacts related to air quality
- Impacts on the registered Battlefield to the north
- Flooding and flood compensation
- Design of Hams Way Cycle and Footbridge
- Width of shared cycleway/footpath and
- Drainage of the site

With the scope considered, alternative approaches to the scheme were also examined, mainly consisting of scaled down versions of the dualling improvements, focussing on various areas along the Phase 4 route. None of these alternatives were deemed appropriate to sufficiently address the traffic density issues and therefore increase the usability and desirability of the route to public and other stakeholders. This subject is a long-running cause for concern within the EIA process with neglect or limited consideration of genuine alternatives (Cashmore, Bond, and Cobb 2007).

### 3.2 Air Quality and Climate

An atmosphere dispersion model was utilised, verified against the affected road network, and used to estimate the potential impacts on air quality for the life of the scheme. There were negligible negative impacts at 7 receptor sites, with a noted possible generation of dust during construction processes, likely to cause nuisances such as surface discolouration, if left unmanaged. However, implementation of best practice standards are proposed to mitigate this dust through water suppression.

No new exceedance of NO<sub>2</sub> was measured at any receptors. Furthermore, with 50 receptors showing significant beneficial results linked directly from the project, particularly notable within Worcester city centre, it is foreseen that the overall impact of the scheme has a net positive impact on air quality in across Worcester and the surrounding area.

### 3.3 Cultural Heritage

Phase 4 of the development occupies an area demanding far more stringent consideration regarding cultural heritage preservation of international and local historical importance than the previous three phases of this development. Cultural heritage consideration within ESs has improved since the inception of the EIA framework and there are numerous elements of this heritage within this project area (Lindblom 2012). These range from paleochannels, Mesolithic flint knapping, an Iron Age enclosure, and Roman archaeology, to a registered civil war battlefield, a scheduled monument, listed buildings, Second World War features, and heritage conservation areas (Heritage Environments Record 2021).

Already deemed to have been impacted by the original construction of the road in 1983, this expansion of the road to dual carriageway offers a further threat to Heritage England registered battlefield. The battlefield in question was the site of both, the first and last battles of the civil war in 1942 and 1651, respectively.

This section of the River Severn, near its confluence with the River Teme is where 'Cromwell had with much celerity finisht his bridge of boats and plancks over the main river, without any considerable opposition, whereby he might communicate with those of his party at Powick bridge, and was the first Man that led the rest over, and then went back himself and rais'd a Battery of great guns against the Fort-royal on the Southside the City.' (Blount 1660)

The main and protected battlefield area lies directly along the northern boundary of the development, with the new construction taking place on the south side of the previously built bridge and road, thus limiting the disturbance to all but the wider unprotected, undesignated reaches of the accepted battlegrounds. Within the ES Technical Assessment Report, the excavation works for the additional road structure is seen as a positive opportunity to further understand and uncover archaeological features in the area, through ongoing monitoring of possible finds during construction.

Using the Significance of Effects Matrix from the Design Manual for Road and Bridges (DMRB 2007), version now withdrawn and superseded, despite the battlefield designated high importance, negligible magnitude of impact has been foreseen. This view was in part, resultant from six trial trenches dug to a depth of 2.5m, investigating the alluvial landscape of the floodplain, focussed on visible features present in cartographic sources and general perceived battlefield landscape and using optically stimulated luminescence (OSL) attempting to establish the likely 17<sup>th</sup> century horizon. The conclusion from limited findings suggested either minimal presence of items of archaeological interest within the project boundary or regular flood movement of organic material resulting in increased depth of floodplain deposits, causing the original battlefield horizon to be deeper than proposed construction ground disturbance.

Negligible impact was foreseen regarding the Grade I Listed Building and Scheduled Monument of Powick Old Bridge, which played an important part in both battles, nor on the Grade II Listed Powick New Bridge and Powick Mills Hydro-electric plant. All of these features lie on the edge of the proposed extent of the site and were deemed to suffer little direct impact other than some increased traffic across the New Bridge during the construction phase. Non-designated assets present include prehistoric finds and Second World War aircraft landing obstacles, all of which are seen as likely to be directly impacted by the dualling of

the road, multi-access footbridge and enabling works. The probable negative impacts are stated in the ES as possible to limit with appropriate mitigation, although no examples or commitment to completing these is mentioned.

Similarly, towards the eastern end of Phase 4 is believed to be the existence of a Roman road running between Gloucester and Worcester, which although deemed worthy of 'properly' investigating, no such pledge to do so is present within the ES. On this evidence, numerous archaeological features, including the wider farming landscape recorded as such in the area, with records of which dating back to at least 1648 (Historic Landscape Characterisation 2021) and the internationally important battlefields, have all been considered, although in some cases, through classification of importance, to some extent disregarded.

### 3.4 Ecology and Nature Conservation

Faunal surveys of the overall site area have been undertaken, focused on protected species and those considered at most significant risk. These included bat transect and static monitoring surveys, revealing the presence of a number of bat species including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Brandt's (*Myotis brandtii*), Daubenton's (*Myotis daubentonii*), Natterer's (*Myotis nattereri*), noctule (*Nyctalus noctula*), lesser horseshoe (*Rhinolophus hipposideros*), and barbastelle (*Barbastella barbastellus*). The vast majority of bat activity was recorded along the Severn River corridor, including the Carrington Bridge with significantly less activity across the rest of the site, due to the exposed nature of the topography and limited roosting opportunities. However, one tree containing a bat roost was specified for felling, necessitating licensing from Natural England, with the presence of a licenced bat expert, using felling methods aimed at avoiding bat injuries or mortalities, with mitigation provision in the form of bat boxes.

Further surveys of water voles (*Arvicola amphibious*) protected under Schedule 5 of the WCA and dormice (*Muscardinus avellanarius*) protected by both the Conservation of Habitats and Species Regulations 2010 8.22 and the Wildlife and Countryside Act 1981 found no specimens of the former locally and limited to no suitable habitat given the scale of the river channels and propensity for flooding, with only one individual of the latter 1.5km south of the development. Otter (*Lutra lutra*) activity was also surveyed for, revealing

limited activity locally and no presence of holts within or near to the site boundaries.

Conversely, badger (*Meles meles*) details provided by Worcester Biological Records Centre (WBRC) showed numerous recordings of badgers across the site, with five known setts present within the extent of the site. A further licence to be acquired through Natural England would be required to evict the badgers in one sett outside of the main breeding season, with the hope of relocation to a linked annex sett nearby. To mitigate this disturbance, an artificial badger sett was proposed for completion six-months prior to exclusion.

A further broad span of surveys were carried out by ecologists for birds, reptiles, fish, and invertebrates with a variety of designated values within the local and wider area, with UK based EIA specialists and ES production teams thought to cover a broader spread considerations and have a greater expertise in comparison to those in Italy, enabling a more effective implementation of holistic methodologies (Bassi *et al* 2012). Though this may be the case, there is still concern that specific attention is paid only to endangered, protected species, leaving vulnerable species at greater risk of unseen or unforeseen impact (Simmonds *et al* 2020).

Invasive species have also been considered with the presence of Himalayan Balsam (*Impatiens glandulifera*) along stretches of the River Severn, liable to be disturbed and therefore spread by construction work, with limited or no mitigation in place, regardless of non-native invasive species (INNS) posing one of the main threats to global biodiversity (Roy *et al* 2019). Despite this, there has been appreciable investment in ecological surveying to determine impacts to wildlife and the local natural environment detailed within the ES, with all detrimental impacts on local ecology other than residual impact of increased air pollutants on the River Teme SSSI reportedly, although arguably, avoided, mitigated, or compensated for.

One such form of mitigation described is due to the loss of a mature oak tree, to be replaced with new planting, with the impact described as remaining significant until the oaks planted have matured. An oak tree is not considered mature until it is 150 years old, thus rendering this form of mitigation insufficient at best, for the next 150 years. The increased number of trees would eventually provide a larger surface area of habitat, however mature and ancient oak provide habitat for a significantly broader range of hundreds of invertebrates and birds and food in the form of acorns

for mammals (Woodland Trust 2020). However, dependent on measurements used, an increased number of oak saplings could be perceived as net-gain despite a genuine net-loss. In over 100 countries no net loss biodiversity policy is being developed or implemented, with the UK having gone further, with net gain a recent development. Compensatory methods or 'cure' has been shown to potentially rival prevention whilst proving more economically viable, however, without appropriate measures and controls, over reliance on this could prove foolhardy (Bull, Milner-Gulland, and Müller 2020).

Another compensatory effort stipulated within the ES is a Flood Compensation Area, providing additional wetland habitat near sites of historical water meadows. The design of which, will be driven by the project ecologist, in collaboration with the County Ecologist and Worcestershire Wildlife Trust.

The production of a Construction Environmental Management Plan is put forward to provide detailed mitigation measures for the project, to control impacts on high nature conservation value species and habitat. This, along with Local Environmental Management Plan (LEMP) aim to monitor the effectiveness of mitigation methods, establishing a commitment to implementing all agreed mitigation set through planning conditions.

Subject to implementing all proposed mitigation measures, the ES states the overall project can be completed in accordance with the relevant legislation, planning policy and biodiversity targets, and achieve 'net gain' for biodiversity.

Figure 4. Habitat Loss/Gain for the scheme (WCC 2017b)

| Habitat Type                                    | Original (m <sup>2</sup> ) | Retained (m <sup>2</sup> ) | New (m <sup>2</sup> ) | Total (m <sup>2</sup> ) | Net Gain/Loss (m <sup>2</sup> ) |
|-------------------------------------------------|----------------------------|----------------------------|-----------------------|-------------------------|---------------------------------|
| Total woodland/scrub                            | 31549                      | 17569                      | 13878                 | 31447                   | -102                            |
| SI Grassland/tall ruderal                       | 27251                      | 16498                      | 3943                  | 20441                   | -6810                           |
| Wetland creation within Flood Compensation Area | 0                          | 0                          | 44910                 | 44910                   | 44910                           |
| <b>Net Gain</b>                                 |                            |                            |                       |                         | <b>37998</b>                    |

Due to the development needing to comply with Town & Country Planning (Environmental Impact Assessment) Regulations 2011 (SI No 1824), as opposed to The Town and Country Planning (Environmental Impact Assessment) Regulations 2017, the project only requires a no net loss outcome for biodiversity. However, the ES states an aim and expectation of achieving biodiversity net gain, claiming replacement habitats would be larger in scale and more species-rich than lost habitats. Figure 4. taken from the ES shows a loss of both woodland and

grassland habitats, whilst compensating with a large gain in wetland habitat, likely to be disturbed by regular flood events and unrelated in habitat type to those lost. Provision of substantially different habitat types as compensation for others could be a worrying sign for future developments and counteract the positive step forward in policy from no net loss or net neutral to biodiversity net gain. Further consideration of ecological impacts require improvement and clarification to generate positive outcomes and could include improved guidelines for spatial and temporal delimitation and establishing a quantitative framework with selective methods and accurate threshold values to assess the trade-offs between development and biodiversity (Karlson, Mörtberg, and Balfors 2014).

### 3.5 Landscape and Visual Impacts

Landscape and visual factors presented as focal elements in the location of the project are the Registered Battlefield, of which a portion is to be lost, mature trees, established hedgerows, and a Battlefield viewpoint are also set to disappear during construction. Improved planting schemes are said to provide improved biodiversity in the future and return to a similar recognisable visual standard in approximately 15 years. As previously mentioned under Ecology and Nature Conservation, the addition of wetland habitat south of the dualling construction, will offer new and varied habitat, although altered as a landscape feature visual and ecologically.

Public rights of way are portrayed as slight beneficiaries through an additional footbridge giving previously unseen views of the River Teme's course and potential improvements in interpretation signage, although this is not a promised provision in the ES. The Ketch viewpoint, with far reaching views across the floodplain, to the Malvern Hills, and across the Battle of Worcester Registered Battlefield is to be removed and replaced. The new placement at time of application had not been decided, though artistic visualisations of the proposed replacement area now exist (WCC 2021b). However, with proposed doubling in size of the road and the newly constructed structure, the view across the Battlefield is greatly altered, with losses in vegetation and development related infrastructure present albeit temporarily. Overall, the landscape would be irreversibly changed, although the detrimental impact is considered slight by the developer.

### 3.6 Water and Environment

Water Framework Directive (WFD) waterbodies located within the site include River Severn (medium value), River Teme (high value), and Careys Brook (medium value). The River Teme is a SSSI and therefore a protected area for conservation, giving rise to its high value as a water receptor. Much of Phase 4 is located on the River Severn floodplain, which sees regular and dramatic flood events. Other features within the immediate locality are several ponds, drains and the Worcester Middle Severn - Mercia Mudstone aquifer, however there are no groundwater Source Protection Zones (SPZ) present.

A Flood Risk Assessment (FRA) and drainage strategy has been produced for the Scheme, which includes detailed hydraulic modelling of the Scheme and quantitative impact assessment, demonstrating that the development would pass the exception test as per the requirements of the National Planning Policy Framework 13.28. Drainage design in line with Ciria SuDS Manual C753 (Ciria 2015) guidance for the 1 in 100 year plus 40% climate change scenario has been produced.

An identified failure for routine from the road, affecting water quality is into Careys Brook for soluble pollutants, sediments, and annual average copper concentrations vs. the generic EQS. Mitigation in the form of a vortex separator and filter drains has been proposed, resulting in a non-significant impact, although not fully eradicating the issue. Furthermore, spillage assessments are not thought to pose unacceptable risk.

With drainage designed to avoid discharge into the River Teme SSSI and best construction practice, the scheme overall is considered to have neutral effect on the water features present, even during heightened risk periods of construction through possible sediment disturbance and pollution from cement, fuel, and other materials necessary during the building phase. Moreover, with the compensatory water volume additions and adherence to mitigation and design efforts, the scheme is adjudged to pose no significant residual effects upon the water environment. Mitigation measures proposed are often thought to result minor significant positives, more ticking a box than producing genuine efficacy, although the hope is, in this case that the efforts are appropriate and successful (Barker and Wood 1999).

### 3.7 Cumulative Effects

Using the DMRB Vol. 11, Section 2, Part 5 (HA 205/08)16.1 which outlines the approach to assessing cumulative impacts for road schemes. Both cumulative impacts from a single project and separate projects were considered at a pre-application meeting with WCC on 10<sup>th</sup> May 2017, to produce a list of relevant single impacts and other developments within the area which may contributed to cumulative effects. Most of these were housing developments and cumulative impacts were generally considered to be slightly adverse in nature in terms of noise and visual impacts during construction phases.

The ES also considers:

- Ground Conditions and Contamination
- Materials and Waste
- Noise and Vibration
- People and Communities
- Transport Movement and Access

This broad range of considered environmental areas detailed within the ES contribute to the need for the EIA process to continue evolving, particularly with increasing occurrence of unexpected events, whether flood, pandemic or other, higher pressure for efficiency, and mitigation amidst resource scarcity and increased ecosystem pressures (Retief *et al* 2016).

### 4. Conclusion

The Environmental Impact Assessment provides a structured framework to aid the protection of the environment from the early stages of the planning process, with the Environmental Statement at its core. If used effectively the EIA is a key tool in achieving sustainable development for the future. However, the process must continue to evolve to cope with new pressures and improve outcomes for a changing human and natural environment.

The Worcestershire County Council Worcester Southern Link Road case study helps to show the direction of progress towards completing an ES, along with potential flaws in the process, given some areas are open to flexibility and subjectivity. With the ES having been produced by a county council, it can be expected that the document could be presented as an exemplar of such a document, due to the experience and expertise generally considered to be available within a government department. The published ES is extensive nature with consideration of a broad range of factors and features, although it is by no means perfect.

Through the determination of levels of impact and importance, there is a level of tolerance and flexibility shown, favouring the development's needs over those of the environment. Mitigation and compensation measures could be seen in some areas to be insufficient or disparate from the potential harm to species and habitats. Only through improving the measurement of the recently adjusted net benefit to biodiversity within the regulations, can an accurate and appropriate reparation from developments be realised.

Disparity between EIA processes are evident across countries but also across planning authorities. Further research into this would provide insight into how different approaches are nationally and internationally and potentially provide suggestions for collaborative efforts to improve EIA implementation. For example, limited post-planning monitoring and audits could lead to developments making bold statements without genuine substance, with the environment suffering the consequences, however, novel, or longer-term strategies may be in place in some localities, which others could learn from.

EIAs perform a hugely valuable role in the preservation of the environment, and they have been developed and been enhanced within the UK and globally, since their initial conception. However, further improvements can be made, and a flexible innovative approach is called for, whilst retaining accountability and a clear structure in a key time for the natural world and human impact upon it.

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